



3rd INTERNATIONAL CONFERENCE ON COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES - (CMES-2018)

04-06 May 2018, Girne, CYPRUS

(Turkish Republic of Northern Cyprus)

ABSTRACT BOOK



THE THIRD INTERNATIONAL CONFERENCE ON COMPUTATIONAL MATHEMATICS AND ENGINEERING SCIENCES (CMES-2018), GIRNE, 04-06 MAY 2018

The **Third International Conference on Computational Mathematics and Engineering Sciences (CMES-2018)** will be held in Final International University from **May 4 to 6, 2018 in Girne, Cyprus**. It provides an ideal academic platform for researchers and professionals to discuss recent developments in both theoretical, applied mathematics and engineering sciences. This event also aims to initiate interactions among researchers in the field of computational mathematics and their applications in science and engineering, to present recent developments in these areas, and to share the computational experiences of our invited speakers and participants.

Organizing Committee

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MESSAGE FROM THE GENERAL CHAIRS



Dear Conference Attendees,

We would like to welcome you to the **3rd International Conference on Computational Mathematics and Engineering Sciences (CMES-2018)** in Girne, Cyprus. This year, the conference includes 400 extended abstracts, out of 400 submissions received in response to the call for papers, selected by the Program Committee. The program features keynote talks by distinguished speakers such as Abdon Atangana from Free State University, Mourad E. H. Ismail from University of Central Florida Orlando, FL, USA, Şeref Mirasyedioğlu from Başkent University, Turkey, Etibar Penahlı from Bakû State University, Bakû, Azerbaijan, Jose Francisco Gomez Aquilar from Tecnologica Nacional de Mexico, Mexico, Carlo Cattani from Tuscia University, Italy, Vatan Karakaya from Ahi Evran University, Kırsehir, Turkey, İsmail Yüksek from Antalya Bilim University, Antalya, Turkey, Khalil Ezzinbi from Cadi Ayyad University Marrakesh. The conference also comprises contributed sessions, posters sessions and research highlights.

We would like to thank the Program Committee members and external reviewers for volunteering their time to review and discuss submitted abstracts. We would like to extend special thanks to the Honorary, Scientific and Organizing Committees for their efforts in making CMES-2018 a successful event. We would like to thank all of the authors for presenting their research studies during conference. We hope that you will find CMES-2018 interesting and intellectually stimulating, and that you will enjoy meeting and interacting with researchers around the world.

Hasan Bulut, Firat University Elazig, Turkey.

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PROCEEDINGS

Extended abstracts will be published in some Special Volumes of famous journals. Procedure, Guidelines and Checklist for the preparation and submission of a paper for the Proceedings of CMES-2018 can be found in the journals websites. The journals in which selected and peer-reviewed full papers of CMES-2018 will be published are follows:

1. ITM Web of Conferences, (Web of Science, SCI-E)
(Editor in Chief: Prof. Isaline AUGUSTO)
<http://www.itm-conferences.org/>

2. Journal of Inequalities and Special Functions (E-SCI)
<http://www.ilirias.com/jiasf/>

3. Journal of Mathematical Analysis (E-SCI)
<http://www.ilirias.com/jma/>

4. Bulletin of Mathematical Analysis and Applications (E-SCI)
<https://www.emis.de/journals/BMAA/>

5. Gümüşhane Üniversitesi Fen Bilimleri Enstitüsü Dergisi (ULAKBİM)
<http://dergipark.gov.tr/gumusfenbil>

6. An International Journal of Optimization and Control: Theories & Applications (IJOCTA) (ULAKBİM)
(Editor in Chief: Prof. Ramazan YAMAN)
(Editor in Field : Prof. Necati OZDEMIR)
<http://ijocta.balikesir.edu.tr/index.php/files>

7. Non. Sci. Letters A, (It will be submitted for possible inclusion in SCI)
(Editor in Chief: Prof. Ji-Huan HE)
http://www.nonlinearscience.com/journal_2076-2275.php

8. Mathematics in Natural Science (MNS)
(Editor in Chief: Prof. Abdon ATANGANA)
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9. Journal of Modern Technology and Engineering
(Editor in Chief: Prof. Mutallimov Mutallim)
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10. Mathematics in Engineering, Science and Aerospace (MESA)
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<http://nonlinearstudies.com/index.php/mes>



PLENARY SPEAKER TALKS



MATHEMATICS AS A LANGUAGE OF MIND

Vatan KARAKAYA^{1,2} Derya SEKMAN

¹Department of Mathematics, Ahi Evran University, Kirsehir, Turkey

²Department of Mathematical Engineering, Yıldız Technical University, Istanbul, Turkey

vkkaya@yahoo.com, deryasekman@gmail.com

Abstract

In this study, the emphasis will be placed on the importance of mathematical thinking in our lives and our world of thought. It is to be argued that the real life involving of objects, as stated in Ibn Sina's "Kitabu's Şifa Metaphysic" book, is rough and that the delicacy of the relations between these objects can only be understood by reason, in other words, these relations can be explained by the mathematical notions that language of mind. However, it will be evaluated the contributions making development of our scientific knowledge of the logicism, intuitionism and symbolism, which are phases in the historical development of the mathematical thinking. Each of these scientific trends will be briefly mentioned about contributions making the development of the thinking. It will also be argued that the distinction of mathematics with symbolism leads to the stagnation of mathematics or mathematical thought at the same time. Later, the contributions of mathematical studies in the development of the thinking will be explained with examples from the history of mathematics and emphasis will be given to the mistakes of some approaches in mathematics teaching of the present educational system.

Keywords: Mind and logic; Mathematics and real life; Logicism, intuitionism and symbolism

REFERENCES

1. İbni Sina, Kitabu's Şifa Metaphysics, Litera Publishing, Istanbul, 2017.
2. Karl Popper, The Logic of Scientific Discovery, Taylor & Francis, 2002.
3. Thomas S. Kuhn, The Structure of Scientific Revolutions, The University of Chicago Press, 2012.



A NEW PERSPECTIVE ON THE COOPERATION BETWEEN UNIVERSITIES AND INDUSTRY: REFLECTIONS OF INDUSTRY 4.0 ON HIGH EDUCATION

Ismail Yuksek¹

¹Antalya Bilim University, Antalya, Turkey

rector@antalya.edu.tr

Abstract

Industry 4.0 is regarded as more than just a basic challenge for mankind. It is a new concept of the industry in which computers and automation will come together in entirely new way, with robotics connected remotely to computer systems that can learned and control the robotics with very little input and effort from human operators. The new and challenging way of industry has not only changed of itself but also the other sectors such as education, especially high education. The concept of Industry 4.0 brings quite significant innovation in terms of both the industry and the university. Today, the industry, because of the need of qualitative force work, is largely in collaboration with universities, and the universities are in collaboration with the industry to catch up with future technologies. This case makes universities reconsider their curriculum, practical implications, collaboration with industry, research fields and students competences.

Keywords: Industry 4.0, High Education, Research, Cooperation.

REFERENCES

1. Rojko, A. (2017). Industry 4.0 Concept: Background and Overview. *International Journal of Interactive Mobile technologies*, Vol. 11(5), 77-90.
2. Wallner, T. & Wagner, G. *Academic Education 4.0*. International Conference on Education and New Developments. Ljubljana, Slovenia, 12-14 of June, 2016.
3. Baygin, M., Yetis, H., Karakose, M., & Akin, E. *An Effect Analysis of Industry 4.0 to Higher Education*. 15th International Conference on Information Technology Based Higher Education and Training. Istanbul, Turkey, 8-10 September of 2016.
4. S. Jeschke, "Engineering Education for Industry 4.0: Challenges, Chances, Opportunities," World Engineering Education Forum, 2015.



REDUCTION OF COMPLEXITY FOR PARTIAL FUNCTIONAL DIFFERENTIAL EQUATIONS AND APPLICATIONS: NEW RESULTS AND OPEN PROBLEMS

Khalil Ezzinbi

¹Cadi Ayad University, Marrakesh, MOROCCO

ezzinbi@gmail.com

Abstract

The aim of this work is to study the existence of a center manifold for some semilinear partial functional differential equations in fading memory spaces. We assume that the unbounded linear part of the equation satisfies the Hille-Yosida condition. The existence of the centre manifold is obtained, under sufficiently small nonlinearity, as the graph of a fixed point for an integral operator given by a variation-of-constants formula. We use a new reduction principle to prove that the flow on the center manifold is completely determined by an ordinary differential equation in a finite dimensional space. When the nonlinear perturbation is only locally Lipschitzian, we obtain the existence of a local center manifold. As application, we provide many applications for the existence of almost periodic solutions and almost automorphic solutions. Also applications are provided for the stability in critical cases.

Keywords: Partial differential equations, infinite delay, Hille-Yosida operator, integral solution, semigroup, variation-of-constants formula, fading memory space, center manifold, reduction principle.

REFERENCES

- [1] Kpoumiè, M. E. K., Ezzinbi, K., & Békollè, D. (2018), Periodic Solutions for Some Nondensely Nonautonomous Partial Functional Differential Equations in Fading Memory Spaces. *Differential Equations and Dynamical Systems*, 26(1-3), 177-197.
- [2] Diao, B., Ezzinbi, K., & Sy, M. (2018). Existence, Global Continuation and Regularity in the $\|\cdot\|_\alpha$ -Norm for Some Partial Functional Integrodifferential Equations with Infinite Delay. *Differential Equations and Dynamical Systems*, 26(1-3), 37-55.



INVITED SPEAKER TALKS



SINC-FRACTIONAL DERIVATIVE AND SHANNON WAVELETS

Carlo Cattani

Tuscia University, Viterbo, ITALY

cattani@unitus.it

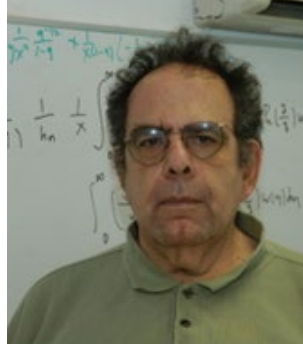
Abstract

Sinc fractional derivative is a fractional order operator which enable to easily compute the derivative of functions belonging to the Hilbert space defined by Shannon wavelets. By combining this operator with the Shannon wavelet representation it is possible to express these derivatives by some suitable series. These series will be used to solve some differential problems.

Keywords: Fractional operator, Shannon wavelet, sinc-function.

REFERENCES

1. C.Cattani, Shannon wavelets theory, Mathematical Problems in Engineering, Volume 2008 (2008), Article ID 164808, 24 pages
2. C.Cattani, Shannon Wavelets for the solution of Integrodifferential Equations, Mathematical Problems in Engineering, Volume 2010, Article ID 408418, 22 pages
3. C.Cattani, Fractional Calculus and Shannon Wavelets, Mathematical Problems in Engineering, Volume 2012 (2012), Article ID 502812, 26 pages
4. C.Cattani, Local Fractional Calculus on Shannon wavelet basis, in Fractional Dynamics,
5. C.Cattani, H.Srivastava, X-J. Yang (Eds), de Gruyter, (2016), pp. 6-30,



q- SERIES A BRIDGE BETWEEN ANALYSIS AND DISCRETE MATHEMATICS

Mourad E. H. Ismail

Department of Mathematics, University of Central Florida, Orlando, FL, USA
mourad.eh.ismail@gmail.com

Abstract

We discuss the connection between partitions and allied areas of combinatorics and the q -series identities. We shall illustrate this interaction by several examples.

Keywords: q-series identities; Partitions; Discrete Mathematics

REFERENCES

1. G. E. Andrews, Applications of basic hypergeometric functions. SIAM Rev. 16, 441-484, 1974.
2. G. Andrews, The Theory of Partitions, Addison-Wesley, Reading, Massachusetts, 1976, reissued by Cambridge University Press, Cambridge, 1998.
3. G. E. Andrews and M. E. H. Ismail, in preparation.
4. K. Garrett, M. E. H. Ismail, and D. Stanton Variants on the Rogers-Ramanujan identities, joint with, Advances in Applied Math. 23, 274-299, 1999.
5. M. D. Hirschhorn, A simple proof of Jacobi's two-square theorem, Amer. Math. Monthly 92, no. 8, 579-580, 1985.



λ - ALMOST CONVERGENCE AND SOME SEQUENCE SPACES

Ekrem SAVAS

Uşak University, Uşak, Turkey

ekrem.savas@usak.edu.tr

Abstract

In this article, we study some new sequence spaces which naturally emerge from the concept of λ -almost convergence. Just as almost, absolutely almost and strongly almost summability, it is expected that λ -almost convergence must give rise to λ -almost, absolutely λ -almost and strongly λ -almost summability. The goal of this paper is to introduce the spaces of strongly λ -almost summability sequences. Some topological results has been discussed.

Keywords: almost convergence, λ -almost convergence; topological properties, paranormed spaces.

REFERENCES

1. I.J. Maddox, Spaces of strongly summable sequences, Quart. J. Math. Oxford Se. (2), 18,345-355.
2. S. Nanda, Some sequence spaces and almost convergence, J. Austral. Math. Soc. 22 (Series A) (1976), 446-455.



NON-LOCAL OPERATORS WITH SINGULAR AND NON-LOCAL KERNEL: THEORY, METHODS AND APPLICATIONS

Abdon Atangana

Institute for Groundwater Studies, University of the Free State, 9300, Bloemfontein, South Africa,
atanganaA@ufs.ac.za

Abstract

The concept of fractional differentiation and integration have captured minds of mankind due to their wider applicability in several fields of science, technology and engineering. Riemann and Liouville introduced the concept with power law kernel. This type imposes singularity to non-singular physical problems and their operators have no crossover properties. Caputo and Fabrizio suggested the concept with non-singular kernel. This new version is local as its associate integral is the average the function and its classical integral and the evolution equation associates to it satisfies the C_0 semi-group principle thus is time memoryless. Atangana and Baleanu suggested those with non-singular and non-local kernel. The Atangana-Baleanu fractional derivative have crossover properties including its waiting time distribution, mean square displacement and density distribution. The new operators captured the Brownian motion at earlier time and the power law for latter time. The derivatives are strong forces as their Atangana-Gomez fractional bracket are non-null.

Keywords: Power law, Mittag-Leffler kernel, exponential decay law, crossover, Markovian and non-Markovian property, Atangana-Gomez bracket.

REFERENCES

1. Atangana A., Dumitru B. "New fractional derivatives with non-local and non-singular kernel: Theory and application to heat transfer model, Thermal Science, Year 2016, Vol. 20, No. 2, pp. 763–769
2. Atangana A., Koca I. (2016). "Chaos in a simple nonlinear system with Atangana–Baleanu derivatives with fractional order, Chaos, Solitons & Fractals, Volume 89, August 2016, Pages 447–454". Chaos, Solitons & Fractals. 89: 447–454.
3. Atangana, Abdon; Bildik, Necdet (2013). "The Use of Fractional Order Derivative to Predict the Groundwater Flow". Mathematical Problems in Engineering. 2013: 1–9.



21ST CENTURY COMPUTATIONAL MATHEMATICS: AN INTERDISCIPLINARY APPROACH OF SCIENCE, TECHNOLOGY AND ENGINEERING

Seref Mirasyedioglu

Faculty of Education, Başkent University, Ankara, Turkey

serefm@baskent.edu.tr

Abstract

In the 21st century, scientific and technological innovations have become increasingly important as we face the benefits and challenges of both globalization and a knowledge-based economy. To succeed in this new information-based and highly technological society, all students need to develop their capabilities in science, technology, engineering, and computational mathematics [2]. The theory of computation [1] has been and still is one of the core areas of applied mathematics. It explores the fundamental capabilities and limitations of models of computation. A model of computation is a mathematical abstraction of a computing system. The most important model of sequential computation studied in computer science is the Turing machine, first proposed by Alan Turing in 1936. Mathematical abstractions called models of computation are at the heart of computation and computational thinking. Computation is a process that is defined in terms of an underlying model of computation and computational thinking is the thought processes involved in formulating problems to which solutions can be represented as computational steps and algorithms.

Keywords: Computational mathematics, Turing Machine, Mathematical abstractions, Interdisciplinary Approach.

REFERENCES

1. Anil Maheshwari, Michiel Smid; Theory of Computing, Carleton University, Ottawa Canada, March 23, 2017.
2. Rui Games Neves, Jorge Cavalho Silra, Victor Duarye Teotra, University Nova, Lisbon, 2016.



SOME INVERSE PROBLEMS OF THE SPECTRAL THEORY FOR THE DIFFERENTIAL OPERATORS

Etibar Penahli

Bakû State University, Bakû, Azerbaijan
epenahov@hotmail.com, epenahov@firat.edu.tr

Abstract

In this talk, merely one of the variants of the inverse problem will be treated and solved. In particular, we shall give the solutions of the inverse problems for the equations with specified singularities. Some questions of the spectral problems having analogous singularities were considered in [1-4], etc. Also in this, in particular, we investigate the transformation operators for differential operators and their properties. In the theory of inverse problems, regular and singular operators of the Sturm-Liouville type, Dirac systems, Diffusion equations etc., and also in scattering theory play an important role, introduced by B. Ya. Levin [4], transformation operators. In particular, on the semi-axis for special types of equations, we construct the transformation operator under the scattering condition.

Keywords: Spectrum, Transformation operator, Scattering theory.

REFERENCES

1. Nanette Levinson, The Inverse Sturm-Liouville problem, Matematisk Tidsskrift B., 25-30, 1949.
2. Z. S. Agranovich, Vladimir Alexandrovich Marchenko, The Inverse Problem of Scattering Theory, Gordon and Breach, New-York, 1963.
3. Boris M. Levitan, Inverse Sturm-Liouville Problems, Utrecht, Netherlands, 1987.
4. Etibar S. Panakhov, Cauchy and Goursat problem for Hiperbolic Equation Second Order Non-continuous Coefficient, Izv. AN Azer. SSR, 1-3, 63-66, 1995.



SYNCHRONIZATION OF CHAOTIC SYSTEMS INVOLVING FRACTIONAL OPERATORS

Jose Francisco Gomez Aquilar

CONACyT-Tecnologico Nacional de Mexico/CENIDET, MEXICO

jgomez@cenidet.edu.mx

Abstract

Fractional order derivatives with Mittag-Leffler kernel are a good option to design state-observers to synchronize chaotic systems. Complete synchronization can be performed with a so-called unidirectional master–slave topology. The master is described by a dynamical system in state-space representation whereas the slave is described by a state observer. This topology has been widely studied because of its potential application in secure communications.

Keywords: Fractional observers; Fractional multi-scrolls attractors; Atangana–Baleanu–Caputo derivative of constant and variable-order; Adams method.

REFERENCES

1. A. Atangana, D. Baleanu. New Fractional Derivatives with Nonlocal and Non-Singular Kernel: Theory and Application to Heat Transfer Model. *ThermSci.* 20(2), (2016), 763-769.
2. A. Atangana, I. Koca. Chaos in a simple nonlinear system with Atangana-Baleanu derivatives with fractional order. *Chaos, Solitons & Fractals*, 89, (2016), 447-454.
3. A. Coronel-Escamilla, J.F. Gómez-Aguilar, M.G. López-López, V.M. Alvarado-Martínez, G.V. Guerrero-Ramírez, Triple pendulum model involving fractional derivatives with different kernels. *Chaos, Solitons & Fractals*, 91, (2016), 248-261.
4. A. Coronel-Escamilla, J.F. Gómez-Aguilar, L. Torres, R.F. Escobar-Jiménez, M. Valtierra-Rodríguez. Synchronization of chaotic systems involving fractional operators of Liouville–Caputo type with variable-order. *Physica A: Statistical Mechanics and its Applications*, 487, (2017), 1-21.

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PENTAGONAL CONE b -METRIC SPACES OVER BANACH ALGEBRAS AND FIXED POINT THEOREMS OF GENERALIZED LIPSCHITZ MAPPINGS

Abba Auwalu¹

¹Department of Mathematics, Near East University, Nicosia -TRNC, Turkey

abba.auwalu@neu.edu.tr, abbaauwalu@yahoo.com

Abstract

In this paper, we introduce the concept of pentagonal cone b -metric space over Banach algebras as a generalization of cone metric space, cone b -metric space, rectangular cone metric space, rectangular cone b -metric space, pentagonal cone metric space and pentagonal cone b -metric space. Furthermore, some fixed point theorems are proved in this space. We provide some examples to elucidate the validity and superiority of our results.

Keywords: Pentagonal cone b -metric space over Banach algebras; c -sequence; contraction mapping; fixed point.

REFERENCES

1. Manoj Garg, Shikha Agarwal, Banach contraction principle on cone pentagonal metric space, Journal of Advanced Studies in Topology, Vol:3, No:1, 12-18, 2012.
2. Abba Auwalu, Banach fixed point theorem in a cone pentagonal metric space, Journal of Advanced Studies in Topology, Vol:7, No:2, 60-67, 2016.
3. Huaping Huang, Stojan Radenovic, Some fixed point results of generalised Lipschitz mappings on cone b -metric spaces over Banach algebras, Journal of Computational Analysis and Applications, Vol:20, No:3, 566-583, 2016.
4. Reny George, Hossam A. Nabwey, R. Rajagopalan, Stojan Radenovic and K.P. Reshma, Rectangular cone b -metric spaces over Banach algebra and contraction principle, Fixed Point Theory and Applications, Vol:2014, No: 14, 2017.

Adsorption of chromium (VI) onto Moroccan clay of Kssabi in aqueous solution: kinetic, thermodynamic and surface properties of suspended particles clay studies

A. RAADA , M. OUHAZZA, A. EL ANSSARI, D. MRANI

*Research team: Chemical Analysis Materials and Environment Department of chemistry,
University, Moulay Ismail, Faculty of Sciences and Techniques, Errachidia
E-mail: raada.aziz@yahoo.fr*

Abstract:

In the environment, chromium exists predominantly in one of two valence states, namely Cr (VI) and Cr (III) forms. It is reported that hexavalent chromium is more toxic than trivalent chromium and more soluble in soil and water. The objective of the present study is to contribute to the removal of hexavalent chrome from aqueous solution by adsorption; the adsorbent used is Ghassoul clay coming from the Kssabi region.

The Experiments were carried out to optimize various experimental parameters such as: initial chromium concentration, pH, temperature, contact time and mass of the adsorbent. The influence of pH on chromium (VI) adsorption was studied at the pH range of 2 to 6. The optimal pH was approximately 2 and the temperature of 298 K was the best fit. The experimental data were well represented by the Langmuir model while the Kinetic analyses showed that the adsorption rates were more accurately represented by a pseudo second-order model. All adsorption processes reached equilibrium in 10minutes. In addition, various thermodynamic parameters, such as Gibbs free energy (ΔG), enthalpy (ΔH) and entropy (ΔS) were calculated. The adsorption process was found to be a spontaneous and exothermic process. The release of the ions by the adsorbent in bi-distilled water was studied by conductivity and pH metric. The point of zero charge (pzc) was also determined.

Keywords: Chromium, Adsorption, Raw Ghassoul, Kinetics, Isotherm, Thermodynamic, pH, Conductivity, Point of zero charge (pzc).

REFERENCES

1. Ad, C., Benalia, M., Laidani, Y., Elmsellem, H., Henini, G., Nouacer, I., & Djedid, M. Kinetics, thermodynamics and equilibrium evaluation of adsorptive removal of iron from aqueous solution onto Algerian biosorbent'LUFFA CYLINDRICA'.
2. Benhammou, A., Yaacoubi, A., Nibou, L., & Tanouti, B. (2007). Chromium (VI) adsorption from aqueous solution onto Moroccan Al-pillared and cationic surfactant stevensite. *Journal of hazardous materials*, 140(1-2), 104-109.

An Alternative Method for the Determination of the Number of Elements of a Given Order in a Direct Product of Two Cyclic Groups

Abdulkadir Datti

Bauchi State University, Gadau

dattiabdulkadir@gmail.com

Abstract

A method for the determination of number of elements of a given order in a direct product of cyclic groups has been in the literature. In this paper, we proposed an alternative algorithm which may be used to find the number of elements of any order in the direct product of cyclic groups. The method proposed uses the idea of Euler phi function, which has been used in the determination of the number of elements of any order in a cyclic group.

Key Words: Cyclic group, elements, order, Euler phi function

References

1. Charles C. Pinter, A book of Abstract Algebra, McGraw-Hill Book Company, New York, 1982
2. Davis S. Dummit, Richard M. Foote, Abstract Algebra 3rd Ed., John Wiley & Sons Inc., 2004
3. John B. Fraleigh, A first Course in Abstract Algebra 7th Ed., Pearson Education, 2003
4. Joseph A. Gallian, Contemporary Abstract Algebra 2nd ed., D.C Health and Company, 1990.

DOUBLE LACUNARY STATISTICAL CONVERGENCE OF ORDER $\tilde{\alpha}$ IN TOPOLOGICAL GROUPS

Abdulkadir KARAKAŞ¹ Yavuz ALTIN² Mikail ET³

Department of Mathematics, University Siirt, Siirt, Turkey

Department of Mathematics, University of Firat, Elazig, Turkey

kadirkarakas21@hotmail.com yaltin23@yahoo.com mikailet68@gmail.com

Abstract

In this study, we define the concept double lacunary statistical of order $\tilde{\alpha}$ in topological groups, and give some inclusion relations between the set of all double statistically convergent sequences of order $\tilde{\alpha}$ and the set of all double lacunary statistically convergent sequences of order $\tilde{\alpha}$.

Keywords: Statistical convergence; Double sequences.

REFERENCES

1. H. Cakallı, Lacunary statistical convergence in topological groups, Indian J. Pure Appl. Math. 26(2),113-119,1995.
2. M. Et and H. Şengül, Some Cesaro-Type Summability Spaces of Order α and Lacunary Statistical Convergence of Order α , Filomat 28(8), 1593-1602, 2014.
3. R. Çolak, Statistical Convergence of Order α , Modern Methods in Analysis and Its Applications, New Delhi, India: Anamaya Pub, 121-129, 2010.
4. A. R. Freedman ; J. J. Sember and M. Raphael, Some Cesaro-type summability spaces, Proc. Lond. Math. Soc. 37, 508-520,1978.
5. J. A. Fridy and C. Orhan, Lacunary Statistical Convergence, Pacific J. Math. 160, 43-51, 1993.
6. E. Savaş, Lacunary statistical convergence of double sequences in topological groups, J. Inequal. Appl. 2014:480, 10 pp, 2014.
7. H. Steinhaus, Sur La Convergence Ordinaire et la Convergence Asymptotique, Colloq. Mathematicum 2, 73-74, 1951.

Spectral problem for diffusion operator with discontinuity function

Abdullah ERGÜN¹, Rauf AMİROV²

¹ Cumhuriyet University, Vocational School of Sivas, 58140 Sivas, Turkey

² Cumhuriyet University Department of Mathematics, Faculty of Science and Arts, 58140 Sivas, Turkey

¹ aergun@cumhuriyet.edu.tr, ² emirov@cumhuriyet.edu.tr

Abstract

In this study, diffusion operator with discontinuity function is considered. Integral equations have been obtained for the solution under certain initial conditions. Furthermore, we obtained integral representations for these solutions. Some equations have been obtained by the kernel functions. By using the characteristic function, asymptotic formulas of eigenvalues with zeros of the characteristic function are obtained. The initial value problem in this study is defined as follows.

$$L := \{-y'' + [2\lambda p(x) + q(x)]y = \lambda^2 \delta(x)y, x \in (0, \pi)\}$$

$$U(y) = y'(0) = 0, V(y) = y(\pi) = 0$$

where λ is a spectral parameter, $q(x) \in L_2[0, \pi]$, $p(x) \in W_2^1[0, \pi]$, $a_1, a_2 \in (0, \pi)$, $a_1 < a_2$ and

$$\delta(x) = \begin{cases} 1, & x \in (0, a_1) \\ \alpha^2, & x \in (a_1, a_2) \text{ to be } \alpha > 0, \alpha \neq 1, \beta > 0, \beta \neq 1 \text{ are real numbers.} \\ \beta^2, & x \in (a_2, \pi) \end{cases}$$

Keywords: Integral equation, Sturm-Liouville equations, Diffusion Operator.

REFERENCES

1. H. Koyunbakan, E. S. Panakhov, Half-inverse problem for diffusion operators on the finite interval. J. of Math. Anal. and App., 326, 1024–1030, 2007.
2. B. M. Levitan and I. S. Sargsyan, Introduction To Spectral Theory, American Mathematical Society, Providence, USA, 1975.
3. V. A. Marchenko, Sturm-Liouville Operators and Applications, AMS Chelsea Publishing, 1986.
4. V. A. Yurko, Inverse spectral problems for linear differential operators and their applications, Gordon and Breach, New York, 2000.

BLOCK NYSTROM TYPE METHOD AND ITS BLOCK EXTENSION FOR FOURTH ORDER INITIAL AND BOUNDARY VALUE PROBLEMS

Adeyefa Emmanuel

Department of Mathematics, Federal University Oye-Ekiti, Nigeria

adeoluman@yahoo.com

Abstract

The derivation of Block Nystrom type Method (BNTM) which is not normally used as numerical integrator of boundary value problems (BVPs) is considered and directly applied to solve both initial value problems (IVPs) and BVPs in ordinary differential equations (ODEs). Collocation technique is adopted in the derivation of the BNTM which is applied as simultaneous integrator to fourth order ODEs. The BNTM possesses the desirable feature of being self-starting as the implementation is in block form. The paper concludes by solving Numerical examples which establish the effectiveness and accuracy of the method. The superiority of BNTM is established by the numerical values presented.

Keywords: *Fourth Order Ordinary Differential Equation, Collocation, Block Nystrom type Methods, Zero-Stability*

REFERENCES

1. A.O. Adesanya, A. A. Momoh, M. A. Alkali and A. Tahir: Five Steps Block Method For The Solution Of Fourth Order Ordinary Differential Equations, International Journal of Engineering Research and Applications, Vol: 2, No:5, 991-998, 2012.
2. A. K. Alomari, N. Ratib Anakira, A. S. Bataineh and I. Hashim: Approximate solution of nonlinear system of BVP arising in fluid flow problem, Mathematical Problems in Engineering, vol.2013, Article ID 136043, 1-7, 2013.
3. D.O. Awoyemi: A P-stable linear multistep method for solving general third order ordinary differential equations, Intern. J. Comput. Math, Vol:80, No:8, 987-993, 2003.

INTELLIGENT BANKNOTE ISSUING COUNTRY IDENTIFICATION

Adnan Khashman ¹, Waleed Ahmed ²

^{1,2} Faculty of Engineering, Final International University, Girne, Mersin 10, Turkey

^{1,2} European Center for Research and Academic Affairs (ECRAA), Lefkosa, Mersin 10, Turkey

¹adnan.khashman@final.edu.tr, ²waleed.ahmed@final.edu.tr

Abstract

Technology advancement in recent years has caused an increase in global interactions, tourism, traveling and international trading; in particular with Asian countries which became lately more interactive with the rest of the world, and providing very popular tourism and trading destinations. However, many of these Asian countries tend to use their own issued local currencies which have impressive and diverse designs thus making it difficult to identify by foreign visitors or traders.

In this paper, we investigate and develop an intelligent identification system for currency issuing countries using image processing and neural networks. We consider the main banknotes of 18 Asian countries, in addition to EURO, US dollar, and Turkish Lira (TL). We construct our own dataset comprising 504 original and pre-processed images of 6 banknotes of each of the 21 currencies. The investigated 18 Asian countries in this work are Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Brunei, Burma, Cambodia, China, India, Kuwait, Maldives, Pakistan, Saudi Arabia, Sri Lanka, Syria, Tajikistan, and United Arab Emirates.

This work is novel because most of the existing banknote identification systems aim to recognize the value or the legitimacy of a banknote, rather than the issuing country. For the implementation purposes, we adopt two learning schemes to train and test the proposed neural identification model by using (50:50) and (75:25) training-to-validation data ratios. The obtained experimental results are successful considering the complexity of this novel identification task.

Keywords: Artificial Intelligence, Image Processing, Neural Networks, Intelligent Banknote Identification, Asian Currency.

REFERENCES

1. Oyebade K. Oyedotun, Adnan Khashman, Banknote recognition: investigating processing and cognition framework using competitive neural network, Cognitive neurodynamics, Vol:11, No:1, 67-79, 2017.

BLOW-UP OF SOLUTIONS FOR SEMI LINEAR FRACTIONAL SCHRÖDINGER EQUATIONS

Ahmad Fino¹

¹ Department of Mathematics, Faculty of Sciences III, Lebanese University, Lebanon

afino@ul.edu.lb,

Abstract

We consider the Cauchy problem in the whole spatial space, for the semi-linear Schrödinger equation with fractional Laplacian. We present the local well posedness of solutions in an appropriate fractional Sobolev space. We prove a finite-time blow-up result, under suitable conditions on the initial data.

Keywords: Schrödinger equation; Fractional Laplacian; test function method; Blow-up.

REFERENCES

1. Qi S. Zhang, A blow up result for a nonlinear wave equation with damping: the critical case, C. R. Acad. Sci. Paris, , Vol:333, No:2, 109–114, 2001.
2. M. Ikeda, Y. Wakasugi, Small-data blow-up of L²-solution for the nonlinear Schrödinger equation without gauge invariance, Differential Integral Equations, Vol:26, No:11-12, 1275–1285, 2013.

Recent Results on the Energy Concentration Problem

Ahmed I. Zayed¹

¹ Department of Mathematical Sciences, DePaul University,

Chicago, IL 60614, USA

azayed@depaul.edu

Abstract

One of the classical mathematical problems in communication and electrical engineering is the energy concentration problem which can be stated as follows:

Given a bandwidth $\mu > 0$, among all signals bandlimited to $A = [-\mu, \mu]$, find the signal with maximum energy concentration on $B = [-T, T]$ in the time domain. The difficulty in solving this problem lies in the fact that bandlimited functions are entire functions and as such they cannot vanish on any interval of positive length. Nevertheless, the problem was solved by a group of mathematicians at Bell Labs (D. Slepian, H. Landau, and H. Pollak) in the early 1960s for one-dimensional signals and some special cases in higher dimensions; cf. 1,2. In a series of papers published in Bell System Tech. Journal, they showed that the solution is given in terms of the Prolate Spheroidal Wave Functions (PSWF).

In higher dimensions, the problem is more difficult to solve because it depends on the geometry of both sets A and B . The problem is completely solved for rectangular regions, but for general regions little is known.

In this talk we will discuss some recent results on solving this problem in higher dimensions.

Keywords: Energy concentration problem, bandlimited functions, prolate spheroidal wave functions.

REFERENCES

- 1) H. J. Landau and H. O. Pollak, "Prolate spheroidal wave functions, Fourier analysis and uncertainty-II, Bell Syst. Techn. J. (1960). pp.65-84.
- 2) D. Slepian and H. O. Pollak, "Prolate spheroidal wave functions, Fourier analysis and uncertainty-I, Bell System Tech. J., (1961), pp.379-393.

THE INFLUENCE OF OPENINGS ON THE BEHAVIOR OF LOW-RISE SHEAR WALLS

Ahmed M. Segayer¹ Badredin M. Ammar² Mohamed A. Bin Sulieman³

¹ Department of Civil engineering, University of Tripoli, Libya

² Engineering Consulting Office for Utilities, Tripoli, Libya

³ The higher Institute of science & Technology, Tripoli, Libya

asegayer@yahoo.com

Abstract

A well designed and detailed shear wall can provide the required strength as well as sufficient ductility for resisting lateral loads and can prevent high damages. The increased use of shear wall in buildings has triggered the necessity to study the behavior of the wall under various modeling conditions. In resisting lateral forces, often it becomes necessary to utilize walls that contain openings. The existence of openings in concrete shear walls is still an unexplored field, but it is extremely important that the influence of the characteristics of the openings, such as dimensions, location and type, be established in their bearing capacity. In the present study a typical low-rise shear wall is considered with opening. The stiffness and strength of the wall are reduced by the reduction in concrete area and the discontinuity of the reinforcement due to opening. The objective of the study is to assess the influence of the presence of openings on the concrete walls, based on theoretical studies and also in numerical modeling using Computational ANSYS software, it seeks to present the configuration of the distribution of efforts to some situations of position and dimension of apertures, assessing how these parameters influence the traction tensions, Compression and deformations.

Keywords: Finite Element Analysis; Frequency Response Function; Impulse Response Function.

REFERENCES

1. RANGAN, B. V.; Rational Design of Structural Walls. ACI Structural Journal, 1997.
2. DOH, J. H.; FRAGOMENI, S.; Ultimate Load Formula for Reinforced Concrete Wall Panels with Openings. Advances in Structural Engineering, V.9, No.1, 2006.

THE ADEQUACY OF MODAL TESTING EXCITERS FOR THREE-LAYERED PLATES WITH A VISCOELASTIC CORE

Ahmed M. Segayer¹ Mohamed A. Abugheneda² Ali A. Alharari³ Muhsin A. Sulayman⁴

¹ Department of Civil engineering, University of Tripoli, Libya

² High vocational center of casting, Libya

³ World Islamic Call Society , Libya

⁴ Transportation Projects Board, Ministry of Transportation, Libya

asegayer@yahoo.com

Abstract

Modal testing is usually conducted to validate dynamic numerical models such as Finite Element Analysis. Excitation methods vary depending on several factors. In general an impact hammer or a shaker is used to excite structures where the output is measured in form of Frequency response function or Impulse response function, as well as mode shapes. In this paper a comparison of data resulted from impact hammer and handheld shaker - which was implemented in the structural dynamics laboratory at the university of Tripoli - with Finite element model is conducted on four rectangular plates with free boundary conditions, starting with 6 mm thick steel plate and three other laminated plates with two steel faces and viscoelastic core varying from 1 mm to 2 mm and 3 mm thickness of the core. Results showed that when dealing with plates with viscoelastic core especially 3 mm core, discrepancies in measured frequencies, damping factors and mode shapes between excitation methods is the highest, this is due to the fact that the required excitation energy is increased which means that selection of excitation technique is crucial in this case.

Keywords: Finite Element Analysis; Frequency Response Function; Impulse Response Function.

REFERENCES

1. Javad Baqersad, Peyman Poozesh, Christopher Niezercki and Peter Avitabile, "Comparison of Modal parameters Extracted Using MIMO, SIMO, and Impact Hammer on a Three-Bladed Wind Turbine", 32nd IMAC Conference and Exposition on Structural Dynamics 2014, Topics in Modal Analysis II , Vol:8, Chapter 19, pages 185–197.

ON THE GEOMETRY OF THE SEMI-SYMMETRIC NON-METRIC CONNECTION ON THE ALMOST CONTACT METRIC MANIFOLDS

Ahmet Yıldız¹

¹ Department of Mathematics, University of Inonu, Malatya, Turkey

a.yildiz@inonu.edu.tr,

Abstract

In this paper we classify three-dimensional almost contact metric manifolds with respect to the semi-symmetric non-metric connection.

Keywords: Almost contact metric manifolds, the Schouten-van Kampen connection, semisymmetry, Ricci solitons.

REFERENCES

- [1] Agashe, N.S. and Chafle, M.R. A semi-symmetric non-metric connection on a Riemannian manifold, Indian J. Pure Appl. Math.23(6), 399–409, 1992
- [2] Blair, D.E. Contact Manifolds in Riemannian Geometry, Lecture Notes in Mathematics 509, Springer-Verlag, Berlin-New York, 1976.
- [3] Blair, D.E., The theory of quasi-Sasakian structure, J. Differential Geo.1, 331-345, 1967.
- [4] De, U.C. On a type of semi-symmetric connection on a Riemannian manifold, Ann. Stiint Univ. Al. I. Cuza Iasi Sect. Math.37, 105–108, 1991.
- [5] Friedmann, A. and Schouten, J.A. "Über die Geometrie der halbsymmetrischen" Übertragung, Math. Z.21(1), 211–223, 1924.
- [6] Kim, B.H. Fibred Riemannian spaces with quasi-Sasakian structure, Hiroshima Math. J. 20, 477–513, 1990.
- [7] Olszak, Z. Normal almost contact metric manifolds of dimension 3, Ann. Polon. Math.47, 41–50, 1986.
- [8] Olszak, Z. On three dimensional conformally flat quasi-Sasakian manifold, Period Math. Hungar.33(2), 105–113, 1996.

ON THE GEOMETRY OF THE SCHOUTEN-VAN KAMPEN CONNECTION ON THE ALMOST CONTACT METRIC MANIFOLDS

Ahmet Yıldız¹ & Semra Zeren

¹ Department of Mathematics, University of Inonu, Malatya, Turkey

a.yildiz@inonu.edu.tr,

Abstract

In this paper we classify 3-dimensional almost contact metric manifolds with respect to the Schouten-van Kampen connection.

Keywords: Almost contact metric manifolds, the Schouten-van Kampen connection, semisymmetry, Ricci solitons.

REFERENCES

- [1] Blair D. E. , Contact manifolds in Riemannian geometry, Lecture Notes in Mathematics Vol.509, Springer-Verlag, Berlin-New York, 1976.
- [2] Bejancu A. and Faran H., Foliations and geometric structures, Math. and its appl., 580, Springer, Dordrecht, 2006.
- [3] Goldberg S. I. and Yano K., Integrability of almost cosymplectic structures, Pacific J. Math.,31(1969), 373-382.
- [4] Friedan D., Non linear models in 2+p dimensions, Ann. Phys.,163(1985), 318-419.
- [5] Ianus S., Some almost product structures on manifolds with linear connection, Kodai Math.Sem. Rep.,23(1971), 305-310.
- [6] Janssens D. and Vanhecke L., Almost contact structures and curvature tensors, Kodai Math.J.,4(1)(1981), 1-27.
- [7] Kenmotsu K., A class of almost contact Riemannian manifolds, Tohoku Math. J.,24(1972),93-103.

Some Inequalities of Sturm-Liouville Problems Having Special Singularity

Ahu ERCAN¹ Erdal BAS¹ Etibar PANAKHOV^{1,2}

¹ Department of Mathematics, University of Firat, Elazig, Turkey

² Institute of Applied Mathematics, University of Baku State, Baku, Azerbaijan

ahuduman24@gmail.com

erdalmat@yahoo.com

epenahov@hotmail.com

Abstract

In this study, we examine certain stability of Sturm-Liouville problem with having special singularity. We consider two such problems with potentials and discuss proximity of their spectral functions given that the first eigenvalues of the two spectral problems coincide. Similar stability questions were discussed for regular Sturm-Liouville operators in [1].

Keywords: Stability; Sturm-Liouville Equation; Singularity.

REFERENCES

1. Ryabushko, T. I., Stability of the reconstruction of a Sturm-Liouville operator from, two spectra, II. Teor. Funkts. Anal., Prilozhen., **18**, 176-85, 1973 (in Russian).
2. Levitan, B. M. and Sargsjan, I. S., Introduction to spectral theory, American Mathematical Society, Providence, RI, USA, 1975.
3. Levitan, B. M. and Gasymov, M. G., Determination of a differential equations by. two its spectra, Russian Math Surveys, 1964, **19**, 1-63.

Some Results on Fractional Integro Differential Equation

Ahu ERCAN¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

ahuduman24@gmail.com

Abstract

In this study, we obtain an integral representation of solution for fractional integro-differential equation and give some numerical results. Many problems can be modelled by fractional integro differential equations from various sciences and engineering applications. Furthermore most problems cannot be solved as analytical, and hence obtaining approximate solutions can be useful.

Keywords: Fractional; Integro Differential Equation; Numerical Solution.

REFERENCES

1. Podlubny, I., Fractional differential equations: an introduction to fractional derivatives, fractional differential equations, to methods of their solution and some of their applications (Vol. 198), 1998.
2. Xu, Y., Agrawal, O. P., New fractional operators and application to fractional variationalproblem. Computers & Mathematics with Applications, 2016.
3. Al-Mdallal, Q. M., An efficient method for solving fractional Sturm–Liouville problems. Chaos, Solitons & Fractals, 40(1), 183-189, 2009.
4. Bas, E., Fundamental spectral theory of fractional singular Sturm-Liouville operator. Journal of Function Spaces and Applications, 2013.
5. Hilfer, R., Luchko, Y., & Tomovski, Z., Operational method for the solution of fractional differential equations with generalized Riemann-Liouville fractional derivatives. Fract. Calc. Appl. Anal, 12(3), 299-318, 2009.

A Novel Outlook: A Study On Some Differential Equation Systems

Alaattin Esen¹, Berat Karaagac², Selcuk Kutluay¹, Nuri M. Yagmurlu¹

¹Department of Mathematics, University of Inonu, Malatya, Turkey

²Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

alaattin.esen@inonu.edu.tr

Abstract

In this article, extended modified $\exp(-\Omega(\xi))$ method, introduced by Khater et. al, is going to be used for seeking new exact solutions of some important differential equation systems in mathematical physics. The method depends on reducing partial differential equations into ordinary form and assuming the solution as a polynomial functions in a similar way to some well known methods. The difference and power of the method compared to some existing methods is the fact that the number of solutions provided by the present method are more than others. To show efficiency of the method, New coupled Konno-Oono and Wu-Zhang system have been considered. Various exact solutions of the considered equations have been obtained in certain conditions. Additionally, graphical representation and comparisons of the newly obtained solutions have been presented.

Keywords: extended modified $\exp(-\Omega(\xi))$ method, New coupled Konno-Oono ; Wu-Zhang system, exact solutions

REFERENCES

1. Mostafa M.A. Khater, Aly R. Seadawy, Dianchen Lu, Elliptic and solitary wave solutions for Bogoyavlenskii equations system, couple Boiti-Leon-Pempinelli equations system and Time-fractional Cahn-Allen equation, Results in Physics 7 , 2325–2333,2017.
2. Sadaf Bibi, Syed Tauseef Mohyud-Din, Umar Khan, Naveed Ahmed, Khater method for nonlinear Sharma Tasso-Olevers (STO) equation of fractional order, Results in Physics 7 , 4440–4450,2017.
3. Anand Malik, Fakir Chand, Hitender Kumar and S. C. Mishra, Exact solutions of some physical models using the (G'/G) -expansion method, PRAMANA journal of physics, Vol. 78, No. 4, pp. 513–529, 2012

ON GEOMETRIC PROPERTIES OF POSITION VECTOR OF CS SURFACES

Alev Kelleci¹, Nurettin Cenk Turgay² and Mahmut Ergüt³

¹ Department of Mathematics, Firat University, Elazig, Turkey,

² Department of Mathematics, Istanbul Technical University, Istanbul, Turkey,

³ Department of Mathematics, Namik Kemal University, Tekirdag, Turkey

alevkelleci@hotmail.com, turgayn@itu.edu.tr, mergut@nku.edu.tr

Abstract

In this article, we give a mini survey about constant slope (CS) surfaces in different ambient surfaces obtained so far. Also, we investigate geometric properties of position vector of CS-surfaces in Euclidean spaces.

Keywords: Constant slope surfaces; Euclidean spaces; Position vector.

REFERENCES

1. Chen, B. Y., Geometry of submanifolds, M.Dekker, New York, 1973.
2. Mendonça B. and Tojeiro R., Umbilical submanifolds of $S^n \times R$, Canad. J. Math., 66, no. 2, 400-428, 2014.
3. Munteanu, M. I., From golden spirals to constant slope surfaces, J. Math. Phys., 51(7), 073507, 2010.
4. Tojeiro R., On a class of hypersurfaces in $S^n \times R$ and $H^n \times R$, Bull. Braz. Math. Soc., (N. S.), 41, no. 2, 199-209, 2010.
5. Fu Y. and Yang D., On constant slope space-like surfaces in 3-dimensional Minkowski space, J. Math. Analysis Appl., 385, 1, 208-220, 2012.
6. Fu Y. and Wang X., Classification of Timelike Constant Slope Surfaces in 3-dimensional Minkowski Space, Results in Mathematics, 63, 3-4, 1095-1108, 2013.

ON GEOMETRIC PROPERTIES OF POSITION VECTOR OF GCR SURFACES

Alev Kelleci¹, Nurettin Cenk Turgay² and Mahmut Ergüt³

¹ Department of Mathematics, Firat University, Elazig, Turkey,

² Department of Mathematics, Istanbul Technical University, Istanbul, Turkey,

³ Department of Mathematics, Namik Kemal University, Tekirdag, Turkey

alevkelleci@hotmail.com, turgayn@itu.edu.tr, mergut@nku.edu.tr

Abstract

In this article, we give a mini survey about generalized constant ratio (GCR) surfaces in different ambient surfaces obtained so far. Also, we investigate geometric properties of position vector of GCR-surfaces in Euclidean spaces.

Keywords: Generalized constant ratio surfaces; Euclidean spaces; Position vector.

REFERENCES

1. Chen, B. Y., Geometry of submanifolds, M.Dekker, New York, 1973.
2. Mendonça B. and Tojeiro R., Umbilical submanifolds of $S^n \times R$, Canad. J. Math., 66, no. 2, 400-428, 2014.
3. Tojeiro R., On a class of hypersurfaces in $S^n \times R$ and $H^n \times R$, Bull. Braz. Math. Soc., (N. S.), 41, no. 2, 199-209, 2010.
4. Fu Y. and Munteanu M. I., Generalized constant ratio surfaces in E^3 , Bull. Braz. Math. Soc., New Series, 45, 73-90, 2014.
5. Turgay N. C.}, Generalized constant ratio hypersurfaces in Euclidean spaces, arxiv/papers/1504/07757v1, 2015.
6. Fu Y. and Yang D., On Lorentz GCR surfaces in Minkowski 3-space, Bull. Korean Math. Soc., 53, 1, 227-245, 2016.
7. Yang D., Fu Y. and Li L., Geometry of spacelike generalized constant ratio surfaces in Minkowski 3-space, Front. Math., China, 12, 2, 459-480, 2017.
8. Kelleci A., Turgay N. C., Ergüt M., On generalized constant ratio surfaces with higher codimension, arxiv/papers/1804.00721, 2018.

New Methods for Exact Solutions of System of Nonlinear Differential Equations

Ali Özyapıcı¹

¹ Faculty of Art and Science, Cprus International University, Nicosia, Mersin 10, Turkey.

aozyapici@ciu.edu.tr,

Abstract

The paper concerns new and generalized methods for solving system of nonlinear ordinary differential equations. Moreover, new exact solutions of biological systems are derived in the paper.

Keywords: System of Nonlinear Differentail Equations; Lotka-Volterra System; Trial equations.

REFERENCES

1. J. Biazar, Solution of the epidemic model by Adomian decomposition method, Applied Mathematics and Computation, vol:173, pp.1101--1106, 2006.
2. X-H. Du, " An irrational trial equation method and its applications", PRAMANA-journal of physics, Vol:75, no. 3, pp.415-422, 2010.
3. M. Ekici, M. Mirzazadeh, M. Eslami, " Solitons and other solutions to Boussinesq equation with power law nonlinearity and dual dispersion", Nonlinear Dynamics, vol: 84, no: 2, page: 669-676, 2016.
4. Y. Gurefe, E. Misirli, A. Sonmezoglu, M. Ekici, " Extended trial equation method to generalized nonlinear partial differential equations", Applied Mathematics and Computation, vol:219, pp. 5253--5260, 2013.
5. D.W.Jordan, P. Smith, " Nonlinear Ordinary Differential Equations: An introduction for scientists and engineering", fourth edition, Oxford, 2017.
6. C. Liu, " Trial Equation Method Based on Symmetry and Applications to Nonlilear Equations Arising in Mathematical Physics", Found Phys, Vol:41, pp.793-804, 2011.
7. D.V.G Rao, " Approximate analytical solutions of general Lotka-Volterra equations", Journal of Mathematical Analysis and Its Appications, vol. 122, no:2, page: 582-588, 1987.
8. Özyapıcı, A. "Generalized Trial Equation Method and Its Applications to Duffing and Poisson-Boltzmann Equations", Turkish Journal of Mathematics, DOI: 10.3906/mat-1603-76, 2016.

ESTIMATION OF DAMAGE PATTERNS IN A HISTORICAL MASONRY STRUCTURE

Ali Demir¹, Emin Hökelekli², Emre Ercan³

¹Department of Civil Engineering, Celal Bayar University, 45140, Manisa, Turkey

²Department of Civil Engineering, Bartın University, 74100, Bartın, Turkey

³Department of Civil Engineering, Ege University, 35100, İzmir, Turkey

ali.demir@cbu.edu.tr,

Abstract

Seismic damage pattern estimation in historical brick masonry structure under different earthquakes are investigated by using calibrated finite element models based on ambient vibration data in this study. Measurements and material tests in situ were made to obtain 3D solid model and mechanical properties of the structure. Firstly, the initial 3D finite element model of the structure was occurred and numerical dynamic characteristics of the structure are obtained. Then ambient vibration tests as well as Operational Modal Analysis were performed in order to obtain the experimental dynamic characteristics of the structure. The initial finite element model of the structure was calibrated by using the experimental dynamic results. Lastly, linear and non-linear time history analyses of the calibrated finite element model of the structure were carried out using the acceleration records of two different level earthquakes.

Keywords: Brick masonry structure, Operational modal analysis, Damage Estimation.

REFERENCES

1. ABAQUS V13 (2010), Dassault Systèmes Simulia Corp., Providence, Rhode Island, USA.
2. ARTeMISModal Pro 3.0. 2014. <http://www.svibs.com>
3. Nohutcu, H., Demir, A., Ercan, E., Altıntaş, G., and Hokelekli, E. (2015). "Investigation of a historic masonry structure by numerical and operational modal analysis." *Struct. Des. Tall Spec.*, 24(13), 821-834.
4. Demir, A., Nohutcu, H., Ercan, E., Hokelekli, E., and Altıntaş, G. (2016). "Effect of model calibration on seismic behaviour of a historical mosque." *Struct. Eng. Mech.*, 60(5), 749-760.
5. Livaoğlu, R., Baştürk, M.H., Doğangün, A. and Serhatoğlu, C. (2016), "Effect of geometric properties on dynamic behavior of historic masonry minaret." *KSCE J. Civ. Eng.*, 20(6), 2392-2402.
6. Diaferio, M., Foti, D. and Giannoccaro, N.I. (2016), "Modal parameters identification on environmental tests of an ancient tower and validation of its FE model." *Int. J. of Mech.*, 10, 80-89.

Existence, Uniqueness, and Stability of Solutions to the Telegraph Equation in Reproducing Kernel Hilbert Spaces

Ali Akgül¹ and David Grow²

¹Department of Mathematics, University of Siirt, Siirt, TURKEY

²Department of Mathematics and Statistics, Missouri University of Science and Technology, Missouri, USA

aliakgul@siirt.edu.tr, grow@mst.edu

Abstract

We announce new theorems on the existence, uniqueness, and stability of solutions to the nonhomogeneous telegraph equation in two reproducing kernel Hilbert spaces. We review relevant details of absolutely continuous functions and reproducing kernel Hilbert spaces. We sketch proofs of the existence and stability theorems. We present several numerical examples to illustrate the power and numerical effectiveness of the theory.

Keywords: Reproducing kernel Hilbert space; existence, uniqueness and stability; reproducing kernel functions.

REFERENCES

1. Mir Sajjad Hashemi, Mustafa Inc and Ali Akgül, Analytical treatment of the couple stress fluid filled thin elastic tubes, *Optik-International Journal for Light and Electron Optics*, Volume 145, September 2017, Pages 336-345.
2. Ali Akgül, Yasir Khan, Esra Karatas Akgül, Dumitru Baleanu and Maysaa Mohamed Al Qurashi, Solutions of Nonlinear Systems by Reproducing Kernel Method, *Journal of Nonlinear Sciences and Applications (JNSA)*, J. Nonlinear Sci. Appl., 10 (2017), 4408–4417.
3. Mahmut Modanlı and Ali Akgül, On solutions to the second order partial differential equations by two accurate methods, *Numerical Methods for Partial Differential Equations*, 2018.
4. M.S.Hashemi, Ali Akgül, Solitary wave solutions of time-space nonlinear fractional Schrödinger's equation: Two analytical approaches, *Journal of Computational and Applied Mathematics*, 2018.

On Solutions of Higher-Order Fractional Differential Equations

Ali Akgül¹, Esra Karatas Akgül¹ and Barış Örcan¹

¹ Department of Mathematics, University of Siirt, Siirt, Turkey

aliakgul@siirt.edu.tr,

Abstract

In this work, we use the reproducing kernel method to search higher-order fractional differential equations. We prove that our operator is a bounded linear operator. We give an example to prove how real our theory can be performed in practice.

Keywords: Higher-order fractional differential equations, Hilbert spaces, reproducing kernel functions.

REFERENCES

1. Ali Akgül. A new method for approximate solutions of fractional order boundary value problems. *Neural Parallel Sci. Comput.*, 22(1-2):223–237, 2014.
2. Minggen Cui and Yingzhen Lin. *Nonlinear numerical analysis in the reproducing kernel space*. Nova Science Publishers Inc., New York, 2009.
3. Ali Akgül, Mustafa Inc, and Esra Karatas. Reproducing kernel functions for difference equations. *Discrete Contin. Dyn. Syst. Ser. S*, 8(6):1055–1064, 2015.
4. Huanmin Yao and Yingzhen Lin. Solving singular boundary-value problems of higher even-order. *J. Comput. Appl. Math.*, 223(2):703–713, 2009.

A New Method for a Nonlinear System of Differential Equations

Ali Akgül¹, Esra Karatas Akgül¹ and Barış Örcan¹

¹ Department of Mathematics, University of Siirt, Siirt, Turkey

aliakgul@siirt.edu.tr,

Abstract

In this work, we implement the reproducing kernel method to nonlinear differential systems of equations. We prove the applicability and efficiency of the technique by some specific examples. Results present that the method is very impressive.

Keywords: Reproducing kernel functions; Series solutions; Nonlinear systems.

REFERENCES

1. Ali Akgül, Mir Sajjad Hashemi, Mustafa Inc, and Salar Ameen Raheem. Constructing two powerful methods to solve the Thomas-Fermi equation. *Nonlinear Dynam.*, 87(2):1435–1444, 2017.
2. Ali Akgül, Mustafa Inc, and Dumitru Baleanu. On solutions of variable-order fractional differential equations. *Int. J. Optim. Control. Theor. Appl. IJOCTA*, 7(1):112–116, 2017.
3. Ali Akgül, Mustafa Inc, and Esra Karatas. Reproducing kernel functions for difference equations. *Discrete Contin. Dyn. Syst. Ser. S*, 8(6):1055–1064, 2015.
4. Ali Akgül, Mustafa Inc, Esra Karatas, and Dumitru Baleanu. Numerical solutions of fractional differential equations of Lane-Emden type by an accurate technique. *Adv. Difference Equ.*, pages 2015:220, 12, 2015.

The effect of freezing and thawing on self-compacting hybrid fiber concretes containing mineral admixtures

Ali Öz¹, Abdulkadir Cüneyt Aydın²

¹Narman Vocational High School, Atatürk University, Erzurum, TURKEY
alioz@atauni.edu.tr

²Engineering Faculty, Civil Engineering Department, Ataturk University, Erzurum TURKEY.
acaydin@atauni.edu.tr

Abstract

In this study, the effect of freezing and thawing on self-compacting hybrid fiber concretes containing fly ash as a mineral additive was investigated. For this purpose, self-compacting concrete containing 2% steel fiber and brass coated steel fiber and also 0%, 0.05% and 0.1% polypropylene fiber were produced. In all mixtures, the cement was replaced with fly ash by 20%. For fresh concrete; flow diameter, propagation time (t_{50}), V-funnel flow time, L-box and J ring tests have been performed. In the hardened concrete, the weight loss, ultrasonic pulse velocity and compressive strength tests of the samples exposed to 50, 100 and 300 freeze-thaw cycles were carried out and compared to samples not exposed to freeze-thaw. Consequently, when the amount of steel and polypropylene fibers in the mixture were increased, the flow diameter decreased. On the other hand, when the amount of fly ash and brass coated steel fiber were increased, the flow diameter increased. As the polypropylene fiber content were increased in the mixtures, the loss of strength due to the freezing-thawing effect reduced.

Keywords: Self-compacting concrete, hybrid fiber, steel fiber, brass coated steel fiber, polypropylene fiber, fly ash, strength, freeze-thaw.

REFERENCES

1. Aydın,A.C., Self compactibility of high volume hybrid fiber reinforced concrete. Construction and Building Materials,21,1149-1154, 2007.
2. Alhozaimy, A.M., Soroushian, P. and Mirza, F., Mechanical Properties of Polypropylene Fiber Reinforced Concrete and the Effects of Pozzolanic Materials. Cement and Concrete Composites, 18, 85-92, 1996.
3. Pereira de Oliveira, L.A.,Castro Gomes, J.P., Bernardo, M.M.M. and Ramos, L.F.A., Evaluation of dry mortar ratio as mix design parameter for steel fibre reinforcedself compacting concrete. Construction and Building Materials,40,642-649, 2013.
4. Alhozaimy, A.M., Soroushian, P. and Mirza, F., Mechanical Properties of Polypropylene Fiber Reinforced Concrete and the Effects of Pozzolanic Materials. Cement and Concrete Composites, 18, 85-92, 1996.

An efficient numerical technique to solve state-delayed optimal control problems

Amin Jajarmi¹, Dumitru Baleanu^{2,3}

¹ Department of Electrical Engineering, University of Bojnord, Bojnord, Iran

a.jajarmi@ub.ac.ir,

² Department of Mathematics, Çankaya University, Ankara, Turkey

³ Institute of Space Sciences, Magurele-Bucharest, Romania

dumitru@cankaya.edu.tr

Abstract

Time-delay systems are a very important class of systems whose control and optimization have been of interest to many researchers. The presence of delay makes the analysis and control of such systems much more complicated. In this research, an efficient numerical method is investigated to solve a class of time-delay optimal control problems. The necessary optimality conditions are derived in terms of a two-point boundary value problem (BVP) with both delay and advance terms. The latter problem is then reduced into a sequence of linear two-point BVPs without delay and advance arguments. Some illustrative examples are presented to show the performance of the proposed approach. Simulation results verify that the suggested technique is straightforward and reduces the computational effort, effectively.

Keywords: Optimal control; Time-delay system; Numerical method.

REFERENCES

1. Amin Jajarmi, Mojtaba Hajipour, Dumitru Baleanu, A new approach for the optimal control of time-varying delay systems with external persistent matched disturbances, *Journal of Vibration and Control*, <https://doi.org/10.1177/1077546317727821>, 2017.
2. Amin Jajarmi, Dumitru Baleanu, Suboptimal control of fractional-order dynamic systems with delay argument, *Journal of Vibration and Control*, <https://doi.org/10.1177/1077546316687936>, 2017.
3. Amin Jajarmi, Mojtaba Hajipour, An efficient recursive shooting method for the optimal control of time-varying systems with state time-delay, *Applied Mathematical Modelling*, Vol:40, No:4, 2756–2769, 2016.

STUDY OF THREE DIMENSIONAL LAMINAR FORCED CONVECTION OF NANO FLUID FLOW THROUGH ECCENTRIC RECTANGULAR ANNULAR DUCT

Amr G. Eltorky ^a, Mohamed Elhelw ^b, Mohamed Fayed ^c,
Abdelhamid Attia ^d

^a Faculty of Engineering, Pharos University in Alexandria, Egypt

^{b, c, d} Faculty of Engineering, Alexandria University, Egypt

Email ^a amr.gaber@pua.edu.eg

Abstract

Heat transfer through the horizontal eccentric annulus between eccentric rectangular ducts with different eccentricities has been investigated for various influential parameters. Boundary conditions are used with constant hot temperature on inner duct and constant cold temperature on the outer duct. The spacing between the two ducts contained TiO₂-water nanofluid with different Solid Volume Fraction ($\phi = 0, 2, 5, 10 \%$). The eccentricity was changed with different values ($E = 0.025, 0.05, 0.075$ m) in left direction and aspect ratio was changed with different values ($AR = 0.25, 0.375, 0.5$). Results showed that with the increase of aspect ratio, the average Nusselt number increases. Moreover, with the increase in eccentricity value, the average Nusselt number remains constant, and then an increase begins to occur. Further the average Nusselt number increases with the increase in nanoparticle concentration.

Keywords: Laminar, forced convection, eccentric annulus, nanofluid, rectangle duct.

REFERENCES

- [1] Togun H, Abdulrazzaq T, Kazi SN, Badarudin A, Kadhum AAH, Sadeghinezhad E. A review of studies on forced , natural and mixed heat transfer to fluid and nano fluid flow in an annular passage 2014;39:835–56.
- [2] Matin MH, Pop I, Khanchesar S. Journal of Non-Newtonian Fluid Mechanics Natural convection of power-law fluid between two-square eccentric duct annuli. J Nonnewton Fluid Mech 2013;197:11–23.
- [3] Appl M, Engrg M. Generalized formulation for estimating pressure drop in fully-developed laminar flow in singly and doubly connected channels of non-circular. Comput Methods Appl Mech Eng 2013;259:64–76.
- [4] Xing D, Yan C, Wang C, Sun L. Progress in Nuclear Energy A theoretical analysis about the effect of aspect ratio on single-phase laminar flow in rectangular ducts. Prog Nucl Energy 2013;65:1–7.
- [5] Tobergte DR, Curtis S. Summary for Policymakers. In: Intergovernmental Panel on Climate Change, editor. Clim. Chang. 2013 - Phys. Sci. Basis, vol. 53, Cambridge: Cambridge University Press; 2013, p. 1–30.

On Existence of Common Fixed Point and its Applications

Anita Tomar

V. S. K. C. Government P.G. College Dakpathar (Dehradun) Uttarakhand, India

anitatmr@yahoo.com

ABSTRACT

Motivation behind this talk is the existence of fixed point in classical analysis, functional analysis, operator theory, topology, algebraic topology, theory of nonlinear oscillations, fluid flows, best approximation theory, initial and boundary value problems for differential and partial differential equations, dynamic programming, variation inequalities, solutions to nonlinear integral equations, getting optimum solutions of game theory, establishing the set of prices in general equilibrium theory of economics, area of the control of missiles, population control, signal control and the newly developed wavelets and its applications. The aim of this talk is to discuss the existence and uniqueness of coincidence and common fixed point of noncompatible and discontinuous maps with the help of explanatory examples associated with pictographic validations to demonstrate the authenticity of the postulates. Further solution of the second order differential equation arising in the real world physical problem is also discussed.

Key words: Coincidence point; common fixed point; completeness, noncompatibility, weak compatibility.

OPTION OF THE OPTICAL-MECHANICAL POSITIONING OF THE SENSOR AND SAMPLE IN THE MAGNETOMETER. DETERMINATION OF MAGNETIC SUSCEPTIBILITY OF POWDERS AND PARTICLES.

Sandulyak A.V.¹, Sandulyak A.A.^{1a}., Kiselev D.O.¹., Polismakova M.N.¹., Bulut H.²

¹Moscow technological university, Moscow, RF,

²Department of Mathematics, University of Firat, Elazig, Turkey

^aanna.sandulyak@mail.ru

Abstract

In Faraday's magnetometer it is recommended to apply remotely the located poles hemispheres. In this case (and similar cases) there is a need for expeditious and exact positioning of the measuring sensor (Hall) and the studied sample – for obtaining the most authentic characteristics of induction and its gradient, identification and use of a zone of stability. This problem is solved by the corresponding optical-mechanical system of positioning. It consists of the laser modules promoting aim positioning, the Web camera promoting final positioning. On the received concentration dependences of magnetic susceptibility of powder samples existence of limited line sections is confirmed that gives the chance to define susceptibility of particles. The critical relation to use for the similar purposes of samples (disperse) in the form of colloids and suspensions expresses.

Keywords: Faraday's magnetometer, zone of measurement, optical system of positioning, magnetic susceptibility

REFERENCES

- [1] A.V. Sandulyak, A.A. Sandulyak , M.N. Polismakova, D.O. Kiselev, D.A. Sandulyak , V.A. Ershova The working zone in the interpole area of the Faraday balance: an approach to testing the magnetic force factor stability criterion. MATEC Web of Conferences 10 , 01007 (2017) ICMAA 2017
- [2] A.V. Sandulyak, A.A. Sandulyak, M.N. Polismakova, V.A. Ershova, D.A. Sandulyak, D.O. Kiselev. On the Issue of Choosing the Measuring Zones in a Faraday Balance When Studying Magnetic Susceptibility of Small Samples. Springer International Publishing, Applied Physics, System Science and Computers, Lecture Notes in Electrical Engineering 428. P. 77-83.
- [3] A.A. Sandulyak, A.V. Sandulyak , M.N. Polismakova, D.O. Kiselev, V.A. Ershova , D.A. Sandulyak . The use of spherical pole pieces for performing of Faraday balance method. Instruments and Experimental Techniques. V61. Issue 1.2018. Pp.123-126.

MEASUREMENT OF THE ACTUAL AREA OF CONTACT OF DETAILS ON THE POWER OF THE BEAM OF LIGHT REFLECTED FROM THE CONTACT SURFACE COVERED WITH A FILM

Titov A.A., Sandulyak A.A.¹, Baharev M.M., Sandulyak A.V.

Moscow technological university, Moscow, RF,

[1anna.sandulyak@mail.ru](mailto:anna.sandulyak@mail.ru)

Abstract

Measurement of the actual area of details contact is important for control of friction and wear of such details. For this purpose, in particular, on a surface of one of details of couple covered with the thinnest layer of lubricant the thin film of coal is putted. On the raised dust surface impose the second detail of couple and squeeze them the application of normal loading. Light spots of contact are measured by planimetry. Instead of direct (labor-consuming) measurement of a large number of the areas of spots of contacts it is expedient to use integrated determination of the actual area of details – on the power of the beam of light reflected from ledges of a contact surface. The optical scheme of the device is developed, the efficiency of which for implementation is shown.

Keywords: Measurement of contact area, details, friction, wear

REFERENCES

- [1] Berkovich I.I., Gromakovskiy D.G. Tribology. Physical bases, mechanics and technical applications: The textbook for higher education institutions. Samara. 2000.
- [2] Patent RU 2642915. Way of measurement of the actual area of contact of details. By Albagachiev A.Y., Titov A.A., Sandulyak A.A. 2018.

On The Temperature Impact on Some Populations

Arzu Ünal

Department of Mathematics, Ankara University, Ankara, Turkey

aogun@science.ankara.edu.tr

Abstract

This talk is concerned with a mathematical model for some sea creatures under the effect of temperature. This model, also, will allow us to future estimates of populations can be made under different temperature scenarios.

Keywords: Mathematical modelling; Climate change effect.

REFERENCES

1. M. J. C. Crabbe, Climate change, global warming and coral reefs: modelling the effects of temperature, *Computational Biology and Chemistry*, 32, 311–314, 2008.
2. R. Van Woesik, S. Koksall, A coral population response (CPR) model for thermal stress. *Coral Reefs and Climate Change: Science and Management*, 61, 129-144, 2006.
3. Li, X., H. Wang, Z. Zhang, and A. Hastings, Mathematical analysis of coral reef models. *J. Math. Anal. Appl.*, 416, 352-373, 2014.
4. Riegl, B .M., and S. J. Purkis, Model of coral population response to accelerated bleaching and mass mortality in a changing climate. *Ecological modelling*, 220, 192-208, 2009.

NUMERICAL SIMULATION OF KDV EQUATION VIA FINITE DIFFERENCE METHOD

Asif Yokus¹ and Hasan Bulut²

¹ Department of Actuarial, University of Firat, Elazig, Turkey

asfyokus@yahoo.com

¹ Department of Mathematics, University of Firat, Elazig, Turkey

hbulut@firat.edu.tr,

Abstract

In the present study, the numerical solutions to the KdV equation with dual power nonlinearity by using the finite difference method are obtained. Discretize equation is obtained with the help of finite difference operators. When we used new analytical solution it is considered new initial condition for The KdV equation. It is shown that the FDM is stable for the usage of the Fourier-Von Neumann technique and linear stable. Accuracy of the method is analyzed in terms of the errors in L_2 and L_∞ . We present the numerical, exact approximations and absolute error in tables. We compare the numerical solutions with the exact solutions and this comparison is supported with the graphics. Then, we plot the two- and three- dimensional surfaces for the used analytical solutions paper.

Keywords: KdV equation; Finite Difference Method; Linear Stability; Numerical Solution

REFERENCES

1. A. Yokus, H. M. Baskonus, T. A. Sulaiman, H. Bulut, Numerical simulation and solutions of the two-component second order kdv evolutionary system, Numerical Methods for Partial Differential Equations, In press, corrected proof, 2017.
2. H. Bulut, A. S. Tukur, and .H. M. Baskonus. New solitary and optical wave structures to the Korteweg–de Vries equation with dual-power law nonlinearity. *Optical and Quantum Electronics* 48.12 (2016): 564.

STABILIZATION OF A LAMINATED BEAM WITH INTERFACIAL SLIP BY A PARALLEL COMPENSATOR

Assane Lo¹, Nasser-eddine Tatar²

¹University of Wollongong in Dubai, UAE

²King Fahad University of Petroleum and Minerals, KSA
assanelo@uowdubai.ac.ae, tatarn@kfupm.edu.sa

Abstract

We consider a structure consisting of a two-layered beam with an adhesive layer bonding the two adjoining surfaces. This model for a two-layered plate in which slip may occur along the interface was derived in by Hansen and Spies [1]. The adhesive layer creates a restoring force which is assumed proportional to the amount of slip. Therefore, we are in the presence of a structural damping due to interfacial slip. It has been shown in [2] that the frictional damping created by the interfacial slip alone is not enough to stabilize the system exponentially to its equilibrium state. Therefore, a natural question that can be asked is: what are the possible additional damping that can ensure the exponential stability and other kinds of stability of the system? In a previous publication [3], we improved the result of Wang, Xu and Yung [2] by investigating the case of an additional viscoelastic damping that acts on the effective rotation angle without resorting to any boundary control. In this paper, we propose to investigate an asymptotic stabilization of the undamped system with boundary displacement feedback.

Keywords: Boundary control, Timoshenko beam, parallel compensator, asymptotic stabilization

REFERENCES

- [1] S. W. Hansen, R. Spies; Structural damping in a laminated beam due to interfacial slip, *J. Sound Vibration*, 204 (1997), 183-202.
- [2] J.-M. Wang, G.-Q. Xu, S.-P. Yung; Exponential stabilization of laminated beams with structural damping and boundary feedback controls, *SIAM J. Control Optim.* 44 (5) (2005), 1575- 1597.
- [3] Lo. Assane, Nasser. Tatar; *Electronic Journal of Differential Equations*, Vol. 2015 (2015), No. 129, pp. 1{14.}



AN EXTENSION OF THE LOG-SOBOLEV INEQUALITY TO GENERAL MODELS OF KAC TYPE

Assane Lo¹, Ziad Choucair¹

¹ University of Wollongong in Dubai

assanelo@uowdubai.ac.ae, ZiadChoucair@uowdubai.ac.ae

Abstract

Helffer, Sjostrand and Bodineau pioneered the use of the Witten Laplacian formalism to derive the Log-Sobolev inequality in continuous lattice models with restricted interactions. In this paper, we propose an extension of the Log-Sobolev inequality to general models of Kac Type. Our method will use a strong uniform estimate of the two point-correlation functions.

Keywords: Log-Sobolev inequality; Kac Type

USING FUZZY GRA TO DETERMINE E-WASTE RECYCLING FACILITY LOCATION

Esra Avdan, Aşkıner Güngör*

Department of Industrial Engineering of Pamukkale University, Denizli, Turkey

avdanesra@gmail.com, * askiner@pau.edu.tr

Abstract

Recycling of electronic waste (e-waste) has become crucially important since it handles hazardous waste according to regulations and brings economic benefits to associated role players. One of the strategic issues in creating appropriate e-waste recycling infrastructure is determining the location of e-waste recycling facilities. Selection of an e-waste location requires to consider several tangible and intangible criteria together. This study contributes to this developing literature domain by presenting a Fuzzy Grey Relational Analysis (GRA) model to prioritize the alternative locations for e-waste recycling facilities. The model is used for the case of Turkey and the several scenarios are developed and evaluated to provide flexibility to decision makers.

Keywords: E-waste, Fuzzy GRA, Turkey.

REFERENCES

1. Ch. Achillas, Ch. Vlachokostas, N. Moussiopoulos, G. Banias, "Decision support system for the optimal location of electrical and electronic waste treatment plants: A case study in Greece." *Waste Management* 30(5): 870-879, 2010.
2. N. Aras, A. Korugan, G. Büyüközkan, F. Sivrikaya Şerifoğlu, İ. Erol, M. Nurtanış Velioglu "Locating recycling facilities for IT-based electronic waste in Turkey." *Journal of Cleaner Production* 105: 324-336, 2015.
3. M. Ekmekçioğlu, T. Kaya, C. Kahraman, "Fuzzy Multicriteria Disposal Method and Site Selection for Municipal Solid Waste." *Waste Management* 30(8): 1729-1736, 2010.
4. D. Queiruga, G. Walthera, J. González-Benitob, T. Spengler, "Evaluation of sites for the location of WEEE recycling plants in Spain." *Waste Management* 28(1): 181-190, 2008.
5. A. Taşkın. Gumus, A. Yesim Yayla, E. Çelik, A. Yildiz, "A combined fuzzy-AHP and fuzzy-GRA methodology for hydrogen energy storage method selection in Turkey." *Energies* 6.6, 3017-3032, (2013).

DIFFERENTIATION OF USING FLATTENING FILTER FREE ENERGY IN VMAT PLANS FOR PROSTATE CANCER

Yonca YAŞI ÇELEN¹, Atilla EVCİN²

¹Afyon Kocatepe University, Faculty of Medicine, Department of Radiation Oncology, Afyonkarahisar, Turkey, yyahsi@aku.edu.tr,

²Afyon Kocatepe University, Faculty of Engineering, Department of Materials Science and Engineering, Afyonkarahisar, Turkey, evcin@aku.edu.tr,

Abstract

Prostate Cancer the volumetric modulated arc therapy (VMAT) plans with 10 patients using flattening filter (FF) and flattening filter free (FFF) energies were assessed for conformity index (CI), homogeneity index (HI), monitor unit (MU) and 50% the comparison of volume values is aimed. In the study, treatment plans were prepared using 6 MV FF and 6 MV FFF in the Eclipse (ver.13.6) treatment planning system with Varian Trilogy Linear Accelerator. When the planning was completed, CI averaged 0.87, HI averaged 0.44 and MU values ranged from 600 to 680. As a result of planning, when PTV coverage, CI, HI and MU comparisons were made, there was no significant difference when comparing VMAT plans for FFF and FF energy. When we compare the MU values, MU increase by 10% is seen when the flattening filter is removed. In both energy modes, good homogeneity in PTV was achieved with conventional francitation and close dose rates. No significant advantages and disadvantages of the unfiltered energy mode were observed in the assessment of plan quality in terms of CI, HI.

Keywords: Flattening Filter (FF), Flattening Filter Free (FFF), Volumetric Modulated Arc Therapy (VMAT), Conformity Index (CI), Homogeneity Index (HI)

REFERENCES

1. Fogliata A, Garcia R, Knöös T. Definition of parameters for quality assurance of flattening filter free (FFF) photon beams in radiation therapy. Med Phys, Vol:39, No:10, 6455-6464, 2012.
2. Palma, D.A. New developments in arc radiation therapy: a review. Cancer Treat Rev, Vol:36, No:5, 393-399, 2010.
3. Zwahlen DR, Lang S, Htbacek J. The Use of Photon Beams of a Flattening Filter-free Linear Accelerator for Hypofractionated Volumetric Modulated Arc Therapy in Localized Prostate Cancer. Int. J. Radiation Oncology Biol. Phys, Vol:83, No:5, 1655-1660,2012.

COMPARISON OF DIFFERENT ALGORITHMS IN THE RADIOTHERAPY PLANS OF BREAST CANCER

Yonca YAHŞI ÇELEN¹, Atilla EVCİN²

¹Afyon Kocatepe University, Faculty of Medicine, Department of Radiation Oncology, Afyonkarahisar, Turkey, yyahsi@aku.edu.tr,

²Afyon Kocatepe University, Faculty of Engineering, Department of Materials Science and Engineering, Afyonkarahisar, Turkey, evcin@aku.edu.tr,

Abstract

Purpose: Assessment of portal dosimetry results of Anisotropic Analytical (AAA) and Pencil Beam Convolution (PBC) dose calculation algorithms intensity modulated radiotherapy (YART) planned breast cancer patients. **Material / Method:** The plans of 10 treated patients will receive 6 MV photon energy and a total of 25 fractions of 50 Gy dose using the inverse IMRT technique, which is reverse planned in the Eclipse (ver.13.6) treatment planning system with Varian Trilogy Linear Accelerator prescribing. For each plan, dose was calculated after optimization using PBC and then AAA algorithms. The quality controls of the plans were made using the Electronic Portal Imaging Device (EPID) by creating individual verification plans for each algorithm. In addition, the maximum and average dose values in the target volume were compared in inverse IMRT plans calculated using PBC and AAA. **Result:** When treatment plans generated by AAA and PBC dose calculation algorithms are analyzed using EPID, For the PBC algorithm, the mean values of γ_{Area} and γ_{Avg} are 98.15 ± 1.07 0.40 ± 0.048 and 98.72 ± 1.13 0.37 ± 0.051 , respectively, for the AAA algorithm. The PTV Dmax value for the PBC algorithm is 109.3 ± 1.09 and the Dot value is 101.7 ± 0.51 . For the AAA algorithm, the PTV Dmax value is 110.6 ± 1.12 and the Dot value is 102.9 ± 0.62 . **Conclusion:** When the mean values of portal dosimetry, γ_{Area} and γ_{Avg} evaluated using PBC and AAA algorithms were compared, the differences between the algorithms were not statistically significant ($p > 0,05$). Differences between the algorithms for PTV Dmax and Dort average values are not statistically significant ($p > 0,05$).

Keywords: Anisotropic Analytical (AAA), Pencil Bean Convolution (PBC), Intensity Modulated Radiotherapy (IMRT), Portal Dosimetry, Breast Radiotherapy

REFERENCES

1. Ma C, Yin Y, Lu J. The Study of AAA Algorithm and PBC Algorithm of Intensity Modulated Radiation Therapy for Breast Cancer. Med Phys , Vol:37, 3122, 2010.
2. Ronde HS, Hoffmann L. Validation of Varian's AAA algorithm with focus on lung treatments. Acta Oncol, Vol:48, 209-215, 2009.
3. Yoo S, Wu Q, O'Daniel J, Horton J, Yin FF. Comparison of 3D conformal breast radiation treatment plans using the anisotropic analytical algorithm and pencil beam convolution algorithm. Radiother Oncol, Vol:103 No:2, 172-177, 2012.
4. Bragg CM, Wingate K, Conway J. Clinical implications of the anisotropic analytical algorithm for IMRT treatment planning and verification. Radiotherapy and Oncology, Vol:86, No:2, 276-284, 2008.

THE LOCATION-ALLOCATION ANALYSIS OF R&D CENTERS WITH REGARD TO UNIVERSITIES AND TECHNOPARKS

Eren ÖZCEYLAN¹, Cihan ÇETİNKAYA¹, Ayca ÖZCEYLAN²

¹ Department of Industrial Engineering, Gaziantep University, Gaziantep, Turkey

erenozceylan@gmail.com, cihancetinkaya@gmail.com

² Oğuzeli Vocational School, Gaziantep University, Gaziantep, Turkey

aycaozceylan@gmail.com

Abstract

The regulation about R&D Centers in Turkey was published in the official gazette on July 31, 2008. It defines the required obligations, incentives and audit of R&D Centers which are established in Turkey. As the beginning of 2018, 712 enterprises were found eligible to establish R&D Center under this law. Current R&D Centers need to carry out projects with the universities and technoparks to survive. The relationships between R&D Centers, universities and technoparks are mainly related with distance, hence these facilities must be close. In this paper, the location and allocation analysis of R&D Centers with regard to the universities and technoparks is conducted. To do so, 712 R&D Centers, 184 universities and 69 technoparks in Turkey are considered. Then, P-median, P-center and set covering models are applied to analyze the coverage between aforementioned facilities. Computational experiments show the optimal assignments between R&D Centers and universities/technoparks.

Keywords: R&D Centers; Location and Allocation; P-center; P-median; Set Covering.

REFERENCES

1. Eren Özceylan, Ayşenur Uslu, Mehmet Erbaş, Cihan Çetinkaya, Selçuk Kürşat İşleyen, Optimizing the location-allocation problem of pharmacy warehouses: A case study in Gaziantep, An International Journal of Optimization and Control: Theories & Applications, Vol:7, No:1, 117–129, 2017.
2. Seifollah Louis Hakimi, Optimal locations of switching centers and the absolute centers and medians of a graph, Operations Research, Vol.12, No.3, 450–459, 1964.
3. Susan Owen, Mark Daskin, Strategic facility location: A review, European Journal of Operational Research, Vol.111, No.3, 423–447, 1998.

Existence, Uniqueness, and Stability of Solutions to the Telegraph Equation in Reproducing Kernel Hilbert Spaces

Ali Akgül¹ and David Grow²

¹Department of Mathematics, University of Siirt, Siirt, TURKEY

²Department of Mathematics and Statistics, Missouri University of Science and Technology, Missouri, USA

aliakgul@siirt.edu.tr, grow@mst.edu

Abstract

We announce new theorems on the existence, uniqueness, and stability of solutions to the nonhomogeneous telegraph equation in two reproducing kernel Hilbert spaces. We review relevant details of absolutely continuous functions and reproducing kernel Hilbert spaces. We sketch proofs of the existence and stability theorems. We present several numerical examples to illustrate the power and numerical effectiveness of the theory.

Keywords: Reproducing kernel Hilbert space; existence, uniqueness and stability; reproducing kernel functions.

REFERENCES

1. Mir Sajjad Hashemi, Mustafa Inc and Ali Akgül, Analytical treatment of the couple stress fluid filled thin elastic tubes, *Optik-International Journal for Light and Electron Optics*, Volume 145, September 2017, Pages 336-345.
2. Ali Akgül, Yasir Khan, Esra Karatas Akgül, Dumitru Baleanu and Maysaa Mohamed Al Qurashi, Solutions of Nonlinear Systems by Reproducing Kernel Method, *Journal of Nonlinear Sciences and Applications (JNSA)*, J. Nonlinear Sci. Appl., 10 (2017), 4408–4417.
3. Mahmut Modanlı and Ali Akgül, On solutions to the second order partial differential equations by two accurate methods, *Numerical Methods for Partial Differential Equations*, 2018.
4. M.S.Hashemi, Ali Akgül, Solitary wave solutions of time-space nonlinear fractional Schrödinger's equation: Two analytical approaches, *Journal of Computational and Applied Mathematics*, 2018.

Numerical Investigation of Acoustics Performance of Low-Pressure Ducted Axial Fan by Using Different Turbulence Model

Aykut Bacak¹ Ali Pınarbaşı²

^{1,2} Department of Mechanical Engineering, Yildiz Technical University, Istanbul, Turkey

¹ bacakaykut@gmail.com

Abstract

In this article, capacity and acoustics parameters of low pressure ducted axial fan is numerically investigated with k-w SST, DES and LES turbulence models by using computational fluid dynamics software. One slice of six bladed axial fan operating at 3000 RPM is simulated periodically as low pressure ducted axial ventilation fan. Simulations are run for three different operating point on the performance curve for each turbulence models. Investigation of acoustics parameters are obtained Ffowcs-Williams Hawkins acoustic model to calculate sound pressure levels for related frequencies. Numerical results are compared with the experimental results provided from blade manufacturer company.

Keywords: Ducted axial fan; Numerical modeling; Aero-acoustics; CFD; Turbulence Models.

REFERENCES

1. Cory, W., “Fans and Ventilation A Practical Guide”, Elsevier – Roles & Associates, ISBN 0-080-44626-4, 2005.
2. Sturm, M., Sanjose M., Moreau S., Carolus T., “Aeroacoustic Simulation of an Axial Fan Including the Full Test Rig by using the Lattice Boltzmann Method”, Fan 2015 Conference, 2015.
3. Reese, H., Carolus, T., Kato, C., “Numerical Prediction of the Aeroacoustic Sound Sources in a Low-Pressure Axial Fan with Inflow Distortion”, Fan Conference 2007, Lyon, France, 2007.
4. Perot F., Kim, M., S., Moreau S., Henner, M., “Axial Fan Noise Aeroacoustics Predictions and Inflow Effect on Tonal Noise using LBM”, CFD Canada 2013 Conference, Canada, 2013.
5. Neise, W., “Review of Fan Noise Generation Mechanisms and Control Methods, Fan Noise Symposium, CETIM, France, 1992.

BOUNDS FOR ATOM-BOND CONNECTIVITY INDEX

Ahmet UĞUR and Ayşe Dilek MADEN¹

¹ Department of Mathematics, University of Selçuk, Konya, Turkey

aysedilekmeden@selcuk.edu.tr,

Abstract

Atom-bond connectivity index, introduced by Ernesto Estrada et al., attracted a great deal of interest in mathematical chemistry.

In this article, we obtain some new and improved bounds for atom-bond connectivity index by using different method.

Keywords: Atom-bond connectivity index; pendant vertex; pendant edge; Comparison Theorem for Integrals.

REFERENCES

1. K. C. Das, Atom-bond connectivity index of graphs, *Discrete Applied Mathematics*, 158, 1181-1188, 2010.
2. E. Estrada, L. Torres, L. Rodriguez, I. Gutman, An atom-bond connectivity index: modelling the enthalpy of formation of alkanes, *Indian J. Chem.*, 37A, 849-855, 2011.
3. L. Gan, H. Hou, B. Liu, Some results on atom-bond connectivity index of graphs, *MATCH Commun. Math Comput Chem.* 66, 669-680, 2011.
4. W. Rudin, *Principals of Mathematical Analysis*, McGraw-Hill, New York 1976.
5. R. Xing, B. Zhou, Z. Du, Further results on atom bond connectivity index of trees, *Discrete Applied Mathematics* 158, 1536-1545, 2010.

BRIEF NOTE ON SYSTEM SIGNATURE AND THE LONG-TERM METHOD

Mehmet Gürcan¹, Ayşe T. Bugatekin¹

¹ Department of Statistics, University of Firat, Elazig, Turkey

mgurcan@firat.edu.tr, aturan@firat.edu.tr

Abstract

In this article, the system signature of the system is created by using the long-term method and then the transition matrices of each step are calculated. In this way, it is possible to have information about the reliability of the system after each unit becomes failure. Also, in this study, three systems are presented as examples.

Keywords: System reliability, Two state Markov chain, System signature, Long-term method.

REFERENCES

1. P.K. Andersen, Ø. Borgan, R. Gill, N. Keiding, *Statistical Models Based on Counting Processes*, Springer, New York, 1992.
2. G.R. Grimmett, D.R. Stirzaker, *Probability and Random Processes*, 2nd ed., Oxford Science Publication, Oxford, 1992.
3. R. Barlow, F. Proschan, *Mathematical Theory of Reliability*, Wiley, New York, 1965
4. V.V. Kalashnikov, Analytical and Simulation Estimates of Reliability for Regenerative Models, *Syst. Anal. Model. Simul.* 6, 833–851, 1989.
5. J. Navarro, F.J. Samaniego, N. Balakrishnan, D. Bhattacharya, On the Application and Extension of System Signatures in Engineering Reliability, *Naval Research Logistic*, 55, 1, 313-327, 2008.

A NEW GENERAL SUMMABILITY METHOD

Hikmet Seyhan Özarıslan¹ and Bađdagül Kartal²

¹ Department of Mathematics, Erciyes University, Kayseri, Turkey

seyhan@erciyes.edu.tr

² Department of Mathematics, Erciyes University, Kayseri, Turkey

bagdagulkartal@erciyes.edu.tr

Abstract

In this article, a known absolute summability theorem has been generalized for a general absolute matrix summability method by means of A -transform of the series $\sum a_n \lambda_n$, where $A = (a_{mv})$ is a positive normal matrix. Also, some conclusions have been obtained.

Keywords: Absolute matrix summability; Almost increasing sequence; Infinite series; Summability factors.

REFERENCES

1. Bari, Nina Karlovna and Stechkin, Sergeĭ Borisovich, Best approximations and differential properties of two conjugate functions, Trudy Moskov. Mat. Obšč., Vol:5, 483-522, 1956 (in Russian).
2. Bor, Hüseyin, On two summability methods, Math. Proc. Cambridge Philos. Soc., Vol:97, No:1, 147-149, 1985.
3. Bor, Hüseyin, A note on absolute summability factors, Internat. J. Math. Math. Sci., Vol:17, No:3, 479-482, 1994.
4. Flett, Thomas Muirhead, On an extension of absolute summability and some theorems of Littlewood and Paley, Proc. London Math. Soc. (3) Vol:7, 113-141, 1957.
5. Özarıslan, Hikmet Seyhan, A note on $|A, p_n|_k$ summability factors, Antarctica J. Math., Vol:7, No:1, 23-30, 2010.
6. Sulaiman, Waadallah Tawfeeq, Inclusion theorems for absolute matrix summability methods of an infinite series. IV, Indian J. Pure Appl. Math., Vol:34, No:11, 1547-1557, 2003.

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IMPROVED BIASED ESTIMATION METHODS IN LOGISTIC REGRESSION

Bahadır Yüzbaşı¹ and Yasin Asar²

¹Department of Econometrics, Inonu University, 44280 Malatya, Turkey,

b.yzb@hotmail.com

² Department of Mathematics-Computer Sciences, Necmettin Erbakan University, Konya, Turkey,

yasar@konya.edu.tr, yasinasar@hotmail.com

Abstract

In this study, we propose preliminary test and shrinkage type biased estimators in binary logistic regression model. We impose some sub-space restrictions on parameters so that the non-sample information is used to improve the estimations. We perform Monte Carlo simulations to evaluate the performances of existing estimators and also the new proposed ones. Moreover, a real data example is illustrated to support the simulation results.

Keywords: Biased estimators, Logistic Regression, Preliminary Test, Shrinkage Estimation

REFERENCES

1. Kibria, B. G., and Saleh, A. M. E. (2012). Improving the estimators of the parameters of a probit regression model: a ridge regression approach. *Journal of Statistical Planning and Inference*, 142(6), 1421-1435.
2. M°ansson, K., Kibria, B., and Shukur, G. (2012). On Liu estimators for the logit regression model. *Economic Modelling*, 29(4), 1483-1488.
3. Saleh, A. M. E. (2006). *Theory of preliminary test and Stein-type estimation with applications* (Vol. 517): John Wiley & Sons.
4. Saleh, A. M. E. and Kibria, B. G. (2013). Improved ridge regression estimators for the logistic regression model. *Computational Statistics*, 28(6), 2519-2558.

Quantile correlation based penalty estimator

Bahadır Yüzbaşı¹ and Yasin Asar²

¹Department of Econometrics, Inonu University, 44280 Malatya, Turkey,

b.yzb@hotmail.com

²Department of Mathematics-Computer Sciences, Necmettin Erbakan University, Konya, Turkey,

yasar@konya.edu.tr, yasinasar@hotmail.com

Abstract

In this study, we propose a new type of correlation based penalty estimator, which is an efficient estimator when there is the problem of multicollinearity, in a multiple regression model when the number of explanatory variables is larger or smaller than the number of observations. Therefore, we conducted a Monte Carlo simulation study and a real word example in order to investigate performance of the suggested estimator.

Keywords: Lasso Regression; Correlation Based Penalty; Quantile Regression

REFERENCES

1. Tibshirani, R. (1996). Regression shrinkage and selection via the lasso. Journal of the Royal Statistical Society. Series B (Methodological), 267-288.
2. Koenker, R., & Bassett Jr, G. (1978). Regression quantiles. Econometrica: journal of the Econometric Society, 33-50.
3. Koenker, R. (2005). Quantile regression (No. 38). Cambridge university press.
4. Tutz, G., & Ulbricht, J. (2009). Penalized regression with correlation-based penalty. Statistics and Computing, 19(3), 239-253.

DISCRETE FRACTIONAL SOLUTIONS OF ASSOCIATED LEGENDRE EQUATION

Bahar Acay¹ and Resat Yilmazer²

¹ Department of Mathematics, University of Firat, Elazig, Turkey

bbahar503@gmail.com , rstyilmazer@gmail.com

Abstract

Fractional calculus and discrete fractional calculus have generated a great deal of interest in recent years. Properties of discrete fractional calculus based on backward difference or nabla operator are developed and introduced. In this work, we begin with some basic definitions and identities of discrete fractional calculus. We are concerned with the homogeneous and non-homogeneous associated Legendre equation. We obtain new fractional solutions via Nabla fractional calculus operator method using the important Leibniz rule.

Keywords: Fractional Calculus; Discrete Fractional Calculus; Associated Legendre Equation.

REFERENCES

1. J. Hosking. Fractional differencing. *Biometrika*, 68(1):165-176, 1981.
2. C. Granger and R. Joyeux. An introduction to long-memory time series models and fractional differencing. *J. Time Ser. Anal.*, 1(1):15-29, 1980.
3. F.M. Atici and P.W. Elloe, Discrete fractional calculus with the nabla operator, *Electronic Spec. Ed. I, No. 3*, 1-12, 2009.
4. F.M. Atici and Sengul, *J. Math. Anal. Applic.* 369, 1-9, 2010.
5. J.J. Mohan, *Novi Sad. J. Math.* 43, 125-138, 2013.

ON A NEW FAMILY OF THREE VARIABLES POLYNOMIALS

Can KIZILATEŞ¹, Bayram ÇEKİM², Naim TUĞLU³

¹ Department of Mathematics, Bülent Ecevit University, Zonguldak, Turkey

can.kizilates@beun.edu.tr

^{2,3} Department of Mathematics, Gazi University, Ankara, Turkey

² bayramcekim@gazi.edu.tr, ³ naimtuglu@gazi.edu.tr

Abstract

In this article, we define a new family of three variables polynomials related to well known polynomials and numbers in literature. Then we give the explicit representations and partial differential equations of these polynomials. Finally, we give the interesting applications of these new polynomials.

Keywords: Fibonacci polynomials; Lucas polynomials; Trivariate Fibonacci polynomials; Generating functions.

REFERENCES

1. Gülşah Özdemir, Yılmaz Şimşek, For two variable polynomials related to a family of Fibonacci type polynomials and numbers, *Filomat*, Vol:30, No:4, 969–975, 2016.
2. Thomas Koshy, *Fibonacci and Lucas numbers with applications*, John Wiley and Sons Inc, NY, 2001.
3. E. Gökçen Koçer, Hatice Gedikce, Trivariate Fibonacci and Lucas polynomials, *Konuralp Journal of Mathematics* Vol:4, No:2, 247–254, 2016.
4. T. Koshy, *Fibonacci and Lucas Numbers with Applications*. John Wiley and Sons Inc, NY, (2001).
5. G. Özdemir, Y. Şimşek, G.V. Milovanović, Generating functions for special polynomials and numbers including Apostol-type and Humbert-type polynomials, *Mediterr. J. Math.*, Vol: 14, No:3, 17 pp., 2017.

Exact solutions of Conformable Benjamin Bona Mahony and Zoomeron equations

Nuri M. Yagmurlu¹, Selcuk Kutluay¹, Berat Karaagac², Alaattin Esen¹,

¹Department of Mathematics, University of Inonu, Malatya, Turkey

²Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

murat.yagmurlu@inonu.edu.tr

Abstract

In this paper, we are going to seek the new exact solutions of fractional Benjamin Bona Mahony equation and fractional Zoomeron equation which are presented with definition of the fractional derivative called "conformable fractional derivative" proposed by Khalil *et al.* By implementing the properties of conformable fractional derivative and travelling wave transform, the equations are converted into ordinary differential equations, then the procedure of Extended Modified Exp $(-\Omega(\xi))$ method and symbolic computation have allowed us to obtain trig, hyperbolic and rational solutions of those equations. As an outcome, we insure that Conformable derivative definition and Extended Modified Exp $(-\Omega(\xi))$ method are powerful tools for obtaining new exact solutions of fractional partial differential equations.

Keywords: Extended Modified Exp $(-\Omega(\xi))$ Method, Benjamin Bona Mahony equation, Zoomeron equation, exact solutions, Conformable derivative.

REFERENCES

1. R. Khalil, M. Al Horani, A. Yousef, M. Sababheh, A new definition of fractional derivative, *Journal of Computational and Applied Mathematics* 264, 65–70, 2014.
2. Mostafa MA Khater, Seadawy R Aly., and Lu Dianchen, Elliptic and solitary wave solutions for Bogoyavlenskii equations system, couple Boiti-Leon-Pempinelli equations system and Time-fractional Cahn-Allen equation, *Results in Physics* 7, 2325-2333, 2017.
3. Sadaf Bibi, Syed Tauseef, Mohyud Di and Naveed Ahmed, Khater method for nonlinear Sharma Tasso-Olevers (STO) equation of fractional order, *Results in physics* 7, 4440-4450, 2017.

Exact Solution of Nonlinear Evolution Equations Using the Extended Modified $\text{Exp}(-\Omega(\xi))$ Method

Berat Karaagac¹, Selcuk Kutluay², Nuri M. Yagmurlu², Alaattin Esen²

¹ Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

² Department of Mathematics, University of Inonu, Malatya, Turkey

bkaraagac@adiyaman.edu.tr

Abstract

Obtaining exact solutions of the evolution equation is one of the very important subjects in mathematics, science and technology. For this purpose, many different methods have been constructed and developed. In this article, a new technique which is called extended modified $\text{exp}(-\Omega(\xi))$ method is going to be studied for seeking new exact solutions of Burger-Fisher equation and Phi Four equation. The method is capable of deriving many number of solutions. With the aid of the method, various exact solutions including trig, hyperbolic and rational solutions have been obtained and using a software the graphical representation of the solutions have been presented. In conclusion, we can say that the present method can also be used for the solutions of a wide range of problems.

Keywords: Extended Modified $\text{Exp}(-\Omega(\xi))$ Method, Burger-Fisher equation, Phi-four equation, exact solutions

REFERENCES

1. Mostafa MA Khater, Seadawy R Aly., and Lu Dianchen, Elliptic and solitary wave solutions for Bogoyavlenskii equations system, couple Boiti-Leon-Pempinelli equations system and Time-fractional Cahn-Allen equation, Results in Physics 7 , 2325-2333, 2017.
2. Anand Malik, Fakir Chand, Hitender Kumar and S.C. Mishra, Exact solutions of some physical models using the (G'/G) -expansion method, *Pramana* 78.4 , 513-529, 2012
3. Sadaf Bibi, Syed Tauseef, Mohyud Di and Naveed Ahmed, Khater method for nonlinear Sharma Tasso-Oleiver (STO) equation of fractional order, Results in physics 7, 4440-4450, 2017.
4. Ahmet Bekir, Ahmet Boz, Exact solutions for nonlinear evolution equations using Exp-function method." *Physics Letters A* 372.10, 1619-1625, 2008.
5. A M Wazwaz, A sine-cosine method for handling nonlinear wave equations, Mathematical and Computer modelling 40.5-6, 499-508, 2004.

Exact and numerical solutions to the time-fractional combined KdV-mKdV equation

Asif Yokus¹, Betül Demirdag², Tukur Abdulkadir Sulaiman^{2,3} and Hasan Bulut²

¹Department of Actuary, Firat University, Elazig, Turkey

²Department of Mathematics, Firat University, Elazig, Turkey

³Department of Mathematics, Federal University Dutse, Jigawa, Nigeria

asfyokus@yahoo.com, betuldenizd@gmail.com,

sulaiman.tukur@fud.edu.ng, hbulut@firat.edu.tr

Abstract

This study investigates the time-fractional combined Korteweg-de Vries and modified Korteweg-de Vries (KdV-mKdV) equation by utilizing the sine-Gordon expansion method, topological kink-type soliton is successfully constructed with the conformable fractional derivative under consideration. Furthermore, the obtained topological kink-type soliton is considered to examine the numerical behavior of the combined KdV-mKdV equation by using the finite difference scheme. We consider the conformable and Caputo fractional derivatives for the numerical investigation.

Keywords: Combined KdV-mKdV equation; fractional order; soliton.

REFERENCES

1. H. Bulut, T.A. Sulaiman, H.M. Baskonus and A.A. Sandulyak, New solitary and optical wave structure to the (1+1)-dimensional combined KdV-mKdV equation, *Optik*, Vol:135, 327-336 2017.
2. C. Yan, A simple transformation for nonlinear waves, *Physics Letters A*, Vol:22, No:4, 77-84 1996.
3. T. Abdeljawad, On conformable fractional calculus, *Journal of Computational and Applied Mathematics*, Vol:279, No:1, 57-66 2015
4. Asif Yokus, Haci Mehmet Baskonus, Tukur Abdulkadir Sulaiman, Hasan Bulut, Numerical simulation and solutions of the two-component second order KdV evolutionary system, *Numerical Methods for Partial Differential Equations*, 2017;00: 1–17. <https://doi.org/10.1002/num.22192>, 2017

ENHANCE IMAGE FORGERY DETECTION WITH OPTIMIZATION ALGORITHMS

Bilgehan Gurunlu¹, Serkan Ozturk²

¹ Department of Informatics, Kahramanmaraş Sutcu Imam University, K.Maras, Turkey

gurunlu@ksu.edu.tr

² Department of Computer Engineering, Erciyes University, Kayseri, Turkey

serkan@erciyes.edu.tr

Abstract

Image forgery detection is one of the most interesting research topic in information forensics and security area. Many algorithms have been suggested to improve the detection of image forgery, but many problem have not being solved yet.

Optimization is the process of exploration the best value, maximum or minimum, of a function for some constraint. While new image forgery detection algorithms have been suggested in the literature, some parameters must to be optimized.

Keywords: Image forgery detection; Copy-move forgery detection; optimization algorithms.

REFERENCES

1. Fridrich, J., Soukal, D., Lukas, J., “Detection of Copy-Move Forgery in Digital Images. Int. J. Comput. Sci. Issues 3, 652–663, 2003.
2. Al-Qershi, O.M., Khoo, B.E., “Passive detection of copy-move forgery in digital images: State-of-the- art”, Forensic Science International, Vol.231, no. 1-3, September, 2013.
3. Blum, C., Aguilera, M.J.B., Roli, A., Sampels, M., (Editors), “Hybrid Metaheuristics: An Emerging Approach to Optimization”, Studies in Computational Intelligence, vol. 114, Springer-Verlag Heidelberg, Berlin, 2008.
4. Dorigo, M., Stutzle T., “Ant Colony Optimization: Overview and Recent Advances”, Editors: Gendreau M., Potvin J.-Y., Handbook of Metaheuristics, International Series in Operations Research & Management Science, vol. 146, pp. 227-263, 2010

A SURVEY ON IMAGE FORGERY DETECTION METHODS

Bilgehan Gurunlu¹, Serkan Ozturk²

¹ Department of Informatics, Kahramanmaraş Sutcu Imam University, K.Maras, Turkey

gurunlu@ksu.edu.tr

² Department of Computer Engineering, Erciyes University, Kayseri, Turkey

serkan@erciyes.edu.tr

Abstract

In recent years, digital image forgery detection has become one of the hardest studying area for researchers investigations in the field of information security and image processing. Image forgery detection methods can be divided into two extensive groups such as Active methods and Passive (Blind) methods.

Active methods have been used data hiding techniques like watermarking and digital signatures. Passive forensic methods (or Blind) use image statistics or they investigate the attributes of the image to determine the forgeries. Passive detection techniques are also split into three branches; image splicing, image retouching, copy-move. Such image forgery detection methods are focus of this survey.

Keywords: Image forensics; Image forgery detection; Copy-move forgery detection; Blind detection.

REFERENCES

1. Agarwal, S., Farid, H., “Photo Forensics from JPEG Dimples”, IEEE Workshop on Image Forensics and Security, Rennes, France, 2017.
2. Fridrich, J., “Methods for Tamper Detection in Digital Images”, Proc. ACM Workshop on Multimedia and Security, Orlando, FL, October 30–31, pp. 19–23, 1999.
3. Bayram, S., Sencar, T., Memon, N., “An efficient and robust method for detecting copy-move forgery”. In: Proc IEEE ICASSP, 2009.
4. Korus, P., “Digital image integrity – a survey of protection and verification techniques”, Digital Signal Processing, Volume 71, pp. 1-26, December 2017.

USE AND COMPARISON OF TOPSIS AND ELECTRE METHODS IN PERSONNEL SELECTION

^aAssociate Professor Bilgin ŞENEL

^bAssociate Professor Mine ŞENEL

^cGizem Aydemir

^{ab} Munzur University, Industrial Engineering Department, Tunceli, Turkey

^c OBSS-Bilişim Computer Services Consulting, Senior Business Analyst, İstanbul, Turkey

ABSTRACT

One of the most important factors in terms of efficiency and efficiency in today's enterprises is the human factor and the first and most important step of this factor is personnel selection process. In this study, a leading company operating in the automotive sector in Turkey, the staff will provide maximum benefit to the company, in the most efficient manner, and at minimal cost is selected as soon as possible. For this purpose, the criteria that are important in blue collar personnel selection are determined and these criteria are weighted. TOPSIS and ELECTRE methods have been used for the selection of the candidates most suitable for the job among the candidates in the application pool of the automotive firm. By comparing the results obtained from these last two methods, it has been tried to determine which method is best suited to the criteria of the employer and which will provide the maximum benefit to the operation with the minimum cost and which is selected as soon as possible.

Keywords: Personnel Selection, Multi-Decision Making, TOPSIS, ELECTRE

REFERENCE

- Saaty, T. L., “Fundamentals of Decision Making and Priority Theory”, RWS Publications, Pittsburgh, s.1-5, 2000.
- Forman, E. and Selly, M.A., Decision by Objectives, Expert Choice Inc., s.20, 2001.
- Triantaphyllou, E., Shu, B., Nieto, S. and Ray, T., “Multi-Criteria Decision Making: An Operations Research Approach”, Encyclopedia of Electrical and Electronics Engineering, Cilt 15, ss. 175-186, 1998.
- Serinkaya, O., Çok Kriterli Karar Destek Sistemi ELECTRE Yöntemleri Üzerine Bir Uygulama, Yayınlanmamış Yüksek Lisans Tezi, Gazi Üniversitesi Fen Bilimleri Enstitüsü.,Ankara, s.32, 2001.
- Spee, B., Multi-Criteria Decision Making An Application Study of ELECTRE & TOPSIS, <http://www.ai.wuwien.ac.at/>, 2005.

INVESTIGATION OF MECHANICAL STRESSES ON SANDWICH COMPOSITE LAYERS ACCORDING TO THE PRESSURE BY MAKING USE OF ANSYS SOFTWARE

Kürşat KAYMAZ¹, Bilgin ZENGİN^{2a}, Muzaffer AŞKIN^{2b}, Semih TAŞKAYA³

¹Department of Civil Engineering, University of Munzur, Tunceli, Turkey

²Department of Electrical and Electronics Engineering, University of Munzur, Tunceli, Turkey

³Department of Metallurgy and Materials Engineering, University of Firat, Elazig, Turkey

kkaymaz@munzur.edu.tr, bilginzengin@munzur.edu.tr, muzafferaskin@munzur.edu.tr,
muh.semihtaskaya@gmail.com

Abstract

Sandwich materials are the most important applications of technological composites. A composite material is a structure formed by combining the macroscopic meaning of more than one base material for a specific purpose. The sandwich materials are combined without dissolving the different structures to provide the desired various mechanical properties. Ansys is simulation software that enables a test in virtual environment between materials. In Ansys package program, 2 different models of 3 intermediate layers, with a straight and 7° orientation angle, are designed as 3 dimensional according to x, y, z coordinate measurements. Sandwich plates with smooth and radial geometries were fixed in two different tests from their right and left supports, linearly and mechanical stresses were analyzed according to axes under 4 MPa pressure. Here, we mainly analysed two different structures by comparing features according to the cases that having same shape-different supports and different shapes-same support. It has been investigated that the compression ratios of straight anchorage support increase linearly as a function of linear meshes in the same geometry but different support stresses. The radial anchorage support draw ratio decreases with linear supports while the compression ratios increase with x axis and decrease with y and z axes. On the other hand, it is concluded that radial anchorage ratio for the structures having different shapes and same type supports increases in x axis and decreases in both y and z. Moreover, one can see that radial linear support has lower draw and compression ratios on the x axis, and also the quantity increases on the y axis while the compression ratio decreases on the z axis.

Keywords: Sandwich composite, Ansys, Mechanical tension, Flat and radial layer.

REFERENCES

1. F. C. Campbell, Structural Composite Materials, ASM International, Novelty, Ohio, 2010.
2. M. Ganapathi, B.P. Patel, D.P. Makhecha Nonlinear dynamic analysis of thick composite/sandwich laminates using an accurate higher-order theory Compos B Eng, 35 (2004), pp. 345-355.
3. Stephen.R.Swanson, Jong Man Kim, Design of Sandwich Structures under Contact Loading. s.l. : Elsevier Ltd, 2003, Composite Structures, Vol. 59, pp. 403-413.

ELASTIC STRESS ANALYSIS OF ST 37 AND ST 70 STEELS BY USING FINITE COMPONENTS TECHNIQUE

Semih TAŞKAYA¹, Kürşat KAYMAZ², Bilgin ZENGİN^{3a}, Muzaffer AŞKIN^{3b}

¹Department of Metallurgy and Materials Engineering, University of Firat, Elazig, Turkey

²Department of Civil Engineering, University of Munzur, Tunceli, Turkey

³Department of Electrical and Electronics Engineering, University of Munzur, Tunceli, Turkey

muh.semihtaskaya@gmail.com, kkaymaz@munzur.edu.tr, bilginzengin@munzur.edu.tr,
muzafferaskin@munzur.edu.tr

Abstract

St 37 and St 70 steels are used in general building materials and these structures are constructed by making use of the cold drawing process for the steel produced as a result of hot production. With the help of the Ansys package software, St 37 and St 70 steels having 3 mm thickness were modelled as a 3 dimensional I profile by using the finite element method. The finite element technique is a method providing a solution which can be controlled with simple pieces of complex engineering problems. Applying the fixing process to the steel section from its right and left bearings we give 100 MPa pressure to upper profile of the model and then we analyse the elastic stress analysis occurred on the X, Y, Z directions. Considering the analysis simulation data, we conclude that the St 37 steel has bigger elastic stress effect than the St 70 one.

Keywords: St 37-ST70, Ansys, Elastic stress, Finite element method.

REFERENCES

1. S.Taşkaya, Investigation of mechanical stresses dependent on press in St 37 steel Ansys program, The Journal of International Manufacturing and Production Technologies, 1 (2017), pp. 39-46.
2. P.B. Dinis, B. Young, D. Camotim Local-distortional interaction in cold-formed steel rack-section columns Thin-Wall Struct, 81 (2014), pp. 185-194.
3. M. Jandera, L. Gardner, J. Machacek Residual stresses in cold-rolled stainless steel hollow sections J. Constr. Steel Res., 64 (2008), pp. 1255-1263.
4. Pham CH, Hancock GJ. Numerical simulation of high strength cold-formed purlins in combined bending and shear. Research report – University of Sydney, Department of Civil Engineering; 2009(904). p. 1–53.
5. L. Gardner, D. Nethercot Numerical modeling of stainless steel structural components—a consistent approach J. Struct. Eng., 130 (2004), pp. 1586-1601.

STEAM Education for the Next Generation

Fatma Bozkurt

Department of Mathematics, Faculty of Education, Erciyes University ,Kayseri, Turkey

fbozkurt@erciyes.edu.tr

and

Ali Yousef

Department of Mathematical Science, Kuwait College of Science and Technology, Kuwait

ayousef.math@gmail.com

Abstract

There are 6 defined generations living now in the modern World. Each generation is intensively different, growing up amongst different political and social environments and various technological advancements. In this study we analyzed some studies about the iPad generation and the reports of the World Economic Forum. It is seen that STEAM education for the next generation needs some complement courses to reach to the desired equipments in the 4th Industrial Revolution.

Keywords: STEAM education, Gen-Z, Gen-Alpha, 4th Industrial Revolution.

REFERENCES

1. HyunJu Park, Teachers' Perceptions and Practices of STEAM education in South Korea, Eurasia Journal of Mathematics, Science and Technology Education, 12(7):1739–1753, 2106.

Neimark-Sacker Bifurcation Analysis of a Monoclonal Tumor Growth

Fatma Bozkurt

Department of Mathematics, Faculty of Education, Erciyes University, Kayseri, Turkey

fbozkurt@erciyes.edu.tr

Mohammed A. Hajji

Department of Mathematical Science, College of Science, UAE University, Al Ain, UAE

mahajji@uaeu.ac.ae

Abstract

This study is concerned on a brain tumor growth with piecewise constant arguments, where we embed $\llbracket t \rrbracket$ and $\llbracket t - 1 \rrbracket$ as coefficients to the equation to emphasize the treatment therapy for specific times such as

$$\frac{dx(t)}{dt} = x(t)r(1 - \alpha x(t) - \beta_0 \llbracket t \rrbracket x(\llbracket t \rrbracket) - \beta_1 \llbracket t - 1 \rrbracket x(\llbracket t - 1 \rrbracket)) - \gamma_1 \llbracket t \rrbracket x(t)x(\llbracket t \rrbracket) - \gamma_2 \llbracket t - 1 \rrbracket x(t)x(\llbracket t - 1 \rrbracket), \quad (A)$$

where the parameters $\alpha, \beta_0, \beta_1, \gamma_1, \gamma_2$ and r belongs to R^+ and $\llbracket t \rrbracket$ is the integer part of $t \in [0, \infty)$. γ_1 represents the effect of the treatment on the tumor, while γ_2 is embedded to show the rate that causes a negative effect from the immune system to the tumor population. In this work, we analyzed the local and global asymptotic stability of the positive equilibrium in equation (A). Furthermore, we consider the conditions for a saddle point case and unstable behavior. The work focus also on the semi-cycle and periodic (or non-periodic) cases of the difference equation solutions in (A). Additionally, studies have shown that the equations goes on a Neimark-Sacker bifurcation, where we investigated the direction of equation (A).

Keywords: logistic differential equations; local stability; global stability; semi-cycle solutions; Neimark-Sacker bifurcation

REFERENCES

1. J.L. Gevertz, S. Torquato, *Modeling the effects of vasculature evolution on early brain tumor growth*, Journal of Theoretical Biology, 243, pp.517-531, 2006.

SOME BOUNDS FOR LAPLACIAN-LIKE ENERGY

Burcu Kaya and A. Dilek Maden¹

¹ *Department of Mathematics, Faculty of Science, Selçuk University, Campus, 42075 Konya, Turkey*

aysedilekmeden @ selcuk.edu.tr

Abstract

Let G be a connected graph with n vertices and m edges. The Laplacian-energy-like of a graph G , denoted by $LEL(G)$, is defined as

$$LEL = LEL(G) = \sum_{i=1}^{n-1} \sqrt{\mu_i}$$

where μ_i 's are eigenvalues of the Laplacian matrix of G .

In this article, we obtain some new lower and upper bounds for Laplacian-energy-like of G .

Keywords: Energy of graph, Laplacian-like-energy, Laplacian matrix, the number of spanning tree, The first Zagreb index

REFERENCES

1. Kinkar Ch. Das, Seyed Ahmad Mojalal, On Energy and Laplacian Energy of Graphs, *Electronic Journal of Linear Algebra*, Volume 31, pp. 167-186, 2016
2. Akbar Jahanbani, Some new lower bounds for energy of graphs, *Applied Mathematics and Computation* 296, 233-238, 2017
3. Kinkar Ch. Das, Seyed Ahmad Mojalal, On Laplacian energy of graphs, *Discrete Mathematics*, 325, 52-64, 2014
4. Weizhong Wang, Yanfeng Luo, On Laplacian-energy-like invariant of a graph, *Linear Algebra and its Applications*, 437, 713-721, 2012
5. Bo Zhou, Ivan Gutman, On Laplacian Energy of Graphs, *MATCH Communications in Mathematical and in Computer Chemistry*, 57, 211-220, 2007

POWER SIDE CHANNEL ANALYSIS AND ANOMALY DETECTION OF MODULAR EXPONENTION METHOD IN DIGITAL SIGNATURE ALGORITHM BASED FPGA

Burcu Sönmez¹ Ahmet Bedri Özer²

¹ Department of Computer Engineering, University of Agri Ibrahim Cecen, Agri, Turkey

² Department of Computer Engineering, University of Firat, Elazig, Turkey

bsonmez@agri.edu.tr, bozer@firat.edu.tr,

Abstract

In this study, digital signature application was performed on FPGA with classical RSA and Chinese Remainder Theorem (CRT). The power consumption of the system was observed when the digital signature process was performed on the FPGA. In order to distinguish the modular exponentiation methods as the classical RSA and the Chinese Remainder Theorem (CRT), the anomaly detection method was applied to the digital signature application using the power side channel analysis of the system. According to the obtained result, it is proved that information about the structure of the algorithm running in the system can be obtained by using machine learning techniques by using the power information consumed by a cryptographic device.

Keywords: Digital Signatures; RSA; Chinese Remainder Theorem; CRT; FPGA; Anomaly Detection; Power Side Channel Analysis.

REFERENCES

1. Whitfield Diffie and Martin Edward Hellman, New directions in cryptography. IEEE Transactions on Information Theory, IT-22, 644–654, 1976.
2. Ron Rivest, Adi Shamir, Leonard Adleman, A method for obtaining digital signatures and public-key cryptosystems, Communications of the ACM, 120-126, 1978.
3. Taher Elgamal, A public-key cryptosystem and a signature scheme based on discrete logarithms, IEEE Transactions on Information Theory, pp. 469–472, 1985.
4. Archived NIST Technical Series Publication, Secure Hash Standard (SHS), Federal Information Processing Standard (FIPS), 180-4, March 2012.
5. Peter Lawrence Montgomery, Modular Multiplication Without Trial Division, Mathematics of Computation, 4A 170, 519-521, 1985.

BOUNDED NELDER-MEAD ALGORITHM AS A LOCAL OPTIMIZER FOR PORTFOLIO OPTIMIZATION

Can B. Kalayci^{1, *}, Olcay Polat¹

¹Department of Industrial Engineering, Pamukkale University, Denizli, Turkey

*cbkalayci@pau.edu.tr

Abstract

Portfolio optimization, from the perspective of the modern portfolio theory proposed by Markowitz, is a quantitative approach to make investment decisions across a collection of financial instruments. Often, a trade-off is sought between two conflicting objectives that an investor greatly desires: minimizing risk and maximizing profit. Real-life constraints such as boundary and cardinality transform the original convex quadratic programming problem into a mixed integer quadratic programming problem which is proven to be NP-Complete. This optimization problem can be effectively solved in two phases; asset selection and proper weight assignment. In this paper, attention is given to the proper weight assignment using the nelder-mead simplex algorithm. Initial simplex parameters for various risk levels are investigated. Lower and upper limits for each asset proportion, namely boundary constraints, are dealt within the algorithm to keep any solution within the feasible region. Results confirm the effectiveness of the solution methodology. This research is funded by the Scientific and Technological Research Council of Turkey (TUBITAK) with the grant number 214M224 and Scientific Research Project Coordination Unit of Pamukkale University with the grant number 2018KRM002-128.

Keywords: Nelder-Mead, boundary constraints, local optimizer, portfolio optimization.

REFERENCES

1. Markowitz, H.M., Portfolio selection, The Journal of Finance, Vol: 7, No: 1: 77-91,1952.
2. Nelder, J.A. and Mead, R., A simplex method for function minimization, The computer journal, Vol: 7, No: 4: 308-313,1965.
3. Bienstock, D., Computational study of a family of mixed-integer quadratic programming problems, Mathematical programming, Vol: 74, No: 2: 121-140,1996.
4. Grazia Speranza, M., A heuristic algorithm for a portfolio optimization model applied to the milan stock market, Computers & Operations Research, Vol: 23, No: 5: 433-441,1996.
5. Luersen, M.A., Le Riche, R., and Guyon, F., A constrained, globalized, and bounded nelder-mead method for engineering optimization, Structural and Multidisciplinary Optimization, Vol: 27, No: 1: 43-54,2004.
6. Gao, F. and Han, L., Implementing the nelder-mead simplex algorithm with adaptive parameters, Computational Optimization and Applications, Vol: 51, No: 1: 259-277,2012.
7. Kalayci, C.B., Ertenlice, O., Akyer, H., and Aygoren, H., An artificial bee colony algorithm with feasibility enforcement and infeasibility toleration procedures for cardinality constrained portfolio optimization, Expert Systems with Applications, Vol: 85, No: Supplement C: 61-75,2017.
8. Ertenlice, O. and Kalayci, C.B., A survey of swarm intelligence for portfolio optimization: Algorithms and applications, Swarm and Evolutionary Computation, Vol: 39, No: 36-52,2018.

On the wave solutions to the TRLW equation

Canan Unlu¹, Tukur Abdulkadir Sulaiman^{2,3} and Hasan Bulut^{2,4}

¹Department of Mathematics, Istanbul University, Istanbul, Turkey

²Department of Mathematics, Firat University, Elazig, Turkey

³Department of Mathematics, Federal University Dutse, Jigawa, Nigeria

⁴Department of Mathematics Education, Final International University, Kyrenia, Cyprus

cunlu@istanbul.edu.tr, sulaiman.tukur@fud.edu.ng, hbulut@firat.edu.tr

Abstract

In this study, a nonlinear model are investigated, namely; the time regularized long wave equation. Various solitary wave solutions are constructed such as the topological, non-topological, topological and non-topological kink-type, compound topological bell-type and singular soliton solutions. Under the choice of suitable parameters values, the 2D, 3D and the contour graphs to some of the obtained solutions are plotted. We feel that the reported results in this study may be helpful in explaining the physical meanings of some important nonlinear models arising in the field of nonlinear science.

Keywords: The extended ShGEEM; TRLW equation; soliton.

REFERENCES

1. X. Xian-Lin and T. Jia-Shi, Travelling Wave Solutions for Konopelchenko-Dubrovsky Equation Using an Extended sinh-Gordon Equation Expansion Method, Commun. Theor. Phys., Vol:50, 1047 2008.
2. H. Bulut, T.A. Sulaiman, H. Bulut and T. Yazgan, Novel Hyperbolic Behaviors to Some Important Models in Quantum Science, Optical and Quantum Electronics, Vol:49, 349 2017.
3. A.K.M.K.S. Houssain, M.A. Akbar and Md.A.K. Azad, Closed Form Solutions of Two Nonlinear Evolution Equations, Cogent Physics, Vol:4, 1396948 2017.
4. D. Lu, Jacobi Elliptic Function Solutions for two Variant Boussinesq Equation, Chaos Solitons and Fractals, Vol:24, No:5, 1373-1385 2005.

INSPECTION OF ARTIFICIALLY BUILT MECHANICAL FAILURES THROUGH INNOVATIVE CONDITION MONITORING TECHNIQUES

S. Seçkin EROL^{1*}, Cemal MERAN^{2,*}

¹Department of Mechanical Eng., Faculty of Engineering&Architecture, Kilis 7 Aralık University, Kilis, Turkey, sserol@kilis.edu.tr

²Department of Mechanical Eng., Faculty of Engineering, Pamukkale University, Denizli, Turkey, cmeran@pau.edu.tr

*Corresponding Author

Abstract

The aim of this research study is to investigate the problems of unbalance, axial misalignment, mechanical looseness and bearing fatigue which are frequently encountered in the industry in comparison with the ideal vibration method and electrical consumption technique which is the latest condition monitoring technique in the laboratory environment.

Artificial damages were created with the help of technological infrastructure and it was possible to investigate the activities of two different state monitoring techniques based on vibration and electrical consumption (current, voltage) signals and to obtain detailed information on this issue. In the study, it was tried to emphasize the application of condition-based estimator maintenance and the importance of relevant technologies.

Considering the importance of this in the study, the data on the types of defects planned for the tests have been examined in a wide spectrum. The results will contribute to the correct determination of the defects that occur under different conditions. The effects of imperfections were investigated by both waveform and spectrum imaging techniques. It is aimed for contributing to scientists working in this field and to their practice studies by examining oil starvation, unbalances, misalignment and mechanical looseness defects in case based estimator maintenance through untreated precision and sharing the obtained findings with scientific world.

Keywords: Condition monitoring; Spectrum; Diagnostic; Prognostic; Vibration.

REFERENCES

1. Collacott, R.A., 1977: *Mechanical Fault Diagnosis*, Chapman&Hall, London, s405.
2. Lee, J., Ni, J., Djurdjanovic, D., Qiu, H., and Liao, H., 2006: Intelligent prognostics tools and e-maintenance. *Computers in Industry*, 57, 476-489.
3. Campos, J., 2009: Development in the application of ICT in condition monitoring and maintenance. *Computers in Industry*, 60, 1-20.
4. Rao, B.K.N., 1996: *Handbook of Condition monitoring*, Elsevier, Oxford.
5. Tsang, A. H. C., 1995: Condition-based maintenance tools and decision making. *Journal of Quality in Maintenance Engineering*, 1(3), 3-17.

SOME OPERATIONAL FORMULAS FOR THE MULTIVARIATE MITTAG-LEFFLER FUNCTIONS

Mehmet Ali Özarslan¹, Cemaliye Kürt¹

¹ Department of Mathematics, Eastern Mediterranean University, Famagusta, North Cyprus

mehmetali.ozarslan@emu.edu.tr,

cemaliye.kurt@emu.edu.tr,

Abstract

In this article, with the help of the inverse operator \widehat{D}_x^{-1} , we rewrite multivariate Mittag-Leffler functions $E_{\rho_1, \dots, \rho_j, \lambda}^{(\gamma_1, \dots, \gamma_j)}(x_1, \dots, x_j)$ [3] in the series representation which further yields the Rodrigues-type relation. Also, as a special case of the main results, we rewrite a class of polynomials $Z_{n_1, \dots, n_j}^{(\alpha)}(x_1, \dots, x_j; \rho_1, \dots, \rho_j)$ [2] which contains the multivariate Laguerre polynomials $L_{n_1, \dots, n_j}^{(\alpha)}(x_1, \dots, x_j)$ [1]. Finally, we construct an integral operator involving $Z_{n_1, n_2}^{(\alpha)}(x_1, x_2; \rho_1, \rho_2)$ in the kernel and then we propose fractional integro-differential equation contains $\varepsilon_{n_1, n_2, \lambda, \omega_1, \omega_2; 0^+}^\alpha$.

Keywords: Laguerre and Konhauser polynomials; Mittag-Leffler function; Laplace transform.

REFERENCES

1. Arthur Erdélyi, Beitrag zur Theorie der konfluenten hypergeometrischen Funktionen von mehreren Veränderlichen, Akademia der Wissenschaften in Wien, Sitzungsberichte, Abt. IIa, Math-Nat, Vol:146, 431-467, 1937.
2. Mehmet Ali Özarslan, On a singular integral equation including a set of multivariate polynomials suggested by Laguerre polynomials, Appl. Math. Comput. Vol:229, 350-358, 2014.
3. R. K. Saxena, S.L. Kalla, R. Saxena, Multivariate analogue of generalized Mittag-Leffler function, Int. Trans. Special Funct. Vol:22, No:7, 533-548, 2011.

RISK ASSESSMENT WITH FAILURE MODE AND EFFECT ANALYSIS AND GREY RELATIONAL ANALYSIS METHOD IN PLASTIC INJECTION PROCESS

Ceren Ünlükal¹, Mine Şenel¹, Bilgin Şenel¹

¹Department of Industrial Engineering, Munzur University, Tunceli, Turkey

cerentunc_crn@yahoo.com, mines@anadolu.edu.tr, senelbilgin@gmail.com,

Abstract

This study aims to evaluate the risks that may arise during the production process in a plastic injection manufacturing enterprise with traditional Failure Mode and Effect Analysis (FMEA) and Grey Relational Analysis (GRA). Although it is a widely used analytical technique that helps to identify and reduce the risks of failure in a process, the failure mode and effects analysis (FMEA) has some drawbacks that the different risk can have the same risk priority values and the weight of risk factors is not take into consideration. This situation has been tried to be eliminated by integrating the FMEA with the GRA. As a result, it is seen that the order of risk priority values of the identified failure change according to both methods.

Keywords: Risk Assessment; Failure Mode and Effect Analysis (FMEA); Grey Relational Analysis (GRA).

REFERENCES

1. P. Garvey, Analytical Methods for Risk Management, New York: Chapman and Hall/CRC, 2008.
2. Ching- Liang Chang, Chiu- Chi Wei, Yeong- Hoang Lee, Failure mode and effects analysis using fuzzy method and grey theory, Kybernetes, Vol. 28 Issue: 9, pp.1072-1080, 1999.
3. Çiğdem Sofyalıoğlu, Süreç Hata Modu Etki Analizini Gri Değerlendirme Modeli, Ege Akademik Bakış, 11 (1), 155-164, 2011.
4. R. E. McDermott, R. J. Mikulak, M. R. Beauregard, The Basics of FMEA, Productivity Press 2nd edition, ISBN 9781563273773, 91 pages, 2008.
5. W C Ng, S Y Teh, H C Low, P C Teoh, The integration of FMEA with other problem solving tools: A review of enhancement opportunities, Journal of Physics: Conference Series 890/012139, 2017.
6. Cengiz Kahraman, İhsan Kaya, Özlem Şenvar, Healthcare Failure Mode and Effects Analysis Under Fuzziness, Human and Ecological Risk Assessment, 19: 538–552, 2013.
7. Hu-Chen Liu, Long Liu, Nan Liu, Ling-Xiang Mao, Risk evaluation in failure mode and effects analysis with extended VIKOR method under fuzzy environment, Expert Systems with Applications, Vol: 39,12926–12934, 2012.
8. Yuanyuan Jiang, Hongmin Jiang , Siyi Ding, Qin Liu, Application of failure mode and effects analysis in a clinical chemistry laboratory, Clinica Chimica Acta, Vol: 448, 80-85, 2015.

TAYLOR'S FORMULA AND RELATED INEQUALITIES FOR A DERIVATIVE WITH A NEW PARAMETER

Deniz UÇAR¹

¹ Department of Mathematics, University of Usak, Uşak, Turkey

deniz.ucar@usak.edu.tr

Abstract

In this paper, we derive Taylor's theorem and some properties for beta fractional derivatives. We extend some classical integral inequalities to the β -fractional calculus. We also establish some refinements of Steffensen, Hermite-Hadamard and some related inequalities for the new parameter.

Keywords: Taylor's formula, β -fractional integral, Steffensen inequality, Hermite-Hadamard inequality.

REFERENCES

1. Abdon Atangana, Derivative with a new parameter, theory, methods and applications, Academic Press, 2015.
2. Douglas R. Anderson, Taylor's formula and integral inequalities for conformable fractional derivatives, Contributions in Mathematics and Engineering, 25-43, Springer, 2016

AN EXTENSION OF DARBO'S FIXED POINT THEOREM DEFINED BY THE SEQUENCES OF FUNCTIONS

Derya SEKMAN¹, Vatan KARAKAYA², Necip ŞİMŞEK³

^{1,2} Department of Mathematics, Ahi Evran University, Kirsehir, Turkey

² Department of Mathematical Engineering, Yildiz Technical University, Istanbul, Turkey

³ Department of Mathematics, Istanbul Commerce University, Istanbul, Turkey

deryasekman@gmail.com, vk kaya@yahoo.com, necsimsek@yahoo.com

Abstract

In this work, we aim to contribute to functional analysis and operator theory by making a generalization of Darbo's fixed point theorem with the help of sequences of functions. Recently, Darbo's fixed point theorem associated with measure of noncompactness have been generalized by using the notion of shifting distance functions. We will define a pair of shifting distance sequences of functions. Besides, we will generalize Darbo's fixed point theorem by using sequences of functions and investigate the its fixed points. Also we will give interesting an example.

This work was supported by the Ahi Evran University Scientific Research Projects Coordination Unit. Project Number: RKT.A3.17.001.

Keywords: Fixed point; Measure of noncompactness, Shifting distance sequences of functions

REFERENCES

1. M. Berzig, Generalization of the Banach Contraction Principle, 2013. arXiv:1310.0995 [math.CA]
2. G. Darbo, Punti Uniti In Trasformazioni A Codominio Non Compatto, Rend. Sem. Mat.Univ. Padova, 24, 84-92, 1955.
3. M. Mursaleen, S.A. Mohiuddine, Applications of Measures of Noncompactness to The Infinite System of Differential Equations in l_p Spaces, Nonlinear Anal. 75(4): 2111-2115, 2012.
4. A. Samadi and M. B. Ghaemi, An Extension of Darbo's Theorem and Its Application, Abstract and Applied Analysis, Vol. 2014, Article ID 852324, 11 pages.

ON NUMERICAL SOLUTIONS FOR TIME FRACTIONAL PARTIAL DIFFERENTIAL EQUATION

Dilara Altan Koç¹ Yalçın Öztürk¹ Ayşe Anapalı Şenel¹ G.Gözde Biçer Şarlak¹
Mustafa Gülsu¹

¹ Department of Mathematics, Mugla Sitki Kocman University, Mugla, Turkey

dilaraaltan@mu.edu.tr, yozturk@mu.edu.tr, ayseanapali@mu.edu.tr gozdebicer@mu.edu.tr

m.gulsu@mu.edu.tr

Abstract

In this work one of the fractional partial differential equations was solved by finite difference scheme based on five point and three point central space method with discretization in time. We use between the Caputo and the Riemann-Liouville derivative definition and the Grünwald-Letnikov operator for the fractional calculus. The stability analysis of this scheme is examined by using von-Neumann method. A comparison between exact solutions and numerical solutions is made. Some figures and tables are included.

Keywords: Fractional diffusion equation, finite difference schemes, explicit method.

REFERENCES

1. Berkowitz B.; Scher H., Anomalous transport in random fracture networks, Phys. Rev. Lett., 79, 4038-4041, 1997.
2. Palade L.I., Attane P., Huilgol R.R., Mena B., Anomalous stability behavior of a properly invariant constitutive equation which generalises fractional derivative models, Inter. J. Eng. Sci., 37, 315-329, 1999.
3. Baskonus ,H. M., Mekkaoui, T., Hammouch ,Z., Bulut, H., Active Control of a Chaotic Fractional Order Economic System, Entropy, 17(8), 5771-5783, 2015.

A NUMERICAL METHOD FOR SOLVING TIME FRACTIONAL DIFFUSION EQUATION

Dilara Altan Koç¹ Yalçın Öztürk¹ G.Gözde Biçer Şarlak¹ Ayşe Anapalı Şenel¹
Mustafa Gülsu¹

¹ Department of Mathematics, Mugla Sitki Kocman University, Mugla, Turkey

dilaraaltan@mu.edu.tr, yozturk@mu.edu.tr, gozdebicer@mu.edu.tr, ayseanapali@mu.edu.tr

m.gulsu@mu.edu.tr

Abstract

In this paper one of the fractional partial differential equations which is called subdiffusion equation was solved by finite difference method based on seven point and five point, for end points three point central space scheme with discretization in time. We used between the Caputo and the Riemann-Liouville derivative definition and the Grünwald-Letnikov operator for the fractional calculus. The stability analysis of this scheme was examined by using von-Neumann method. A comparison between exact solutions and numerical solutions was made. Some figures and tables were included.

Keywords: Improved Fractional diffusion equation, finite difference schemes, explicit method.

REFERENCES

1. Ciesielski M., Leszczynski J. Numerical simulations of anomalous diffusion, Computer Methods in Mechanics, Gliwice, Poland, June 3-6, 2003.
2. Amblard F., Maggs A.C., Yurke B., Pargellis A.N., Leibler S., Subdiffusion and anomalous local viscoelasticity in actin networks, Phys. Rev. Lett., 77, 4470-4473, 1996.
3. Oldham K., Spanier J., The fractional Calculus, Academic Press, New York and London, 1974.

SOME NEW DIRECTIONS WITHIN FRACTIONAL CALCULUS

Dumitru Baleanu^{1,2}

¹Department of Mathematics, Faculty of Art and Sciences, Ankara, Turkey

²Institute of Space Sciences, Magurele-Bucharest, Romania

dumitru@cankaya.edu.tr,

Abstract

In my talk I will present some new trends within the fractional calculus and some of its applications. Several examples of complex models equipped with real data will be analyzed.

Keywords: Fractional differentiation; Mittag-Leffler kernels; Discrete fractional calculus.

REFERENCES

1. G. C. Wu, D. Baleanu, S. D. Zeng and Z. G. Deng, Discrete fractional diffusion equation, *Nonlinear Dynamics*, Vol. 80, No. (1--2), 281—286, 2015.
2. D. Baleanu, K. Diethelm, E. Scalas and J. J. Trujillo, *Fractional Calculus: Models and Numerical Methods*, Series on Complexity Non Linearity and Chaos, Vol. 3, World Scientific, New Jersey, 2012.
3. B. Mehdinejadiani, A. Ali Naseri, H. Jafari, A. Ghanbarzadeh and D. Baleanu, A mathematical model for simulation of a water table profile between two parallel subsurface drains using fractional derivatives, *Computer and Mathematics with Applications*, Vol. 66, No. 5 785-794, 2013.

STEREODYNAMICS CALCULATIONS FOR $O^+ + HD$ COLLISIONS

Duygu Cimenoglu Uludağ¹, Niyazi Bulut², Octavio Roncero³ and François Lique⁴

¹Instructor, Turkish Airlines, Istanbul, Turkey

²Firat University, Department of Physics, Elazig, Turkey

³Dept. Procesos Atómicos, Moleculares y en Superficies (PAMS) Instituto de Fisica Fundamental (C.S.I.C.) Madrid, Spain

⁴LOMC - UMR 6294, CNRS-Université du Havre, 25 rue Philippe Lebon, BP 1123, 76063 Le Havre, France

dcimenoglu@thy.com

Abstract

In space, deuterated species are surprisingly highly abundant. Following the recent discovery of OH^+ , we are studying the possible formation of the OD^+ molecule in the interstellar medium. New quantum reactive scattering calculations for the $O^+ + HD$ collisions have been carried out to obtain state-to-state cross sections for the title system by using an accurate wave packet approach [1-3] using the doublet and quartet ground H_2O^+ electronic potential energy surfaces correlating to the open shell reactants. Calculations were performed for collision energies in the range of 1 meV to 0.7 eV and for different initial rotational excitation of the reagent molecules to investigate the stereodynamics effect. This kind of calculations can provide us a detailed information about atom diatomic molecular collisions.

Keywords: Stereodynamics; reaction cross-section; wave packet method.

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References

- [1] N. Bulut, J. F. Castillo, P.G. Jambrina, J. Klos, O. Roncero, F. J. Aoiz, and L. Banares, J. Phys. Chem. A, 2015, 119, 11951-11962.
- [2] N. Bulut, F. Lique and O. Roncero, J. Phys. Chem. A, 2015, 119, 12082-12089.
- [3] F. Lique, N. Bulut, O. Roncero, MNRAS, 2016, 461, 4477-4481.

PERTURBED TRAPEZOID INEQUALITIES FOR n . ORDER DIFFERENTIABLE CONVEX FUNCTIONS AND THEIR APPLICATIONS

Gülsüm Şanal¹, Duygu Dönmez Demir²

¹ Aeronautics and Astronautics, University of Turkish Aeronautical Association, İzmir, Turkey

² Department of Mathematics, Manisa Celal Bayar University, Manisa, Turkey

duygu.donmez@cbu.edu.tr,

Abstract

In this study, we introduce a new general identity for n times differentiable functions. Then, some new inequalities are presented related to general perturbed trapezoid inequality for the classes of functions whose n . derivatives of absolute values are convex. Finally, some applications are given to prove the proposed inequalities.

Keywords: Convex function; perturbed trapezoid inequality.

REFERENCES

1. P. Cerone, On Perturbed Trapezoidal and Midpoint Rules, Korean J. Comput. Appl. Math., 2, 423-435, 2002.
2. S.S. Dragomir, R.P. Agarwal, Two Inequalities for Differentiable Mappings and Applications to Special Means of Real Numbers and to Trapezoidal Formula, Appl. Math. Lett., 11(5), 91-95, 1998.
3. M. Tunç, G. Şanal, Some Perturbed Trapezoid Inequalities for Convex, s -Convex and tgs-Convex Functions and Applications, Tbilisi Mathematical Journal 8(2), 87-102, 2015.
4. M. Tunç, G. Şanal, Some Perturbed Trapezoid Inequalities for m - and (α, m) -convex Functions and Applications, Journal of New Theory, 2, 69-79, 2015.

PRE-SERVICE MATHEMATICS TEACHERS' ABILITY OF DRAWING THE REFLECTION OF A FIGURE WITH RESPECT TO A SYMMETRY LINE

Ebru Mutlu¹, Asuman Duatepe Paksu¹

¹ Department of Maths and Science Education, Pamukkale University, Denizli, Turkey

e-mails: emutlu@pau.edu.tr, aduatepe@pau.edu.tr

Abstract

Since the concept of symmetry is interwoven with real life, it is one of the fundamental issues for preparing students to life. The related literature on symmetry mostly focuses on students and aims to identify students' current knowledge and conceptual misconceptions. However, there is a limited number of research studies on pre-service mathematics teachers' existing misconceptions and what they pay attention to while taking the symmetry of an objects with respect to a line. The aim of the present study is to investigate pre-service lower secondary school mathematics teachers' ability of drawing a given figure's reflection according to the symmetry lines in various positions. The sample of the study comprised eight pre-service mathematics teachers who were attending a mathematics education department and willing to participate in the study. Criterion sampling of purposive sampling methods was used. The underlying reason of choosing fourth grade teacher candidates is to assume that they acquired the concepts of symmetry and reflection symmetry in geometry courses. Six open-ended questions were asked to determine the ability of the prospective teachers to take the symmetry of a given figure respect to the lines in different situations. Furthermore, interviews were conducted with the participants on their definitions of symmetry and symmetry according to a line. In this way, it was tried to elaborate on the meanings that prospective teachers' understanding of the drawing reflection with respect to a symmetry line. The data of the study were the drawing papers of the questions that the prospective teachers have answered and the video recordings of the interviews including the definitions of the concepts of symmetry and symmetry respect to a line. Content analysis was used for data analysis. The findings indicated that the prospective teachers were successful in drawing the reflection of a given figure according to the vertical, horizontal and inclined symmetry lines, and they used an informal language to define the concepts of symmetry and symmetry according to a line. In this respect, it is thought that mathematical skills of pre-service mathematics teachers are to be supported through activities including verbal skills.

Key Words: Symmetry, Symmetry with respect to a Line, Pre-Service Mathematics Teachers

REFERENCES

1. Dreyfus, T., & Eisenberg, T. "Symmetry in mathematics learning" Zentralblatt fur Didaktik der Mathematik. Vol:90 No:2, 53-59, 1989
2. Köse, N.Y. "İlköğretim öğrencilerinin doğruya göre simetri bilgileri", Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 42: 274-286, 2012

Exact Solutions with Lie Symmetry Analysis for Nano-Ionic Currents along Microtubules

Ebru Cavlak Aslan¹, Zühal Küçükarslan Yüzbaşı¹, Mustafa Inc¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

ebrucavlak@hotmail.com, zuhal2387@yahoo.com.tr and mine@firat.edu.tr

Abstract

In this article, we apply Lie symmetry analysis to nano-ionic currents of MTs which play an important role in biology. Then, the new classes of symmetry reductions of nano-ionic currents of MTs are designated and exact solutions are investigated.

REFERENCES

1. E. H. M. Zahran, Exact Travelling Wave Solutions for Nano-Solitons of Ionic Waves Propagation Along Microtubules in Living Cells and Nano-Ionic Currents of MTs, World Journal of Nano Science and Engineering, Vol:5, 78-87, 2015.
2. M. Younis, S. T. R. Rizvi, Analytical and Soliton Solutions: Nonlinear Model of Nano bioelectronics Transmissionlines, Applied Mathematics and Computations, Vol:265, 994-1002, 2015.

Optical Soliton Solutions of Nonlinear Schrödinger Equation with Jacobi Elliptic Functions

Ebru Cavlak Aslan¹ and Mustafa Inc¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

ebrucavlak@hotmail.com and minc@firat.edu.tr

Abstract

In this article, we obtain optical soliton solutions of the nonlinear Schrödinger equation (NLSE) by the Jacobi elliptic functions. Here, two laws of cubic-quartic nonlinearity are considered as Kerr and Power laws. Also, figures for the obtained solutions are drawn.

Keywords: Nonlinear Schrödinger Equation; Jacobi elliptic function.

REFERENCES

1. Y. S. Kisvar, G. P. Agrawal, Optical Solitons, Academic Press, New York, 2003.
2. A. M. Wazwaz, A two-mode modified KdV equation with multiple soliton solutions, Applied Mathematics Letters, Vol: 70, 1-6, 2017.
3. M. J. Xu, S. F. Tian, J. M. Tian, T. Zhang, Lie Symmetry Analysis, Conservation Laws, Solitary and Periodic Waves for a Coupled Burger Equation, Superlattices and Microstructures, Vol: 101, 415-428, 2017.

SUSTAINABLE DECISIONS AND APPROACHES IN TEXTILE PRODUCTION

Ece Kalayci, Ozan Avinc*, Arzu Yavas

Pamukkale University Department of Textile Engineering
Kinikli Kampusu, Denizli, 20070 TURKEY

*oavinc@pau.edu.tr

Abstract

The production of textile materials increases day by day due to the population growth, increasing consumption and fashion trends. This rapid increase in production triggers the demand of raw materials and causes the consumption of valuable clean water and energy resources. Chemical waste and greenhouse gas that grows out of chemical reactions harm the environment in many different ways such as influencing climate change and global warming. This study focuses on sustainable decisions and approaches in textile production. The production of natural textile fibers which do not need irrigation and/or any protective chemicals contributes to sustainable cultivation and textile manufacturing. In addition to the use of natural and natural-based textile fibers, the recyclability and reusability of the fibers are mandatory for complete sustainable textile production. Environmental textile application methodologies requiring less water, less chemicals and less energy serves to create a more sustainable future for textile industry. Consequently, sustainable decisions and approaches in textile production are; firstly, renewable, reusable, recyclable and bio-degradable material selection, secondly, finishing techniques leading to the use of less water, less chemical and less energy and finally, using natural or natural-based auxiliary substances instead of chemicals for a more environmental, sustainable world. Furthermore, consumers' sensitivity and awareness to environment will encourage the manufacturers for sustainable production and thus, natural resources will be safely transferred to the future generations.

Keywords: sustainability, sustainable textiles, renewable textiles, bio-degradable textiles, reusable textiles

REFERENCES

1. Ravi Kumar, M.N., A review of chitin and chitosan applications, *Reactive and functional polymers*, Vol: 46, No: 1: 1-27,2000.
2. Bechtold, T. and Mussak, R., 2009. *Handbook of natural colorants*: John Wiley & Sons.
3. Öztürk, D. and Eren, H., Tekstil terbiyesinde ozon kullanımı, *Uludağ Üniversitesi Mühendislik-Mimarlık Fakültesi Dergisi*, Vol: 15, No: 2: 37-51,2010.
4. Muthu, S.S., Li, Y., Hu, J.Y., and Mok, P.Y., Quantification of environmental impact and ecological sustainability for textile fibres, *Ecological Indicators*, Vol: 13, No: 1: 66-74,2012.
5. Fletcher, K., 2013. *Sustainable fashion and textiles: Design journeys*. New York: Routledge.
6. Odabaşoğlu, H.Y., Avinc, O.O., and Yavaş, A., Waterless textile dyeing, 2013 (Volume: 20), Vol: 90, No,2013.

Approximate solution of a class of fractional integro-differential equations

E. A. Rawashdeh*, Mohammad F. Al-Jamal†

Abstract

The spline collocation method is applied to approximate the solution of fractional integro-differential equations of the type

$$y'(t) = f(t) + \int_0^1 K(t, s) D_*^q y(s) ds,$$

with the initial condition

$$y(0) = \beta \in \mathbb{R}.$$

A brief review to theory of fractional calculus is given. Numerical examples are also presented to test and illustrate the method.

Key words. Fractional derivative, fractional integro-differential equation, numerical solution, spline space.

References

- [1] L. Blank, *Numerical treatment of differential equations of fractional order*, Numerical Analysis Report No. 287, Manchester Centre for Computational Mathematics, 1996.
- [2] H. Brunner, A. Pedaş, and G. Vainikko, *Piecewise polynomial collocation methods for linear Volterra integro-differential equations with weakly singular kernels*, SIAM Journal of Numerical Analysis, 39 (2001), 957-982.
- [3] W. G. El-Sayed and A. M.A. El-Sayed, *On the functional integral equations of mixed type and integro-differential equations of fractional orders*, Applied Mathematics and Computation, 154 (2004), 461-467.

*Department of Mathematics, Yarmouk University, Irbid, Jordan, edris@yu.edu.jo.

†Department of Mathematics, Yarmouk University, Irbid, Jordan, aljamal@gmail.com.

THE NUMERICAL SOLUTION OF A BOUNDARY VALUE CONTACT PROBLEM FOR HALF PLANE BY USING SIE

Elcin YUSUFOGLU¹

¹Usak University, Usak, Turkey

elcin.yusufoglu@usak.edu.tr,

Huseyin OGUZ²

²Dumlupinar University, Kutahya, Turkey

huseyin.oguz@dpu.edu.tr,

Abstract: In this study, a contact problem between half-plane and a punch is investigated. The elastic parameters of the half-plane are not constant. A numerical solution method is developed to solve the cauchy type integral equation for determine the pressure distribution. The numerical method is based on the ideas of Lifanov [1] ve Erdoğan [2] studies. The numerical results are given.

Keywords: Cauchy Type Integral Equation, Plane Contact Problem.

REFERENCES

- [1] Lifanov, I.K, Saakian, A.V. (1983), Method of numerical solution of the problem of impressing a moving stamp into an elastic half plane, taking heat generation into account PMM U.S.S.R. Cilt. 46,388-394
- [2] F. Erdogan and G.D. Gupta, Cook T.S, The numerical solution of singular integral equations, Q. J. Appl. Math. 29 (1973),pp. 525–534.
- [3] Erdoğan, F., (1969), Approximate Solutions of Systems of Singular Integral Equations, Society for Industrial and Applied Mathematics, 17, 1041-1059.
- [4] Muskhelishvili, N.I, (1958), Singular Integral Equations, Wolters-Noordhoff Publishing, Groningen
- [5] Galin , L. A., (1953), Contact Problems in the Theory of Elasticity, Moscow (In Russian)
- [6] Tricomi, F. G., (1985), Integral Equations, Dover Publications Inc, New York.
- [7] Aizikovich, S.M.; Asymptotic solutions of contact problems of elasticity theory for media inhomogeneous in depth. Journal of Applied Mathematics and Mechanics 46, 116-124 (1982)

ON INTUITIONISTIC FUZZY 2-METRIC SPACES

Elif Güner¹, Vildan Çetkin² and Halis Aygün³

^{1,2,3}Department of Mathematics, University of Kocaeli, Kocaeli, Turkey

¹elif.guner@kocaeli.edu.tr, ²vildan.cetkin@kocaeli.edu.tr, ³halis@kocaeli.edu.tr

Abstract

The aim of this talk is to introduce some fixed point results for intuitionistic fuzzy 2-metric spaces. We first recall the definition of an intuitionistic fuzzy 2-metric space with several illustrative examples. Then we introduce the concepts of ε -chainable space and (ε, λ) -uniformly locally contractive mapping between intuitionistic fuzzy 2-metric spaces. After that, by using the proposed concepts, we obtain a few fixed point theorems for a given complete intuitionistic fuzzy 2-metric space.

Keywords: Intuitionistic fuzzy 2-metric, contractive mapping, fixed point theorem

REFERENCES

1. M.S.Bakry, Common Fixed Point Theorem on Intuitionistic Fuzzy 2-Metric Spaces, General Mathematics Notes, Vol:27, No:2, 69-84, 2015.
2. S. Gähler, 2-metrische Räume und ihre Topologische Struktur, Mathematische Nachrichten, Vol:26, 115-148, 1963.
3. M. Mursaleen, Q. M. D. Lohani, Baire's and Cantor's Theorems in Intuitionistic Fuzzy 2-Metric Spaces, Chaos, Solitons and Fractals, Vol:42, 2254-2259, 2009.
4. R. Shrivastava, V. Gupta, N. Vijaywargi, Common Fixed Point Theorem in Intuitionistic Fuzzy 2-Metric Spaces for Integral Inequality, Mathematical Theory and Modeling, Vol:4, No:12, 17-28, 2014.

The Near-Surface Stability Loss Problems for Layered Half-Plane and Half-Space

Elman Hazar¹, Mustafa Denktash²

1. Department of Mathematics, İğdir, Turkey

E-mail: elman.hazar@igdir.edu.tr

2. Department of Vocational School of Sakarya, Turkey

E-mail: mdenktas@sakarya.edu.tr

This statement increases also the significance of the study for the influence of the curving of the reinforcing elements in the structure of the composite materials to the mechanical behavior of those. According to Refs. [1,2] and others, the curving of the reinforcing elements may be due to the design features (as in a woven composites), or to technological processes resulting from the action of various factors (as in a Polymer-Nanocomposites). Moreover the aforementioned curving can be taken [3] as a geometrical model for the structure of the composite materials for the investigation of the various type of fracture (internal or near-surface stability loss) problems for the unidirectional composites under compression along the reinforcing elements. Owing to such modeling employing “boundary form perturbation” technique in the papers [2] the Three-dimensional Linearized Theory of Stability (TLTS) [2, 3] was developed for the internal and near surface stability loss problems for viscoelastic composite materials by employing the initial imperfection criterion [2]. In this case the development of these imperfections with the time flow is investigated within the scope of the piecewise homogeneous body model by the use of the three-dimensional geometrically non-linear field equations of the theory of the viscoelasticity. Using the series representation of the sought values in small parameter characterizing the degree of the initial insignificant imperfections of the reinforcing elements the solution of the non-linear boundary value problems is reduced to the solution of the series linear boundary-value problems. By direct verification it is proven that the linear equations and relations which are attained in these linear boundary value problems coincide with the corresponding ones of the TLTS. Just aforementioned statements allows the authors of the papers [3] to take into account the initial imperfection in the relations of the TLTS and employ the TLTS to investigate the stability loss problems of the time dependent materials within the framework of the initial imperfection criterion. Moreover, in the paper [3] it was proved that for the investigation of the stability loss problems and the determination of the values of the critical forces or critical time results obtained within the framework of only the zeros and first approximations are enough.

Now we consider some details of the results obtained in the papers [3] and start with the paper [3] in which it was assumed that the mode of the initial imperfection of the reinforcing layers is the co-phase periodical plane curving (the plane-strain state was considered). In this case by employing the aforementioned approach the values of the critical forces for elastic composites and the values of the critical time for the viscoelastic composites were determined and it was established that in the particular cases the values of the critical forces coincide with the corresponding results listed in [3] which were attained by employing the Euler approach. In the paper [2] the approach [3] was developed for the unidirectional fibrous viscoelastic composite materials. The near-surface stability loss problems for layered half-plane and half-space are studied in the paper [1] and [2], respectively.

REFERENCES

1. K.Q.Xiao, L.C. Zhang, and I.Zarudi, Mechanical and rheological properties of carbon nanotube-reinforced polyethylene composites, *Compos. Scien. Technol.* 67, 2007, pp. 77–182.
2. A.N.Guz, Fracture Mechanics of composites in Compression, [in Russian], Naukova Dumka, Kiev, 1990, 340p.
3. S.D.Akbarov and A.N.Guz, Mechanics of curved composites, Kluwer Academic Publisher, Dordrecht-Boston-London, 2000, 440p.

Δ^m -STATISTICAL CONVERGENCE IN A PARANORMED SPACE

Çiğdem A. BEKTAŞ¹ and Emine ÖZÇELİK

¹ Department of Mathematics, University of Firat, Elazig, Turkey

cbektas@firat.edu.tr / eminemozcelik@gmail.com

Abstract

In this paper, we introduce the notion of Δ^m -statistical convergence, Δ^m -statistical Cauchy and Δ^m -strongly p -Cesàro summability in a paranormed space. We give some relations between them.

Keywords: Density, Statistical convergence, Paranormed space, Strongly p -Cesàro summability.

REFERENCES

1. Fast, H: Sur la convergence statistique. Colloq Math. 2, 241-244 (1951)
2. Steinhaus, H: Sur la convergence ordinaire et la convergence asymptotique. Colloq. Math. 2, 73-74 (1951)
3. Fridy, JA: On statistical convergence. Analysis. 5, 301-313 (1985)
4. Moricz, F: Statistical convergence of multiple sequences, Arch Math. 81, 82-89 (2003). doi: 10.1007/s00013-003-0506-9
5. Mursaleen, M: λ -statistical convergence. Math Slovaca. 50, 111-115 (2000).
6. Çolak, R, Bektaş, Ç. A., Altınok, H., Ercan, S: On inclusion relations between some sequence spaces. Int. J. Anal. 2016, Art. ID 7283527, 4 pp.
7. Šalát, T: On statistically convergent sequences of real numbers. Math Slovaca. 30,139-150 (1980)
8. Kolk, E: The Statistical convergence in Banach spaces, Tartu UI Toime. 928, 41-52 (1991)
9. Maddox IJ: Elements of Functional Analysis, Cambridge University Press, Cambridge, UK, 2nd edition, 1988.

Morphological disambiguation of Turkish with free-order co-occurrence statistics

Enis Arslan¹, Umut Orhan¹, B. Tahir Tahiroğlu²

¹Department of Computer Engineering, University of Cukurova, Adana, Turkey

²Department of Turkish Language and Literature, University of Cukurova, Adana, Turkey

enisarslan@gmail.com

Abstract

In this article, we address a solution to the morphological ambiguity problem which generally occurs in morphologically complex languages like Turkish. Generally, statistical methods are applicable for this task which maximize the information, obtained for a probable word order sequence in a sentence. The decision in selection of the method to use for the calculation of the probabilities and the sequence selection method depends on the nature of the language. By using the co-occurrence statistics obtained from a semantic graph network which represents the lemmas of the sentences, we select the best word order sequence from the alternatives. The non-ambiguous and free-word-order character of this network is helpful in determining the statistics independently. We have obtained the probability values by using the Naive Bayes (NB) method and the selection of each sequence is maximized in inspiration of the Viterbi algorithm.

Keywords: Morphological ambiguity; Naive Bayes; Viterbi algorithm.

REFERENCES

1. Sak, H., Güngör, T., Saraçlar, M. (2007) Morphological Disambiguation of Turkish Text with Perceptron Algorithm. In: Gelbukh, A. (ed.) CICALing 2007. LNCS, vol. 4394, pp. 107–118. Springer, Heidelberg.
2. Viterbi, A. J. (1967) IEEE Transactions on Information Theory, IT-13(2), 260-269.

Analysis of logistic equation with Atangana-Baleanu derivative with fractional order

Mustafa Ali DOKUYUCU¹, Ercan ÇELİK² and Fahriye Buse CENGİZ²

¹ Department of Mathematics, University of Ağrı İbrahim Çeçen, Ağrı, Turkey

² Department of Mathematics, University of Atatürk, Erzurum, Turkey

madokuyucu@agri.edu.tr, ercelik@atauni.edu.tr, busecngz63@gmail.com

Abstract

This paper seeks to analyse fractional logistic equation via the Atangana-Baleanu fractional derivative. First of all, the logistic equation is integrated a new fractional operator. Then, the existence of the equation a has been examined. Afterwards, we also analysed uniqueness of the solutions using the fixed-point theorem. Finally, the equation was solved with numerical methods and results were obtained.

Keywords: Fractional derivative, logistic equation, fixed-point theory.

REFERENCES

1. Abdon Atangana, and Dumitru Baleanu. New fractional derivatives with nonlocal and non-singular kernel: Theory and application to heat transfer model. Thermal Science 00, 18-18, 2016.
2. Igor Podlubny, Fractional Differential Equations, Academic Press, San Diego, 1999.
3. Abdon Atangana, Badr Saad T. Alkahtani, Analysis of the Keller-Segel model with a fractional derivative without singular kernel, Entropy, 17, 4439-4453, 2015.
4. Guo-Cheng Wu, Dumitru Baleanu. Chaos synchronization of the discrete fractional logistic map." Signal Processing 102, 96-99, 2014.

Analysis of Cancer Treatment model with a fractional derivative without singular kernel

Mustafa Ali Dokuyucu¹, Ercan Çelik² and Merve Zeynep GEÇMEN²

¹ Department of Mathematics, University of Ağrı İbrahim Çeçen, Ağrı, Turkey

² Department of Mathematics, University of Atatürk, Erzurum, Turkey

madokuyucu@agri.edu.tr, ercelik@atauni.edu.tr, mzgecmen1@gmail.com

Abstract

In this work, we analysed the cancer treatment model with the new fractional derivative. Then using the fixed-point theorem, we try to find the existence of the coupled solutions. We also analysed uniqueness of the solutions. Finally, the model will solve with numerical methods and results will be obtained.

Keywords: Fractional derivative, Modelling, fixed-point theory.

REFERENCES

1. Abdon Atangana, and Dumitru Baleanu. New fractional derivatives with nonlocal and non-singular kernel: Theory and application to heat transfer model. Thermal Science 00, 18-18, 2016.
2. Igor Podlubny, Fractional Differential Equations, Academic Press, San Diego, 1999.
3. Heiko Enderling,, Mark AJ Chaplain, Alexander RA Anderson, and Jayant S. Vaidya. A mathematical model of breast cancer development, local treatment and recurrence. Journal of theoretical biology 246, 245-259, 2007.
4. Marcu Loredana, Eva Bezak. Radiobiological modeling of interplay between accelerated repopulation and altered fractionation schedules in head and neck cancer. Journal of Medical Physics/Association of Medical Physicists of India 34, 206, 2009.
5. Heiko Enderling, Cancer Stem Cells and Tumor Dormancy. Advances in Experimental Medicine and Biology. Springer, 55-71, 2012.

ON THE SECOND-ORDER DIFFERENCE EIGENVALUE PROBLEMS

Erdal Bas¹ Ramazan Ozarslan¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

erdalmat@yahoo.com, ozarslanramazan@gmail.com

Abstract

In this study, Sturm-Liouville difference equation is considered. The sum representations of solutions are found. Asymptotic formulas for eigenfunctions are found and behaviors of eigenfunctions are analyzed and illustrated by figures and tables. Also, we find the eigenvalues corresponding some eigenfunctions. We observe the number of eigenvalues of the problem.

Keywords: Sturm-Liouville, Difference Equation, Asymptotic Formula.

REFERENCES

1. Levitan, Boris Moiseevich; Sargsian, Ishkhan Saribekovich. Introduction to spectral theory: selfadjoint ordinary differential operators: Selfadjoint Ordinary Differential Operators. American Mathematical Soc., 1975.
2. Atkinson, Frederick Valentine, and George H. Weiss. "Discrete and continuous boundary problems." *Physics Today* 17 (1964): 84.
3. Adivar, Murat; Baramov, Elgiz. Difference equations of second order with spectral singularities. *Journal of mathematical analysis and applications*, 2.277, 714-721, 2003.
4. Bas, Erdal; Ozarslan, Ramazan. Sturm-Liouville Problem via Coulomb Type in Difference Equations. *Filomat*, Vol:31, No:4, 989-998, 2017.

GENERAL DISCUSSION ON FRACTIONAL SPECTRAL PROBLEMS

Erdal Bas¹ Ramazan Ozarslan² Funda Metin TURK³

Department of Mathematics, University of Firat, Elazig, Turkey

erdalmat@yahoo.com

Abstract

In this study, generally fundamental spectral theory of fractional Sturm-Liouville problems is given under different potentials. Also, similar results are given for discrete fractional Sturm-Liouville problems and obtained results are compared.

Keywords: Sturm-Liouville, fractional, discrete fractional, spectral theory.

REFERENCES

1. Bas, Erdal. "Fundamental spectral theory of fractional singular Sturm-Liouville operator." *Journal of Function Spaces and Applications* 2013 (2013).F.V. Atkinson, *Discrete and Continuous Boundary Value Problems*, Academic Press Newyork (1964).
2. Bas, Erdal, and Metin, Funda. "Fractional singular Sturm-Liouville operator for Coulomb potential." *Advances in Difference Equations* 2013.1 (2013): 300.
3. Bas, Erdal, and Ramazan Ozarslan. "Sturm-Liouville Problem via Coulomb Type in Difference Equations." *Filomat* 31.4 (2017): 989-998.
4. Ansari, Alireza. "On finite fractional Sturm–Liouville transforms." *Integral Transforms and Special Functions* 26.1 (2015): 51-64.
5. Klimek, Malgorzata, and Om Prakash Agrawal. "Fractional Sturm–Liouville problem." *Computers & Mathematics with Applications* 66.5 (2013): 795-812.

ALGORITHM DESIGN FOR IMPROVING PERFORMANCE OF MICROPROCESSOR-CONTROLLED SONAR BUOY PERFORMING SURVEILLANCE OF UNDERWATER OBJECTS

Eren Küren¹ , Akın Cellatoğlu¹

¹ Department of Computer Engineering, European University of Lefke, Northern Cyprus, TR-10 Mersin, Turkey

ekuren@eul.edu.tr , acellatoglu@eul.edu.tr

Abstract

Design approach for improved system performance of a microprocessor-controlled sonar buoys performing surveillance of underwater objects is proposed. When launched under sea or ocean the microprocessor-controlled buoy sets into action for automatic scanning of the underwater as to extract the object information and transmit the same by wireless to a remote ground station for further processing and taking final control action. System design outline for sonar buoy incorporating 7-31 cells replica correlation resulting in improved system performance is presented in this paper. Although the complexity of the hardware replica correlator is minimized using the recent digital delay lines the proposed microprocessor-controlled buoy performs replica correlation through software and extracts object information conceding improved system performance.

Keywords: Buoy, replica correlation, underwater surveillance, microprocessor control, sonar.

REFERENCES

1. Kuren, E., & Cellatoglu, A. 'Optimal cell-pattern setting algorithm for communications systems'. Electronics World, 123(1977), Nov 2017, pp 32-34.
2. K.Balasubramanian, 'Replica correlation detection', Electronics World , Vol 106, No 1767, March2000, pp 238-240.
3. K.Balasubramanian , 'Design Considerations of Portable Sonar and Ground Station Sonar for Improved System Performance', Abstracts of the 3rd International Conference on Computing, Communications and Control Technologies Austin, Texas, USA, July 24-27, 2005.
4. K.Balasubramanian, 'Binary phase shift keying generator', Electronics World, Vol 104, No 1744, April 1998 , pp 300.

A Tabu Search Approach for a Vehicle Routing Problem Arising in a Logistics Company

Cihan ÇETİNKAYA¹, Eren ÖZCEYLAN¹

¹ Department of Industrial Engineering, University of Gaziantep, Gaziantep, Turkey

cihancetinkaya@gmail.com, erenozceylan@gmail.com

Abstract

Fleet management is a very important issue for logistics companies. Since their main aim is to transport the goods with minimum costs, they often make use of the scientific approaches for their vehicle routing problems. In this paper, a real life problem of a logistics company is taken into the account. The firm has 59 customers and one warehouse on their transportation network and they need to facilitate a single route while minimizing their total costs, satisfying customer demands and visiting each customer exactly once. As the size of the network is a large one, a solution approach based on tabu search algorithm is used for the problem. The metaheuristic model is solved by using C# software program, and the computational experiments show that the tabu search algorithm produces high quality solutions within an acceptable computation time.

Keywords: Case study; Vehicle routing problem; Tabu search algorithm.

REFERENCES

1. John Willmer Escobar, Rodrigo Linfati, Maria Baldoquin, Paolo Toth, A granular variable tabu neighborhood search for the capacitated location-routing problem, *Transportation Research Part B: Methodological*, Vol. 67, 344–356, 2014.
2. Suresh Nanda Kumar, Ramasamy Panneerselvam, A survey on the vehicle routing problem and its variants, *Intelligent Information Management*, Vol. 4, No.3, 66–74, 2012.
3. Christos Tarantilis, Foteini Stavropoulou, Panagiotis Repoussis, A template-based tabu search algorithm for the consistent vehicle routing problem, *Expert Systems with Applications*, Vol. 39, No.4, 4233–4239, 2012.

Determination of Semantic Relations Weight's on WordNet

Cagatay TULU¹, Umut ORHAN², Erhan TURAN³

¹ Information Technologies Division, Adana Science Technology University, Adana, Turkey

² Computer Engineering Department, Cukurova University, Adana, Turkey

³ Computer Engineering Department, Osmaniye Korkut Ata University, Osmaniye, Turkey
ctulu@adanabtu.edu.tr , uorhan@cu.edu.tr, erhan.turan@hotmail.com

Abstract

In this study, we propose a new approach to determine the weight of semantic relation types on a graph based WordNet. Semantic relations are important part of the WordNet, each concept in the WordNet is connected to the graph through this relations. Assigning a numerical value to this relation types might bring new opportunity for the measurement of semantic relatedness of the two concept defined in the WordNet. Proposed method uses Men's 3000 semantic relatedness dataset as a human judged and trusted real world dataset and also use publicly available WordNet 3.0 lexical dictionary data. WordNet dictionary data is transformed into graph db. Semantic paths for each word pairs in the Men's 3000 dataset are extracted from graph, these paths are encoded and consolidated with statistical methods. After filtering the paths with length=1, we get the semantic weights of relations defined in WordNet.

Using these found relation weights we can determined the semantic relatedness value for any given word pairs that is defined in the WordNet. Just by collecting all the paths between two words, calculating the path weights by multiplying each relations weights. Finally all the found path values are consolidated by taking mean or median of the path value list, then we get the relatedness score. We might compare the found relatedness values with other real life semantic relatedness datasets in order to evaluate success and reliability of the proposed method.

Keywords: Natural Language Processing, WordNet, Semantic Similarity, Semantic Relations

REFERENCES

1. Fellbaum C., 1998, WordNet: An Electronic Lexical Database. Cambridge, MA: MIT Press.
2. Bruni, E, Tran N. K., Baroni M. Multimodal Distributional Semantics, Journal of Artificial Intelligence Research 49: 1-47

Using Graph Connectivity Measures for Distance in Semantic Networks Erhan TURAN¹, Umut ORHAN², Cagatay TULU³

¹ Computer Engineering Department, Osmaniye Korkut Ata University, Osmaniye, Turkey,
erhan.turan@osmaniye.edu.tr

² Computer Engineering Department, Cukurova University, Adana, Turkey,
uorhan@cu.edu.tr

³Information Technologies Division, Adana Science Technology University, Adana, Turkey,
ctulu@adanabtu.edu.tr

Abstract

Semantic networks are datasets based on graph structure for natural language processing and distance measurement for semantic networks is a vital requirement for semantic analysis on concepts that connected with relations between each other. Connectivity measures can be used for calculating semantic distance between concepts in a semantic network.

In this paper we evaluated graph connectivity algorithms including PageRank, HITS and Betweenness Centrality on a semantic network which was created from a Turkish dictionary. Connectivity measures based on these algorithms used to calculate semantic distance between synonym pairs in the semantic network. And we used a simple connectivity method beside other three popular connectivity algorithms to find most accurate and cost-effective method on our semantic network. Working on bipartite model of the network which increases the complexity of implementation for connectivity algorithms and also calculating on a semantic network that can be expanded with new nodes and edges in periods of time are two major difficulty for connectivity algorithms. Considering all these conditions, results from each algorithm, compared to pick out an optimal method for the semantic network we created.

Keywords: Semantic Networks;PageRank;HITS;Betweenness Centrality;Semantic Distance

REFERENCES

1. Navigli, R., Lapata, M., 2007. Graph Connectivity Measures for Unsupervised Word Sense Disambiguation., in: IJCAI. pp. 1683–1688.
2. Brin, S., Page, L., 2012. Reprint of: The anatomy of a large-scale hypertextual web search engine. Computer networks 56, 3825–3833.
3. Kleinberg, J.M., Kumar, R., Raghavan, P., Rajagopalan, S., Tomkins, A.S., 1999. The web as a graph: measurements, models, and methods, in: Computing and Combinatorics. Springer, pp. 1–17.
4. Brandes, U., Pich, C., 2007. Centrality estimation in large networks. International Journal of Bifurcation and Chaos, 17(07), 2303-2318.

THE PHASE PLANE ANALYSIS OF NONLINEAR EQUATION

Dr. Esen HANAÇ

Department of Mathematics, University of Adiyaman, Adiyaman, Turkey

ehanac@adiyaman.edu.tr

Abstract

I examine the main results concerning the existence and structure of permanent form travelling waves (PTWs) which may occur in the large-time solution to the following initial-boundary value problem

$$u_t + kuu_x = cu_{xx} + u(1 - u),$$

where $k \neq 0$ is a parameter. To show any solution to above equation with $c > 0$ provides a permanent form travelling wave solution which could develop as the primary large-time structure in the solution of the initial-value problem of the equation.

Keywords: Burgers Fisher equation, PTW, manifolds.

REFERENCES

1. Murray, J.D., Mathematical Biology, Springer-verlag, New York 1989.

An inverse Sturm-Liouville problem with a generalized symmetric potential

Esin İnan Eskitaşçioğlu

Yuzuncu Yil University Faculty of Sciences Van, Turkey

Abstract:

We consider the normal form of Sturm-Liouville differential equations with separable boundary conditions. For this problem we know that the potential function is determined uniquely by two spectra and that if the potential is symmetric, then it is determined uniquely by just one spectrum. Here firstly we generalize symmetric potential and then investigate change of needed data to determine potential function uniquely.

REFERENCES

- [1] Ambartsumyan, V. A.; Abereine Frage der Eigenwerttheorie, Zeitschrift f_ur Physik, 53 (1929), pp. 690-695.
- [2] Binding, P. A.; Browne, P. J.; Watson, B. A.; Inverse spectral problems for left-de_nite Sturm-Liouville equations with inde_nite weight, Journal of Mathematical Analysis and applications, 271 (2002), pp. 383-408.
- [3] Borg, G.; Eine Umkehrung der Sturm-Liouvilleschen Eigenwertaufgabe. Bestimmung der Differentialgleichung durch die Eigenwerte, Acta Mathematica, 78 (1946), pp. 1-96.
- [4] Efremova, L. S.; Freiling, G.; Numerical solution of inverse spectral problems for SturmLiouville operators with discontinuous potentials, Cent. Eur. J. Math. 11(11) 2013, pp. 2044-2051.
- [5] Freiling, G.; A Numerical Algorithm for Solving Inverse Problems for Singular SturmLiouville Operators, Advances in Dynamical Systems and Applications. ISSN 0973-5321 Volume 2 Number 1 (2007), pp. 95105.
- [6] Gelfand, I. M.; Levitan, B. M.; On the determination of a di_ erential equation from its spectral function, Izvestiya Akademii Nauk SSSR Seriya Matematicheskaya, 1951, 15 (4), pp. 309-360; 1955. translated in American Mathematical Society Translate, 1, 253.
- [7] Gradshteyn, I. S.; Ryzhik, I. M.; Tables of Integrals, Series, and Products, 6th ed. San Diego, CA: Academic Press, 2000, pp. 1101.
- [8] Hoschtadt, H.; The inverse Sturm-Liouville Problem, Communications Pure and Applied Mathematics, 26 (1973), pp. 715-729.
- [9] Hoschtadt, H.; Lieberman, B.; An Inverse Sturm-Liouville problem with mixed given data, SIAM Journal on Applied Mathematics, 1978, 34(4), pp. 676-680.
- [10] Je_reys, H.; Je_reys, B. S.; Methods of Mathematical Physics 3rd ed., 1988, pp. 446-448, Cambridge University Press, Cambridge, England.

INTERVAL TYPE-2 FUZZY ANALYTIC HIERARCHY PROCESS APPLICATION ON WAREHOUSE PERFORMANCE MEASUREMENT CRITERIA DEFINED

Esra Yaşar¹

Nil Aras²

¹ Department of Logistic Management, University of KTO Karatay, Konya, Turkey

² Department of Industrial Engineering, University of Anadolu, Eskişehir, Turkey

esrayasaarr@gmail.com

nila@anadolu.edu.tr

Abstract

Warehouse performance measurement is of great importance for the development of companies. The companies are to measure their current situation in order to attain ability relating to realizing the improvement process. In this measurement phase, they have to decide what is considered and what proportion it is done. In this study, the most effective factors were determined using the interval type-2 fuzzy analytic hierarchy process method for the factor values that are effective in warehouse performance measurement. The reason to use this solution method is that because of having 3 dimensional membership function, type-2 fuzzy clusters reflect more uncertainties in decision-making problems than type-1 fuzzy clusters do.

Keywords: *Fuzzy analytic hierarchy process, Type-2, Warehouse performance management*

REFERENCES

1. Buckley, J. J. (1985). Fuzzy hierarchical analysis. *Fuzzy sets and systems*, 17(3), 233-247.
2. Kahraman, C., Öztaysi, B., Sarı, İ. U., & Turanoğlu, E. (2014). Fuzzy analytic hierarchy process with interval type-2 fuzzy sets. *Knowledge-Based Systems*, 59, 48-57.
3. Zadeh, L. A. (1996). *Fuzzy sets Fuzzy Sets, Fuzzy Logic, And Fuzzy Systems: Selected Papers by Lotfi A Zadeh* (pp. 394-432): World Scientific.

A novel method for coefficient inverse problem for the kinetic equation

Esra Karatas Akgül¹, Ali Akgül¹ and Şahin Korhan¹

¹ Department of Mathematics, University of Siirt, Siirt, Turkey

aliakgul@siirt.edu.tr,

Abstract

We obtain reproducing kernel functions to investigate the coefficient inverse problem for the kinetic equation. We get approximate solutions by reproducing kernel functions. We present our results by a table. We verify the accuracy of the technique for solutions of a coefficient inverse problem for the kinetic equation.

Keywords: Reproducing kernel method; inverse problem for the kinetic equation; reproducing kernel functions.

REFERENCES

1. Ali Akgül and David Grow. Existence of Solutions to the Telegraph Equation in Binary Reproducing Kernel Hilbert Spaces, *Mathematical Methods in the Applied Sciences*, Submitted.
2. Ali Akgül. New Reproducing Kernel Functions. *Mathematical Problems in Engineering*, Article ID 158134, 10 pages 2015.
3. Ali Akgül, Mustafa Inc, and Esra Karatas. Reproducing kernel functions for difference equations. *Discrete Contin. Dyn. Syst. Ser. S*, 8(6):1055–1064, 2015.
4. Bariza Boutarfa, Ali Akgül and Mustafa Inc. New Approach for the Fornberg-Whitham Type Equations, *Journal of Computational and Applied Mathematics*, 312 13-26, 2017.

On Solutions of Nonlinear Boundary-Value Problems

Esra Karatas Akgül¹, Ali Akgül¹ and Şahin Korhan¹

¹ Department of Mathematics, University of Siirt, Siirt, Turkey

aliakgul@siirt.edu.tr,

Abstract

Reproducing kernel method has been applied to nonlinear boundary-value problems. Implementing this method, we construct a new algorithm to approximate the solution of such nonlinear boundary-value problems. The solution is obtained in the form of a series with this method. The convergence of the reproducing kernel method is shown.

Keywords: Nonlinear boundary-value problems, reproducing kernel method, series solutions.

REFERENCES

1. Nachman Aronszajn. Theory of reproducing kernels. *Trans. Amer. Math. Soc.* 68: 337-404, 1950.
2. Ali Akgül, Mustafa Inc, and Dumitru Baleanu. On solutions of variable-order fractional differential equations. *Int. J. Optim. Control. Theor. Appl. IJOCTA*, 7(1):112–116, 2017.
3. Ali Akgül, Mustafa Inc, and Esra Karatas. Reproducing kernel functions for difference equations. *Discrete Contin. Dyn. Syst. Ser. S*, 8(6):1055–1064, 2015.
4. Mehmet Gıyas Sakar. Iterative reproducing kernel Hilbert spaces method for Riccati differential equations. *Journal of Computational and Applied Mathematics* 2017; 309: 163-174.

INVESTIGATIONS ON THE INITIAL COEFFICIENT ESTIMATES FOR NEW SUBCLASSES OF BI-UNIVALENT FUNCTIONS

Evrım Toklu¹, İbrahim Aktaş²

¹Department of Mathematics, Ağrı İbrahim Çeçen University, Ağrı, Turkey

²Department of Mathematical Engineering, Gümüşhane University, Gümüşhane, Turkey

evrimtoklu@gmail.com, aktasibrahim38@gmail.com

Abstract

In the present paper, the our main object is to introduce new subclasses of bi-univalent functions in the open unit disk by using Salagean operator and find upper bounds on the initial coefficients $|a_2|$ and $|a_3|$ for functions in these new subclasses. Also, we give some interesting results by using the relationship between Salagean differential operator and generalized Salagean differential operator.

Keywords: Univalent function; bi-univalent function; Coefficient bounds; Salagean differential operator.

REFERENCES

1. Al-Oboudi, F.M., On Univalent Functions Defined by a Generalized Salagean Operator, *International Journal of Mathematics and Mathematical Sciences* 27(2004), 1429-1436.
2. P.L. Duren, Univalent Functions, *Grundlehren der Mathematischen Wissenschaften*, Vol. 259. Springer: New York, NY, USA, 1983.
3. H. Orhan, E. Toklu, E. Kadioğlu, Second Hankel determinant problem for k -bi-starlike functions, *Filomat*, 31:12 (2017), 3897-3904.
4. C. Pommerenke, *Univalent Functions*. Gottingen, Germany: Vandenhoeck and Ruprecht, 1975.

STUDIES ON THE RADII OF UNIFORM CONVEXITY OF SOME SPECIAL FUNCTIONS

İbrahim AKTAŞ¹, Evrim TOKLU², Halit ORHAN³

¹Department of Mathematical Engineering, Gümüşhane University, Gümüşhane, Turkey

²Department of Mathematics, Ağrı İbrahim Çeçen University, Ağrı, Turkey

³Department of Mathematics, Atatürk University, Erzurum, Turkey

aktasibrahim38@gmail.com, evrimtoklu@gmail.com, orhanhalit607@gmail.com

Abstract

In this investigation, our main object is to find the radii of uniform convexity of the some normalized q -Bessel and Wright functions. In making this investigation we deal with the normalized Wright functions for three different kind of normalization and six different normalized forms of q -Bessel functions. The key tools in the proof of our main results are the Mittag-Leffler expansion for Wright and q -Bessel functions and properties of real zeros of these functions and their derivatives. Also, we have shown that the obtained radii are the smallest positive roots of some functional equations.

Keywords: Radius of uniform convexity; Mittag-Leffler expansions; q -Bessel functions; Wright function.

REFERENCES

1. İ. Aktaş, Á. Baricz, Bounds for the radii of starlikeness of some q -Bessel functions, Results Math., 72(1) (2017) 947–963.
2. İ. Aktaş, Á. Baricz, H. Orhan, Bounds for the radii of starlikeness and convexity of some special functions, Turkish Journal of Mathematics, 42(1) (2018) 211–226.
3. Á. Baricz, D.K. Dimitrov, I. Mezö, Radii of starlikeness and convexity of some q -Bessel functions, J. Math. Anal. Appl. 435 (2016) 968–985.
4. Á. Baricz, D.K. Dimitrov, H. Orhan, N. Yağmur, Radii of starlikeness of some special functions, Proc. Amer. Math. Soc. 144(8) (2016) 3355–3367.
5. Á. Baricz, E. Toklu, E. Kadioğlu, Radii of starlikeness and convexity of Wright functions, Math. Commun. 23(2018), 97-117.
6. E. Deniz, R. Szasz, The radius of uniform convexity of Bessel functions, J. Math. Anal. Appl. 453(1) (2017) 572–588.

A HYBRID DE - HS ALGORITHM WITH RANDOMIZED PARAMETERS

Ezgi Deniz Ülker¹

¹ Department of Computer Engineering, Faculty of Engineering, European University of Lefke, Mersin-10 Turkey

eulker@eul.edu.tr

Abstract

The evolutionary algorithms and their hybrid methods are quite efficient and accurate in terms of solution quality of optimization. In this study, a new hybrid algorithm is generated by merging Differential Evolution (DE) and Harmony Search Optimization (HS) algorithms which is called DES. The core steps of the algorithms are used without any alterations, but the main control parameters which have direct effect on the performance are randomized in predefined intervals. Experimental study is done by comparing algorithms; DE, HS and their hybrid method DES. According to the results, it is found that DES algorithm has improved the performances of original algorithms in terms of efficiency for the selected test problems.

Keywords: Evolutionary algorithms, hybridization, differential evolution, harmony search, random parameters.

REFERENCES

1. Barış Şimşek, Emir Hüseyin Şimşek, Assessment and Optimization of Thermal and Fluidity Properties of High Strength Concrete via Genetic Algorithm, An International Journal of Optimization and Control: Theories&Applications (IJOCTA), Vol: 7, No: 1 , 90-97, 2017.
2. Bahriye Akay, Derviş Karaboga, Artificial Bee Colony Algorithm Variants on Constrained Optimization, An international Journal of Optimization and Control: Theories&Applications (IJOCTA), Vol:7, No: 1 , 98-111, 2017.
3. Amita Johar, S.S. Jain, P.K. Garg, Transit Network Design and Scheduling using Genetic algorithm- a review, An International Journal of Optimization and Control: Theories&Applications (IJOCTA), Vol: 6, No: 1 , 9-22, 2016.
4. Yılmaz Delice, Emel Kızılkaya Aydoğan, Uğur Özcan, Mehmet Sıtkı İlkey, A modified particle swarm optimization algorithm to mixed-model two-sided assembly line balancing, Journal of Intelligent Manufacturing, Vol: 28, 23-36, 2017.

Some bounds on the Co-PI Spectral Radius of Graphs

Ezgi Kaya^{1,2}, Ayşe Dilek Maden²

¹ Department of Mathematics, University of Iğdir, Iğdir, Turkey

² Department of Mathematics, University of Selcuk, Konya, Turkey

ezgi.kaya@igdir.edu.tr,

aysedilekmeden@selcuk.edu.tr,

Abstract

The Co-PI eigenvalues of a connected graph G are the eigenvalues of its Co-PI matrix. The largest Co-PI eigenvalue is called the Co-PI spectral radius of G . In this study, we give some bounds for the Co-PI Spectral Radius and characterise those graphs for which these bounds are the best possible.

Keywords: Co-PI matrix, Co-PI eigenvalues, Co-PI spectral radius.

REFERENCES

1. D. M. Cvetkovic, M. Doob, H. Sachs, Spectra of Graphs: Theory and Applications, Academic Press, New York, 1980.
2. G. H. Fath-Tabar, T. Doslic, A. R. Ashrafi, On the Szeged and the Laplacian Szeged spectrum of a graph, Linear Algebra Appl., 433, 662-671, 2010.
3. F. Hasani, O. Khormali, A. Iranmanesh, Computation of the first vertex of Co-PI index of TUC4CS(S) nanotubes, Optoelectron, Adv. Mater.-Rapid Commun., 4 (4), 544-547, 2010.
4. G. Indulal, Sharp Bounds on the distance spectral Radius and the distance energy of graphs, Linear Algebra Appl. 430, 106-113, 2009.

A Multi Choice Conic Goal Programming Approach for the Optimization of Cuscrore Control Chart Parameters for the IMA (1,1) Time Series Data

Ezgi Aktar Demirtaş¹

¹ Department of Industrial Engineering, Eskisehir Osmangazi University, Eskisehir, Turkey

eahtar@ogu.edu.tr,

Abstract

In this study, the process for some particular signal type (spike) is modeled for IMA (1,1) Viscosity Data to find the optimum values of CuScore Control Chart parameters. Then the probabilities of identifying (detection rate) and misidentifying the signals (false alarm) were calculated by simulation codes in SAS. By using DOE and Response Surface Methodology, two different non linear regression equations were obtained for detection rate and false alarm. In this study, these regression models were considered as the conflicting objectives. Then, Multi Choice Conic Goal Programming (MCCGP) was used to minimise unwanted deviation variables of goals which contains conflicting objectives namely detection rate and false alarm. The results of the MCCGP provide parameter settings of Cuscrore Control Chart for IMA (1,1) Time Series. MCCGP has been proposed by Ustun based on Conic Scalarizing Function alternatively. This alternative formulation allows the decision maker to set multi-choice aspiration levels for each goal to obtain an efficient solution in the global region and guarantees to obtain a properly efficient (in the sense of Benson) point.

Keywords: Cuscrore Control Chart; Design of Experiment; Multi Choice Conic Goal Programming

REFERENCES

1. Myers R.H., Montgomery D.C., Cook C.M.A., Response Surface Methodology, Wiley & Sons, USA, 2016.
2. Nembhard H.B., Valverde-Ventura R., CuScore Statistics to Monitor a Non-stationary System, Quality and Reliability Engineering International, 23, 303-325, 2007.
3. Üstün Ö., Multi-Choice Goal Programming Formulation Based on the Conic Scalarizing Function, Applied Mathematical Modelling, 36, 974-988, 2012.

ON COMPUTING RELIABILITY OF GENERALIZED SYSTEM

Fahrettin Özbey¹

¹ Department of Statistics, Bitis Eren University, Bitlis, Turkey

fozbey2023@gmail.com & fozbey@beu.edu.tr,

Abstract

A generalized k -out-of- n : F system consists of a sequence of N ordered modules in a line or circle. The j th module is composed of n_j components in parallel ($n_j > 1$, $j = 1, 2, \dots, N$). The system, modules and components are assumed to have binary states which either fail or operate. In the system, lifetimes of components are assumed to be independent and identical distributions random variables. The generalized k -out-of- n : F system fails if and only if there exist at least f failed components or if there exist at least k consecutive failed modules. In the literature, recurrence formula for computing reliability of generalized k -out-of- n : F system was given under different approaches [1 - 4]. In this presentation, an exact formula using mathematical operator for computing reliability of generalized 2-out-of- n : F system will be given.

Keywords: Reliability; Generalized k -out-of- n : F system; Consecutive k -out-of- n : F system.

REFERENCES

1. Kirtee K. Kamalja, Reliability computing method for generalized k -out-of- n system, Journal of Computational and Applied Mathematics, Vol:323, 111–122, 2017.
2. Lirong Cui, Min Xie, On a generalized k -out-of- n system and its reliability, International Journal of Systems Science, Vol:36, No:5, 267–274, 2005.
3. Ming J. Zuo, Zhigang Tian, Performance evaluation of generalized multi-state k -out-of- n systems, IEEE Transactions on Reliability, Vol:55, No:2, 319–327, 2006.
4. Xian Zhao, Lirong Cui, Reliability evaluation of generalised multi-state k -out-of- n systems based on FMCI approach, International Journal of Systems Science, Vol:41, No:12, 1437–1443, 2010.

CHARACTERIZATION OF COHEN-MACAULAY LOCAL RINGS

Fatemeh Mohammadi Aghjeh Mashhad¹

¹ Department of Mathematics, Islamic Azad University, Parand Branch

Tehran, Iran

mohammadifh@ipm.ir

Abstract

In this article, we will use complete intersection homological dimensions to characterize Cohen-Macaulay local rings. Also, we will find some equivalent conditions for local rings which are either regular, complete intersection or Gorenstein.

Keywords: Complete intersection homological dimensions, complete intersection ring, Cohen-Macaulay ring, Gorenstein ring, regular ring.

REFERENCES

1. M. Auslander, D.A. Buchsbaum, Homological dimension in Noetherian rings, Proc. Nat. Acad. Sci. U.S.A., 42, 1956.
2. M. Auslander, M. Bridger, Stable module theory, American Mathematical Society, Providence, R.L., 94, 1969.
3. L.L. Avramov, V.N. Gasharov and I.V. Peeva, Complete intersection dimension, Inst. Hautes Etudes Sci., Publ.Math, Vol:86, 67-114, 1997.
4. N. Bourbaki, Commutative algebra, Chapter 1-7, Springer-Verlag, Berlin, 1998.

Δ^m -STATISTICAL BOUNDEDNESS

Fatih Temizsu¹, Mikail Et²

¹ Department of Mathematics, Bingöl University, Bingöl, Turkey

² Department of Mathematics, Firat University, Elazig, Turkey

¹ femizsu@bingol.edu.tr, ² mikailet68@gmail.com

Abstract

The concept of statistical boundedness of sequences was firstly introduced by Fridy and Orhan in [1]. Bhardwaj and Gupta made some generalizations of statistical boundedness in [2]. On the other hand Et and Çolak and Et and Nuray studied generalized difference sequence spaces with usual and statistical sense in [3] and [4] respectively. In this work we introduce the concept of Δ^m -statistical boundedness by using Δ^m difference operator and examine the relationship amongst Δ^m -statistical convergence, Δ^m -statistical Cauchiness and it. In addition to that we compute the Köthe-Toeplitz and generalized Köthe-Toeplitz duals of the set of all Δ^m -statistical bounded sequences. Moreover we come up with the idea of statistical α and β dual of the sets of sequence which makes us capable of creating statistical equivalents of the notions of normality and perfectness of sequence spaces.

Keywords: Δ^m -statistical boundedness, statistical Köthe-Toeplitz duals, statistical normality and perfectness

REFERENCES

- [1]. Fridy J.A., Orhan C. Statistical limit superior and limit inferior, Proc. Amer. Math. Soc., 125:12 (1997), 3625-3631.
- [2]. Bhardwaj V.K., Gupta S. On some generalizations of statistical boundedness, J. Inequal. Appl., 2014:12 (2014).
- [3]. Et M., Çolak R. On some generalized difference sequence spaces, Soochow J. Math., 21:4 (1995), 377-386.
- [4]. Et M., Nuray F. Δ^m -statistical convergence, Indian J. Pure Appl. Math., 32:6 (2001), 961-969.

COMPARISON OF COAP AND COCOA CONGESTION CONTROL MECHANISMS IN GRID NETWORK TOPOLOGIES

Alper Kamil DEMIR, Fatih ABUT

Department of Computer Engineering, Adana Science and Technology University, Adana, Turkey

akdemir@adanabtu.edu.tr, fabut@adanabtu.edu.tr

Abstract

The Internet of Things (IoT) is a vision of the future Internet. Due to limited resources of IoT devices, a new generation of protocols and algorithms are being developed and standardized. The Constrained Application Protocol (CoAP) has been designed by the Internet Engineering Task Force (IETF) for application layer communication. CoAP is based on UDP, a simple transport layer protocol that does not handle congestion within the network. However, the phenomenon of congestion in IoT networks is also a major problem. Thus, the core CoAP specification offers a basic CoAP congestion control (CC) mechanism based on retransmission timeout (RTO) with binary exponential backoff (BEB). Default CoAP CC is insensitive to network conditions. Therefore, CoAP specification encourages further CC mechanisms that leverage network status information actually available to CoAP [1]. To improve the default CoAP CC, CoAP Simple Congestion Control/Advanced (CoCoA), defined in a draft specification, is being standardized by the IETF CoRE working group. Nevertheless, comparison of default CoAP CC and CoCoA has not been sufficiently investigated in the literature. In this paper, we investigate and present comparison of default CoAP CC and CoCoA in terms of throughput (i.e. number of requests/second) by varying number of concurrent clients where each client continuously sends back-to-back traffic to servers residing in 1x6, 3x6 and 5x6 grid network topologies. On the client side, we set up a PC to run concurrent clients that use Californium implementation of default CoAP CC and CoCoA. On the server side, we also use the same PC to run varying number of servers that use Erbium implementation of CoAP in Cooja simulator of ContikiOS. The CoAP servers are programmed with ContikiOS network stack. For our evaluations, we compare the performance of default CoAP CC and CoCoA. Our results show that CoCoA is not always better than default CoAP CC due to improper selection of the RTO in such scenarios. As a result, design and development of new CoAP CC mechanisms are open to research.

Keywords: Internet of Things; Congestion control; CoAP; CoCOA; Cooja; ContikiOS.

REFERENCES

1. A. Betzler, C. Gomez, I. Demirkol, and J. Paradells, CoAP Congestion Control, IEEE Communications Magazine, Vol:54, No:7, 154–160, 2016.

AN EXPERIMENTAL STUDY FOR ESTIMATING END-TO-END AVAILABLE BANDWIDTH IN A CONTROLLED TESTBED ENVIRONMENT

Fatih ABUT, Alper Kamil DEMIR

Department of Computer Engineering, Adana Science and Technology University, Adana,
Turkey

fabut@adanabtu.edu.tr, akdemir@adanabtu.edu.tr

Abstract

Available bandwidth has been a critical and precious resource in various kinds of networks. Knowledge of available bandwidth is of great interest for both network operators and end-users as it plays a significant role in efficient network management and operation. The purpose of this study is to extend our previous work in [1] by classifying and experimentally evaluating three further end-to-end available bandwidth estimation tools including assolo, yaz and pathchirp. Differently from the rest of studies in literature, this study classifies and evaluates the tools by using two sophisticated classification and evaluation schemes that incorporate a rich set of objective accuracy and performance assessment criteria. The controlled testbed used to evaluate the tools consists of a source, a transit and a destination subnetwork, whereas the end-to-end available bandwidth of the entire network to be estimated was gradually varied from 10 to 90 Mb/s with a step of 10 Mb/s by using a cross-traffic (ct) generator. The results show that in light or medium ct scenarios (i.e. ct rate ≤ 50 Mb/s) assolo on the average yields acceptable estimates and performs better than the other two estimation tools, yielding for our testbed scenario an average estimation error of 4.67%. The average estimation errors of yaz and pathchirp are 8.43% and 15.71%, respectively. However, it has been observed that a major challenge applying for all three tools is that they produce very inaccurate estimates when the ct rate generated on the measurement path is too high. The experimental results clearly show that designing and developing new estimation tools that can properly measure heavily-used paths deserve further investigation.

Keywords: Available bandwidth; Quality of Service; Testbed; Experimental evaluation.

REFERENCES

1. F. Abut, "Messen von Internet-Bandbreite: Metriken, Methoden und Tools", M.Sc. Thesis, Department of Computer Science, Bonn-Rhein-Sieg University of Applied Sciences, Sankt Augustin, Germany, 2012.

CONCEPT DEFINITIONS AND CONCEPT IMAGES FOR LIMIT AND CONTINUITY CONCEPTS OF PRESERVICE ELEMENTARY MATHEMATICS TEACHERS

Fatma Erdoğan¹ Sare Şengül²

¹ Division of Mathematics Education, University of Firat, Elazig, Turkey

f.erdogan@firat.edu.tr

² Division of Mathematics Education, University of Marmara, Istanbul, Turkey

zsengul@marmara.edu.tr

Abstract

The aim of present study was to determine concept images and concept definitions related to limit and continuity concepts of preservice elementary mathematics teachers. In the study, the case study method, one of the qualitative research methods, was used. For this purpose, a test consisting of open-ended questions prepared according to the opinions of field experts and researches in the literature was applied to 65 teachers who have successfully completed the analysis I course. The collected data were analyzed by the content analysis method. In the study, it was found that there were very few candidates of the teacher who gave the correct formal definition of the limit concept. Concept images about the limit of the preservice teachers showed a dynamic view away from the formal definition. It was also found that some preservice teachers had difficulty in distinguishing the concepts of neighborhood and accumulation point. In the study, it was determined that the preservice teachers were in a inconvenient situation to explain the definition of the concept of continuity, to express how the concepts of limit and continuity are related to each other.

Keywords: Limit concept, continuity concept, concept definition, concept image, mathematics education.

References

- Bezuidenhout, J. (2001). Limits and continuity: Some conceptions of first-year students. *International Journal of Education, Science, and Technology*, 32(4), 487 – 500.
- Kabael, T., Barak, B., & Özdaş, A. (2015). Students' concept definitions and concept images about limit concept. *Anadolu Journal of Educational Sciences International*, 5(1), 88-114.

CONCEPTUAL AND PROCEDURAL KNOWLEDGE RESEARCH TRENDS PUBLISHED IN THE FIELD OF MATHEMATICS EDUCATION IN TURKEY

Fatma Erdoğan¹ Ayşegül Gökhan²

¹ Division of Mathematics Education, University of Firat, Elazığ, Turkey

f.erdogan@firat.edu.tr

² Division of Mathematics Education, University of Firat, Elazığ, Turkey

agokhan1@firat.edu.tr

Abstract

The objective of this study was to determine the research trends on conceptual and procedural knowledge published in the field of mathematics education in Turkey. For this purpose, published articles and theses in the field of mathematics education in Turkey between the years 2000-2017 were examined. In order to evaluate related publications, the publication classification form created by using literature has been revised and used for research related to conceptual and procedural knowledge. The data obtained from the publications examined by content analysis within the scope of the research were analyzed using descriptive statistical methods (percentage and frequency). The studies for the conceptual and procedural knowledge in Turkey have been determined to continue to increase over the last decade according to the findings of the research, The majority of the studies were conducted in the field of "numbers and algebra". In addition, the theses for conceptual and operational knowledge have been concentrated at the graduate level. As a sample of the research, generally middle school students and prospective teachers were selected. The results obtained from the study show that it will be useful in identifying the strengths and weaknesses of the studies carried out in this area and will shed light on future work.

Keywords: Conceptual knowledge, procedural knowledge, mathematics education, research trends.

References

Sözbilir, M., & Kutu, H. (2008). Development and current status of science education research in Turkey. *Essays in Education* [Special issue], 1-22.

Yazır, F., & Akkoç, H., (2017). 9th grade vocational high school students' competency of conceptual and procedural knowledge in algebra topics in high school curriculum. *Gaziantep University Journal of Educational Sciences*, 1 (1), 34-54.

THE REVERSE OPERATION OF KNOT DIGRAPH NOTATION

Ferit YALAZ¹, Ceren Sultan ELMALI², Tamer UĞUR³

¹Graduate School of Natural and Applied Science
Atatürk University, Erzurum-TURKEY

²Department of Mathematics, Faculty of Science and Arts,
Erzurum Technical University, Erzurum-TURKEY

³Department of Mathematics, Faculty of Science and Arts,
Atatürk University, Erzurum-TURKEY

ferityalaz@gmail.com

ceren.elmali@erzurum.edu.tr

tugur@atauni.edu.tr

Abstract

It is well known that bitopologies associated with these knot digraphs is found by using knot digraph notation. In this work, we have developed a method that we called reverse of knot digraph notation to find out which knot belongs to when a bitopology associated with the knot is given.

Keywords: Knot, knot graph, knot digraph, bitopology, quasi-pseudo metric

REFERENCES

1. Alexander, J.W., G.B., *On types of knotted curve*. Ann. Math., 28, 562-586, 1956.
2. Bankwitz, C., *Über die Torsionszahlen der alternierenden Knoten*. Math. Ann., 103, 145-161, 1930.
3. Flecher, P., Hoyle, H.B., III, and Patty, C. W., *The Comparison of Topologies*, Duke Math. J. 1969.
4. Girija B., Pilakkat R., *Bitopological spaces associated with digraphs*, South Asian Journal of Mathematics, Vol.3 (1):56-65, 2013.
5. Kelley J.C., *Bitopological Spaces*, Proc. London Math.(3), 13, 71-89, 1963.
6. Kim, Y. W., *Pairwise Compactness*. Publ. Math. Debrecen, 1968.
7. Murasugi, K., *On invariants of graphs with applications to knot theory*. Trans. Amer. Math. Soc., 314, 1-49., 1989.
8. Murasugi, K., *Knot Theory and Its Application*. Boston, 1993.
9. Patty, C. W., *Bitopological Spaces*, Duke Math. J. 1967.
10. Peruin, W. J., *Connectedness in Bitopological Spaces*, Nederl. Arad. Wetensch Prof. Ser. A. 1967.
11. Raghavan T.G., Reilly I.L., *Metrizability of quasi metric spaces*, J. London Math. Soc(2), 15, No. 1, 169-172, 1977.
12. Reilly, Ivan L., *Quasi-Gauges, Quasi-Uniformities and Bitopological Spaces*, Unpublished Ph. D. Thesis, Urbana-Champaign, III, Library, University of Illinois 1970..

Boundary Integral Equation Methods for Plates and Shells

Ferri M H Aliabadi¹

¹ Prof. Aerostructures, Department of Aeronautics, Imperial College, London, UK

m.h.aliabadi@imperial.ac.uk

Abstract

Plate and shell type structures are widely used in engineering, for example aircraft wings and fuselage panels, etc. In this paper, the derivation and implementation of boundary integral equations for the analysis of plates and shells involving shear deformation is initially presented. Next, the formulation is extended to shear deformable shallow shells. The shell formulation is shown to be formed by coupling boundary element formulations of shear deformable plate bending and 2D plane stress elasticity. The domain integrals which appear in this formulation are treated in two different ways: first, the integrals are evaluated numerically using constant cell discretization, and secondly, they are transformed into boundary integrals using the dual reciprocity technique. Furthermore, the Boundary Element Method (BEM) for large deflection of shear deformable plates is reformulated to the case of multi-section assembled plate structures. Each plate section is modelled as a BEM region under membrane and bending loads, with force, moments, displacements and rotations represented by generalized traction and displacement nodal variables on the boundary. Non-linear terms in the boundary integral formulation for each section that arise due to large deflection are treated as effective body forces, and the associate domain integrals are transformed into boundary integrals using the Dual Reciprocity Method. Derivatives of stresses and deflection on the boundary arise in the non-linear terms, and are evaluated by exploring their values at interior domain points using Radial Basis Functions. Plate sections are joined along their edges using compatibility and equilibrium conditions involving the generalized traction and displacement nodal variables. The resulting non-linear equation system is solved numerically using an incremental load approach. An illustrative example of the method is presented for transversely loaded plate reinforced with Z-stringers.

Keywords: *Plates and Shells, Boundary Element Method, Multi-region, Crack Problems.*

REFERENCES

Aliabadi, M.H. *The Boundary Element Method, Vol 2 Appl. Solids and Struc.*, Wiley (2001).

Dirgantara, T Aliabadi, M.H. A new boundary element formulation for shear deformable shells analysis. *International Journal for numerical methods in engineering* 45 (9), 1257-1275

Wen, P Aliabadi, M.H., Young, A Large deflection analysis of Reissner plate by boundary element method *Computers & structures* 83 (10), 870-879, 2005

Purbolaksono, J Aliabadi, M.H. Buckling analysis of shear deformable plates by boundary element method *International journal for numerical methods in engineering* 62, 537-56, 2005

Dirgantara, T Aliabadi, M.H. Dual boundary element formulation for fracture mechanics analysis of shear deformable shells. In *J of Solids and Structures* 38 (44), 7769-7800, 2005

Di Pisa, C Aliabadi, M.H. Fatigue crack growth analysis of assembled plate structures with dual boundary element method. *Engineering Fracture Mechanics* 98, 200-213, 2013

ADVANCED SECRETS OF SUMUDU TRANSFORM APPLICATIONS

Fethi Bin Muhammad Belgacem,

Department of Mathematics, Faculty of Basic Education, PAAET, Al-Ardhiya, Kuwait

fmbelgacem@gmail.com

Abstract:

In this presentation, we investigate essential properties of the Sumudu transform, from theoretical and applicative stances, that render it the tool of choice.

References:

1. Belgacem, F.B.M., Karaballi, A.A., Kalla, S.L.; "Analytical Investigations of the Sumudu Transform and Applications to Integral Production Equations", *Mathematical Problems in Engineering*, No. 3, (2003) 103-118
2. Belgacem, F.B.M., Karaballi, A.A.; "Sumudu Transform Fundamental Properties Investigations and Applications", *JAMSA: Journal of Applied Mathematics and Stochastic Analysis*, Vol. (2006), Article ID 91083.
3. Belgacem, F.B.M.; "Introducing and Analyzing Deeper Sumudu Properties", *Nonlinear Studies*, Vol. 13, No.1, (2006) 23-42
4. Hussain, M.G.M, Belgacem, F.B.M.; "Transient Solutions of Maxwell's Equations Based on Sumudu Transformation", *PIER*, No. 74, (2007) 273-289
5. Belgacem, F.B.M.; "Sumudu Applications to Maxwell's Equations", *PIERS Online*, Vol. 5, No. 4, (2009) 355-360
6. Belgacem, F.B.M.; "Applications with the Sumudu Transform to Bessel Functions and Equ.", *App. Math. Sci. (AMS)*, Vol.4, No. 74, (2010) 3665-3686
7. Katatbeh, Q.K., Belgacem, F.B.M.; "Applications of the Sumudu Transform to Fractional Diff. Equations", *Nonlinear Studies*, Vol. 18, No.1, (2011) 99-112
8. Bulut H., Baskonus M.H., Belgacem, F.B.M.; "The Analytical Solution of Some Fractional Ordinary Differential Equations by the Sumudu transform Method", *Applied and Abstract Analysis, (AAA)*, Article ID 203875 (2013)1-6
9. Dubey, R.S., Goswami, P., Belgacem, F.B.M.; "Generalized Time-Fractional Telegraph Equation Analytical Solution by Sumudu and Fourier " *Journal of Fractional Calculus and Applications, (JFCA)*, Vol. 5, No. 2, pp.. 52-58, (2014).
10. Tuluze D. S., Bulut H., Belgacem F. B. M., "Sumudu Transform Method for Analytical Solutions of Fractional Type Ordinary Differential Equations"., *Mathematical Problems in Engineering*, Volume (2015), pp. 1-6.
11. Nisar, K.S., Belgacem, F.B.M.;, "Dynamic K-Struve Sumudu Solutions for Fractional Kinetic Equations", *Advances in Difference Equations*, (2017):340

UNIFORM DIFFERENCE SCHEMES FOR SINGULARLY PERTURBED INTEGRO DIFFERENTIAL EQUATIONS WITH DELAY

Fevzi Erdogan, Mehmet Gıyas Sakar, Onur Saldır

¹ Department of Mathematics, Van Yuzuncu Yil University, Van, Turkey

ferdogan@yyu.edu.tr, giyassakar@hotmail.com, onursaldır@gmail.com

Abstract

This study deals with the singularly perturbed initial value problems for Volterra integro-differential equations with delay. A difference scheme is constructed in a uniform mesh on each time subinterval which gives first order uniform convergence in the discrete maximum norm. We have shown that the method displays uniform convergence with respect to the perturbation parameter for numerical approximation of the solution. The parameter uniform convergence is confirmed by numerical computations.

Keywords: Singular perturbation; Volterra integro-differential equations; Delay differential equations; Difference scheme.

REFERENCES

1. R. BELLMAN, K. L. COOKE, DIFFERENTIAL-DIFFERENCE EQUATIONS, ACADEMY PRESS, NEW YORK, 1963.
2. R. D. DRIVER, Ordinary and Delay Differential Equations, Belin-Heidelberg, New York, Springer, 1977.
3. A. Bellen, M. Zennaro, Numerical methods for delay differential equations, Oxford University Press, Oxford, 2003.
4. G. M. Amiraliyev, F. Erdogan, Uniform numerical method for singularly perturbed delay differential equations, J.Comput. Math. Appl. 53(2007)1251-1259.
5. G. M. Amiraliyev, F. Erdogan, Difference schemes for a class of singularly perturbed initial value problems for delay differential equations, Numer. Algorithms, 52, 4(2009) 663-675.
6. G. M. Amiraliyev, S. Şevgin, Uniform difference method for singularly perturbed Volterra integro- differential equations, Applied Mathematics and Computation, 179, 2, 15 August 2006, Pages 731-741.
7. M. Kudu, I. Amirali, G. Amiraliyev, A finite-difference method for a singularly perturbed delay integro-differential equation. J. Comput. Appl. Math. 308 (2016), 379–390.

AN ALTERNATIVE APPROACH FOR NONLINEAR OPTIMIZATION PROBLEM WITH CAPUTO-FABRIZIO DERIVATIVE

Firat Evirgen¹ and Mehmet Yavuz²

¹ Department of Mathematics, Balıkesir University, Balıkesir, Turkey

fevirgen@balikesir.edu.tr

² Department of Mathematics-Computer Sciences, Necmettin Erbakan University, Konya, Turkey

mehmetyavuz@konya.edu.tr

Abstract

In this study, a dynamic system is constructed by using Caputo-Fabrizio derivative to find the optimal solution of some class of nonlinear optimization problem. For this purpose, quadratic penalty function is adapted to the dynamic system. Variational Iteration Method (VIM) with multistage technique is used to evaluate the optimal solution. Numerical simulations on the test problems show that the proposed dynamic system with Caputo-Fabrizio fractional derivative is in good agreement with the theoretical solution.

Keywords: Caputo-Fabrizio derivative; Optimization problem; Penalty function; Dynamic system.

REFERENCES

1. Evirgen, F., Conformable fractional gradient based dynamic system for constrained optimization problem, *Acta Physica Polonica A*, 132 (3-II), 1066-1069., (2017).
2. Caputo, M., Fabrizio, M., A new definition of fractional derivative without singular kernel, *Progr. Fract. Differ. Appl.*, 1(2), 73-85, (2015).
3. He, J.H., Approximate analytical solution for seepage flow with fractional derivatives in porous media, *Comput. Meth. Appl. Mech. Eng.*, 167, 57-68, (1998).

ON IMAGES OF CYCLIC CODES

Mustafa Özkan¹ and Figen Öke¹

¹Department of Mathematics, University of Trakya, Edirne, Turkey

mustafaozkan@trakya.edu.tr , figenoke@gmail.com

Abstract

In this paper cyclic codes written on a new ring. Gray images of these codes on the known rings are obtained. Then relations between these codes and their Gray images are given.

Keywords: Cyclic Codes; Gray map; Weight function.

REFERENCES

1. P. Udomkavanich , S. Jitman , On the Gray image of $(1-um)$ -cyclic codes $F_p^k + uF_p^k + \dots + umF_p^k$, *Int.J.Contemp. Math. Sciences*, Vol:4, No:26, 1265–1272, 2009.
2. W. C. Huffman, V. Pless, *Fundamentals of Error Correcting Codes*, Cambridge, 2003.
3. M. Ozkan, F. Oke, , About quasi-cyclic codes over finite fields, *AIP Conf. Proc.*, Vol:1926, 020034-1–020034-3, 2018.
4. S. Roman, *Coding and Information Theory*, Graduate Texts in Mathematics, Springer Verlag, 1992.
5. M. Özkan, F. Öke, Some Special Codes Over $\mathbb{F}_3 + v\mathbb{F}_3 + u\mathbb{F}_2 + u^2\mathbb{F}_2$, *Mathematical Sciences and Applications E-Notes*, Vol. 4, No.1, 40-44, 2016.
6. M. Özkan, F. Öke, Gray images of $(1 + v)$ - constacyclic codes over a particular ring , *Palestine Journal of Mathematics*. Vol. 6, No. s.i.2, 241-245,2017.

DISCRETE HOMOTOPY PERTURBATION SUMUDU TRANSFORM METHOD FRACTIONAL DIFFERENCE EQUATIONS

Figen Özpınar¹ and Fethi Bin Muhammad Belgacem²

¹Bolvadin Vocational School, Afyon Kocatepe University, Afyonkarahisar, Turkey

fozpinar@aku.edu.tr

²Department of Mathematics, Faculty of Basic Education, PAAET, Al-Ardhiya, Kuwait

fbmbelgacem@gmail.com

Abstract

In this article, we apply the discrete homotopy perturbation Sumudu transform method(DHPSTM) to solve fractional partial difference equations. DHPSTM is a combined form of the discrete Sumudu transform method and the discrete homotopy perturbation method. The results show that this method is very accurate, efficient and can be applied to fractional partial difference equations.

Keywords: Discrete homotopy perturbation Sumudu transform; Discrete homotopy perturbation method; Discrete Sumudu transform method; Fractional order; Partial difference equations.

REFERENCES

1. T. Abdeljawad, On Riemann and Caputo fractional differences, *Comput. Math. Appl.* Vol:62, 1602–1611, 2011.
2. R.P. Agarwal, *Difference Equations and Inequalities*, Marcel Dekker, Newyork, 1992.
3. G.A. Anastassiou, *About Discrete Fractional Calculus with Inequalities*, *Intelligent Mathematics: Computational Analysis*, Intelligent Systems Reference Library, Vol:5, 575-585, 2011.
4. M.A. Asiru, Further properties of the Sumudu transform and its applications, *International Journal of Mathematical Education in Science and Technology*, Vol:33, No:3, 441–449, 2002.

STABILITY ANALYSIS AND A DISCRETE-TIME POPULATION MODEL WITH PREDATION

Figen KANGALGİL¹, Özlem Ak GÜMÜŞ²

¹Department of Mathematics, University of Cumhuriyet, Sivas, Turkey

²Department of Mathematics, University of Adıyaman, Adıyaman, Turkey

fkangalgil@cumhuriyet.edu.tr, akgumus@adiyaman.edu.tr

Abstract

In this article, we analyzed the local stability of the equilibrium point of the a general discrete time population model including predation with and without Allee effect. Then, we investigated the effect of the Allee function on the presented model. Obtained theoretical results are supported by numerical simulations.

Keywords: Stability Analysis; Predation; Equilibrium Point; Allee Effect.

REFERENCES

1. Allen and J. S. Linda, An Introduction to Mathematical Biology, Texas Tech. University, 2007.
2. J. D. Murray, Mathematical Biology, New York , 2002.
3. W.C. Allee, Animal Agretions: A Study in General Sociology, University of Chicago Press, Chicago,1931.

ALLEE EFFECT AND STABILITY ANALYSIS OF A DELAYED DISCRETE-TIME POPULATION MODEL

Figen KANGALGİL¹, Özlem Ak GÜMÜŞ²

¹ Department of Mathematics, University of Cumhuriyet, Sivas, Turkey

²Department of Mathematics, University of Adıyaman, Adıyaman, Turkey

fkangalgil@cumhuriyet.edu.tr, akgumus@adiyaman.edu.tr

Abstract

In this work, stability conditions of nonlinear delayed general difference equation have been presented for $T=1$ and $T=2$ where T is delay term. By adding Allee effect to presented model, local stability analysis has been investigated at different times. Also, obtained results for $T=1$ and $T=2$ have been compared. This obtained results for $T=1$ case are different from results of $T=2$ case. Obtained all theoretical results are supported by numerical simulations.

Keywords: Stability Analysis; Equilibrium Point; Allee Effect; Delay Term

REFERENCES

1. Allen and J. S. Linda, An Introduction to Mathematical Biology, Texas Tech. University, 2007.
2. J. D. Murray, Mathematical Biology, New York, 2002.
3. W.C. Allee, Animal Agreations: A Study in General Sociology, University of Chicago Press, Chicago, 1931.

On characterization of open sets in Euclidean Spaces

Firudin Muradov¹

¹ Department of Mathematics, Near East University, Nicosia, TRNC

firudin.muradov@neu.edu.tr,

Abstract

A ternary semigroup is a nonempty set T together with a ternary operation $[abc]$ satisfying the associative law $[[abc]de] = [a[bcd]e] = [ab[cde]]$, $\forall a, b, c, d, e \in T$. Let Ω_1 and Ω_2 be two nonempty sets and let $\mathfrak{R}(\Omega_1, \Omega_2)$ be the set of all pairs of binary relations (ρ, σ) , where $\rho \in \Omega_1 \times \Omega_2$ and $\sigma \in \Omega_2 \times \Omega_1$. The set $\mathfrak{R}(\Omega_1, \Omega_2)$ is a ternary semigroup with respect to the ternary operation

$$[(\rho_1, \sigma_1)(\rho_2, \sigma_2)(\rho_3, \sigma_3)] = (\rho_1 \circ \sigma_2 \circ \rho_3, \sigma_1 \circ \rho_2 \circ \sigma_3).$$

Denote by $\mathcal{F}(\Omega_1, \Omega_2)$ the set of all maps from Ω_1 to Ω_2 . The set $\mathfrak{N}(\Omega_1, \Omega_2) = \mathcal{F}(\Omega_1, \Omega_2) \times \mathcal{F}(\Omega_2, \Omega_1)$ is a ternary subsemigroup of $\mathfrak{R}(\Omega_1, \Omega_2)$. The collection of all open n -cubes in R^n forms a base for a topology on R^n called the standard topology on R^n . With this topology, R^n is called Euclidean n -space. Let X_1 and X_2 be two open subsets of R^n , ($n > 1$). We denote the ternary semigroup of all open maps between X_1 and X_2 by $O(X_1, X_2)$.

In this paper we give an abstract characterization of ternary semigroups of open maps defined on open sets of Euclidean n -spaces. Let X_1 and X_2 be open subsets of R^n and let Y_1 and Y_2 be open subsets of R^m , ($n, m > 1$). The ternary semigroups $O(X_1, X_2)$ and $O(Y_1, Y_2)$ are isomorphic if and only if the spaces X_i and Y_i are homeomorphic ($i = 1, 2$).

REFERENCES

1. V.Sh.Yusufov, Open mappings, U.M.N., V.41, No.6, 185-186.(Russian), 1986.
2. F.Kh.Muradov, Semigroups of Quasi-open mappings and Lattice-Equivalence, International Journal of Algebra, Vol.6, No. 29, 1443 – 1447, 2012.

Construction of exact solutions to partial differential equations with Trial method

Filiz Taşcan, Lütfiye Burçin Pir, Ömer Ünsal

Eskisehir Osmangazi University, Art-Science Faculty,
Department of Mathematics-Computer, Eskisehir-TURKEY

ftascaan@ogu.edu.tr

Abstract

In this paper, the Trial method is presented for constructing new exact solutions of (1+1) dimensional Schamel and (2+1) dimensional ZK-BBM equations. The results obtained confirm that the proposed method is an efficient technique for analytic treatment of a wide variety of nonlinear partial differential equations.

Keywords: Partial differential equations; exact solution; trial method.

REFERENCES

1. O. Dönmez, D. Dağhan, Analytic Solutions of the Schamel-KdV Equation by Using Different Methods: Application to a Dusty Space Plasma, Süleyman Demirel University, Journal of Natural and Applied Sciences, Vol:21, No:1, 208-215, 2017.
2. A. Bekir, A. Akbulut, M. Kaplan, Exact Solutions of Nonlinear Evolution Equations by Using Modified Simple Equation Method, International Journal of Nonlinear Science, Vol:19, 159-164, 2015.
3. F. Taşcan, A. Yakut, Conservation Laws and Exact Solutions with Symmetry Reduction of Nonlinear Reaction Diffusion Equations, International Journal of Nonlinear Sciences and Numerical Simulation, Vol:16, 191-196, 2015.
4. M. Ekici, M. Mirzazadeh, Q. Zhou, S. P. Moshokoa, A. Biswas, M. Belic, Solitons in optical metamaterials with fractional temporal evolution, Optik-International Journal for Light and Electron Optics, Vol:127, 10879-10897, 2016.
5. S. Saha Ray, S. Sahoo, Invariant analysis and conservation laws of (2+1) dimensional time-fractional ZK--BBM equation in gravity water waves, Computers & Mathematics with Applications, In press, corrected proof, Available online 29 December 2017.

COMPARISON THEOREMS TO FRACTIONAL PROBLEM

Funda Metin Turk¹ Erdal Bas²

¹ Department of Mathematics, University of Bartın, Bartın, Turkey

² Department of Mathematics, University of Firat, Elazığ, Turkey

fnd-44@hotmail.com, erdalmat@yahoo.com

Abstract

In this study, we consider the zeros of eigenfunctions of fractional Sturm-Liouville problem. We give 1st and 2nd comparison theorems for fractional Sturm-Liouville equation with boundary condition and we prove this theorems.

Keywords:; Fractional, Sturm-Liouville, Comparison.

REFERENCES

1. Boris Moiseevic Levitan, Sargsjan Ishkhan Saribekovich, Introduction to Spectral Theory: Self adjoint Ordinary Differential Operators, American Math. Soc. Pro. R.I., 1975.
2. Malgorzata Klimek and Om Prakash Argawal, On a Regular Fractional Sturm-Liouville Problem with Derivatives of Order in $(0,1)$, Proceeding, 13 th Int. Cont. Conf., 2012.
3. Igor Podlubny, Fractional Differential Equations, USA: Academic Press, San Diego, CA, 1999.

EXISTENCE RESULTS FOR IMPULSIVE FRACTIONAL QUADRATIC SPECTRAL PROBLEM

Funda Metin Turk¹ Erdal Bas²

¹ Department of Mathematics, University of Bartin, Bartin, Turkey

² Department of Mathematics, University of Firat, Elazig, Turkey

fnd-44@hotmail.com, erdalmat@yahoo.com

Abstract

In this study, by using Schaefer fixed point theorem, we prove existence of solution of fractional Sturm-Liouville problem for diffusion operator via impulsive conditions. The derivatives are described in Riemann-Liouville and Caputo sense. We show integral representation of solution this problem. Therefore, we use Riemann-Liouville integral operator.

Keywords: Sturm-Liouville problem; Fractional; Impulsive; Caputo.

REFERENCES

1. Anatoly A. Kilbas, Juan J. Trujillo, Hari Mohan Srivastava, Theory and applications of fractional differential equations, North-Holland Mathematics Studies, Elsevier, Amsterdam, Vol:204, 2006.
2. Malgorzata Klimek and Om Prakash Argawal, Fractional Sturm-Liouville problem, Computers and Mathematics with Applications, Vol:66, 795-812, 2013.
3. Ravi P. Agarwal, Mouffak Benchohra, B.A. Slimani, Existence results for differential equations with fractional order and impulses, Memoirs on Differential Equations and Mathematical Physics, 44, 1-21, 2008.

SOME LIFT PROBLEMS IN THE (2,0)-TENSOR BUNDLE

Furkan YILDIRIM¹

¹ Department of Mathematics, Faculty of Sci. Atatürk University, Narman Vocational Training School, 25530, Erzurum Turkey

furkan.yildirim@atauni.edu.tr

Abstract

The aim of this study is to determine complete and horizontal lift of vector fields for a special class of semi-tensor (pull-back) bundle tM of the type (2,0).

Keywords: Vector field, complete lift, cross-section, horizontal lift, pull-back bundle, tangent bundle, semi-tensor bundle.

REFERENCES

1. Isham C.J., "Modern differential geometry for physicists", World Scientific, 1999.
2. Fattaev H., Tensor fields on cross-section in the tensor bundle of the type (2,0). News of Baku Univ., Physico-mathematical Sciences Series, (2008), no: 4, p.35-43.
3. Fattaev H., The Lifts of Vector Fields to the Semitensor Bundle of the Type (2, 0), Journal of Qafqaz University, 25 (2009), no. 1, 136-140.
4. Gezer A., Salimov A. A., Almost complex structures on the tensor bundles, Arab. J. Sci. Eng. Sect. A Sci. 33 (2008), no. 2, 283–296.
5. Husemoller D. Fibre Bundles. Springer, New York, 1994.
6. Lawson H.B. and Michelsohn M.L. Spin Geometry. Princeton University Press., Princeton, 1989.
7. Ledger A.J. and Yano K. Almost complex structure on tensor bundles, J. Dif. Geom. 1 (1967), 355-368.
8. Pontryagin L.S. Characteristic cycles on differentiable manifolds. Rec. Math. (Mat. Sbornik) N.S., 21(63):2, (1947), 233-284.
9. Salimov A. Tensor Operators and their Applications. Nova Science Publ., New York, 2013.

ON THE EXISTENCE AND UNIQUENESS OF THE SOLUTIONS OF SPACE and TIME FRACTIONAL TELEGRAPH EQUATIONS

Gökçe Dilek KÜÇÜK^{1*}, Ramin NAJAFI² and Ercan ÇELİK³

^{1*} *Iğdır University, Faculty of Science and Art, Iğdır-Turkey*

² *Department of Mathematics, Maku Branch, Islamic Azad University, , Maku-Iran*

³ *Atatürk University Faculty of Science, Department of Mathematics, Erzurum-Turkey*

gokce.kucuk@igdir.edu.tr, r_najafi@iamau.ac.ir, ercelik@atauni.edu.tr

Abstract

The aim of this study is to give a theorem about the existence and uniqueness on the solutions of space and time fractional telegraph equations. By using the new iterative method proposed by Daftardar-Gejji and Jafari and Sumudu transform, existence and uniqueness of the solutions of the mentioned equations are proven according to Banach's fixed point theorem. Then solutions of space and time fractional telegraph equations are obtained.

Keywords Space and time fractional telegraph equations, Caputo derivative, Sumudu transform, Iterative method

References

- [1] Asiru M A. Further properties of the Sumudu transform and its applications. International Journal of Mathematical Education in Science and Technology, 33, 3, 441–449, 2002.
- [2] Daftardar-Gejji Bhalekar VS. Solving fractional boundary value problems with Dirichlet boundary conditions using a new iterative method. Computers & Mathematics with Applications.59(5), 801-1809, 2010.
- [3] Diethelm K. The analysis of fractional differential equations. Springer: Berlin, 262, 2010.
- [4] Momani S. Analytic and approximate solutions of the space- and time-fractional telegraph equations. Appl. Math. Comput. 170, 1126–1134, 2005.
- [5] Orsingher, E., Zhao, X. The space-fractional telegraph equation and the related fractional telegraph process, Chinese Ann. Math. 24B(1),1-12, 2003.

Dynamic Reliability Evaluation of Linear Consecutive k -out-of- n : F System with Multi-State Components

Gökhan GÖKDERE¹ and Mehmet GÜRÇAN¹

¹ Department of Statistics, University of Firat, Elazig, Turkey

g.g.gokdere@gmail.com, mgurcan2000@yahoo.com

Abstract

In engineering applications, analyzing a technical system vary according to the operating principles of the system. In some situations, the status of the system is a function of stresses which act on the system and cause degradation. In order to efficiently analysis the reliability of a system which operates under stress, assigning the various states to the components depending on their operating performance is very important. In this paper, we have investigated the linear consecutive k -out-of- n : F system (A linear consecutive k -out-of- n : F system consists of n linearly arranged components such that the system fails if and only if at least k consecutive components fail) and assigned multiple states to its components. Due to the reason, the operating performance of the components can easily be controlled. Apart from that the reliability of the system depending on the states of its components can be calculated at any time interval. In the numerical examples, the states of the components and the reliability calculation of the system at specific time intervals are shown clearly.

Keywords: Dynamic system reliability; Multi-State components; Stress-Strength model; Consecutive k -out-of- n : F system.

REFERENCES

1. Ebrahimi N., Multistate reliability models, Naval Research Logistics Quarterly, 31, 671-680, 1984.
2. El-Newehi E., Proschan F., Sethuraman J., Multi-state coherent system, Journal of Applied Probability, 15, 675-688, 1978.
3. Zuo M. J., Kuo W., Design and performance analysis of consecutive- k -out-of- n structure, Naval Research Logistics, 37, 203-230, 1990.
4. Kuo W., Zuo, M. J., Optimal Reliability Modeling: Principles and Applications, New York: John Wiley & Sons, 2003.
5. Finkelstein M., Cha J. H., Stochastic modelling for reliability, shocks, burn-in and heterogeneous populations, London: Springer, 2013.
6. Gökdere G., Gürçan M., Kılıç M.B., A new method for computing the reliability of consecutive k -out-of- n : F systems, Open Phys., 14, 166-170, 2016.

Estimating of Reliability in Multicomponent Stress-strength based on von Mises-Truncated Exponential distribution

Gökhan GÖKDERE¹ and Muhammet Burak KILIÇ²

¹ Department of Statistics, University of Firat, Elazig, Turkey

² Department of Business Administration, Mehmet Akif Ersoy University Burdur, Turkey

g.g.gokdere@gmail.com, muhammet.b.kilic@gmail.com

Abstract

A multicomponent s -out-of- k : G system consists of k linearly arranged components. The system has strengths following k -independently and identically distributed random variables X_1, X_2, \dots, X_k and each component experiences a random stress Y . The system is regarded as working only if at least s out of k ($s < k$) strengths exceed the stress. Let the random samples Y, X_1, X_2, \dots, X_k be independent, $G(y)$ be the continuous distribution function of Y and $F(x)$ be the common continuous distribution function of X_1, X_2, \dots, X_k . Then, the reliability in a multicomponent stress-strength model developed by [1] is given by

$$R_{s,k} = P(\text{at least } s \text{ out of the } (X_1, X_2, \dots, X_k) \text{ exceed } Y)$$

$$= \sum_{i=s}^k \binom{k}{i} \int_{-\infty}^{\infty} [1 - F(y)]^i [F(y)]^{k-i} dG(y)$$

A multicomponent stress-strength model has been extensively studied under different distribution assumptions in reliability analysis [2]. In these models, the stress-strength variates are drawn from probability distributions on the real line. In the present paper, the stress-strength variates are drawn from a von Mises distribution on the unit circle, and a truncated exponential distribution on the real line, respectively. The multicomponent stress-strength reliability of such a system is obtained by maximum likelihood estimation.

Keywords: Reliability estimation; Stress-Strength model; von Mises distribution, Truncated Exponential distribution.

REFERENCES

1. Bhattacharyya G. K., Johnson R. A., Estimation of reliability in multicomponent stress-strength model, Journal of American Statistical Association, 69, 966-970, 1974.
2. Rao G.S, Aslam M., Arif O. H., Estimation of reliability in multicomponent stress-strength based on two parameter exponentiated Weibull Distribution, Communications in Statistics-Theory and Methods, 46, 7495-7502, 2017.

From Discrete to Continuous Regime Switching Models

Guillaume Leduc¹

¹ Department of Mathematics and Statistics, American University of Sharjah, Sharjah, UAE

gleduc@aus.edu,

Abstract

In the Black-Scholes model, there is an abundant literature aiming at describing, quantifying, and improving the convergence speed of lattice-based methods towards their limiting time continuous model. However, most of these results remain to be established in the case of regime switching models. Ma and Zhu (2015) established a speed of convergence of $1/n$ for such models. However, the result is valid only for smooth payoff functions, thus excluding most options which are typically only piecewise smooth and may not even be continuous. We explain here how results in the Black-Scholes model can be extended to the regime switching case in order to establish the correct speed of convergence for a broad class of European options.

Keywords: Regime switching models, convergence rate, lattice methods, security derivatives.

REFERENCES

1. Jingtang Ma and Tengfei Zhu, Convergence rates of trinomial tree methods for option pricing under regime-switching models, Applied Mathematics Letters, No:39, 13–18, 2015.

The Equivalence of Soft Group-Groupoids and Soft Crossed Modules

Gülay Oğuz¹, İlhan İçen² and M.Habil Gürsoy³

^{1,2,3}Department of Mathematics, Faculty of Science and Arts,
Inonu University, Malatya-TURKEY

gulay.oguz@inonu.edu.tr

ilhan.icen@inonu.edu.tr

mhgursoy@gmail.com

Abstract

This paper is devoted to the investigation of relationship between the soft group-groupoids and the soft crossed modules. It is shown that, under some suitable conditions, the category $SGPGD$ of the soft group-groupoids is equivalent to the category $SXMOD$ of the soft crossed modules over soft groups.

Keywords: Group-groupoid; crossed module; soft group-groupoid; soft crossed module.

REFERENCES

- [1] B. Noohi, Notes on 2-Groupoids, 2-Groups and Crossed Modules, *Homology Homotopy Appl.*, 9(1) (2007) 75–106.
- [2] D. Molodtsov, Soft Set Theory-First Results, *Computers and Math. with Appl.*, 37 (1999) 19-31.
- [3] H. Aktas, N. Cagman, Soft sets and soft groups, *Information Sci.*, 177 (2007) 2726-2735.
- [4] O.Mucuk, T. Sahan and N. Alemdar, Normality and quotients in crossed modules and group-groupoids, *Appl. Categor. Struct.* 23 (2015) 415-428.
- [5] I. Icen, The equivalence of 2- groupoids and crossed modules, *Commun. Fac. Sci. Univ. Ank. Ser. A1 Math. Stat.*, 49 (2000) 39-48.
- [6] R. Brown, Topology and Groupoids, *BookSurge LLC*, North Carolina, 2006.

Notes on the Structure of Soft Crossed Module

M.Habil Gürsoy¹, Gülây Oğuz² and İlhan İçen³

^{1,2,3}Department of Mathematics, Faculty of Science and Arts,

Inonu University, Malatya-TURKEY

mhgursoy@gmail.com

gulay.oguz@inonu.edu.tr

ilhan.icen@inonu.edu.tr

Abstract

The main aim in this paper is to introduce the category of soft crossed modules. It is presented the concept of soft crossed module over soft groups. Examples are provided to illustrate this concept. Also, it is shown that the semi-direct product of two soft groups is again a soft group.

Keywords: Crossed module; Soft group; Semi-direct product; Soft crossed module.

REFERENCES

- [1] W. R. Scott, Group Theory, *Dover Publ.*, New York, 1987.
- [2] D. Molodtsov, Soft Set Theory-First Results, *Computers and Math. with Appl.*, 37 (1999) 19-31.
- [3] H. Aktas and N. Cagman, Soft sets and soft groups, *Information Sci.*, 177 (2007) 2726- 2735.
- [4] M H. Gursoy, I. Icen, A. F. Ozcan, The equivalence of topological 2- groupoids and topological crossed modules, *Algebras, Groups and Geometries*, 2005.
- [5] M.H. Gursoy, H. Aslan and I. Icen, Generalized crossed modules and group-groupoids, *Turk J. Math.* 41 (2017) 1535 – 1551.
- [6] I. Icen, The equivalence of 2- groupoids and crossed modules, *Commun. Fac. Sci. Univ. Ank. Ser. A1 Math. Stat.*, 49 (2000) 39-48.

On the Construction of a Novel Categorical Structure

Ilhan İcen¹, Gülay Oğuz² and M.Habil Gürsoy³

^{1,2,3}Department of Mathematics, Faculty of Science and Arts,

Inonu University, Malatya-TURKEY

ilhan.icen@inonu.edu.tr

gulay.oguz@inonu.edu.tr

mhgursoy@gmail.com

Abstract

The main purpose of this study is to introduce a new concept named soft group-groupoid. Several important aspects and results related to this concept are obtained. The category of soft group-groupoids is established by using the definition of homomorphism between the soft group-groupoids. Further, the concept of soft subgroup-groupoid is defined.

Keywords: Groupoid; group-groupoid; soft set; soft group; soft group-groupoid.

REFERENCES

[1] D. Molodtsov, Soft Set Theory-First Results, *Computers and Math. with Appl.* 37 (1999) 19-31.

[2] R. Brown, Topology and Groupoids, *BookSurge LLC*, North Carolina, 2006.

[3] I. İcen, The equivalence of 2- groupoids and crossed modules, *Commun. Fac. Sci. Univ. Ank. Ser. A1 Math. Stat.* 49 (2000) 39-48.

[4] R. Brown and C. B. Spencer, G-groupoids, crossed modules and the fundamental groupoid of a topological group, *Proc. Konn. Ned. Akad. v. Wet.* 79 (1976) 296-302.

[5] M H. Gursoy, H. Aslan and I. İcen, Generalized crossed modules and group-groupoids, *Turk J. Math.* 41 (2017) 1535 – 1551.

[6] H. Aktas and N. Cagman, Soft sets and soft groups, *Information Sci.* 177 (2007) 2726-2735.

A Soft Approach to Ring-Groupoids

Gülay Oğuz¹, M.Habil Gürsoy² and İlhan İçen³

^{1,2,3}Department of Mathematics, Faculty of Science and Arts,

Inonu University, Malatya-TURKEY

gulay.oguz@inonu.edu.tr

mhgursoy@gmail.com

ilhan.icen@inonu.edu.tr

Abstract

This study introduces a soft approach to the concept of ring-groupoid which is the one of structured groupoids. Some properties and characterizations of soft ring-groupoids are established. Also, the category of soft ring-groupoids constructed by the homomorphism between two soft ring-groupoids is presented.

Keywords: Groupoid; ring-groupoid; soft set; soft ring; soft ring-groupoid.

REFERENCES

[1] D. Molodtsov, Soft Set Theory-First Results, *Computers and Math. with Appl.*, 37 (1999), 19-31.

[2] R. Brown, Topology and Groupoids, *BookSurge LLC*, North Carolina, 2006.

[3] H. Aktas and N. Cagman, Soft sets and soft groups, *Information Sci.*, 177 (2007) 2726- 2735.

[4] U. Acar, F. Koyuncu and B. Tanay, Soft sets and soft rings, *Computers and Math. with Appl.*, 59 (2010) 3458–3463.

[5] M H. Gursoy, Generalized ring-groupoids, *Annals of University of Craiova- Math. Comp.Sci. Ser.* 44(1) (2017) 126–136.

[6] R. Brown, C. B. Spencer, G-groupoids and the fundamental groupoid of a topological group. *Proc. Konn. Ned. Akad. v. Wet.* 79 (1976) 296–302.

ON A NEW SEQUENCE SPACE IN 2-NORMED SPACES DEFINED BY A SEQUENCE OF ORLICZ FUNCTIONS

Gülcan Atıcı Turan¹ and Çiğdem Bektaş²

¹Department of Mathematics, University of Muş Alparslan, Muş, Turkey

²Department of Mathematics, University of Firat, Elazığ, Turkey

gatici23@hotmail.com and cigdemas78@hotmail.com

Abstract

In this article, we obtain $F(\|\cdot, \cdot\|, \mathcal{M}, p, s)$ sequence space over 2-normed spaces defined by a sequence of Orlicz functions. We give various properties and some inclusions on this space.

Keywords: Orlicz function; Sequence Spaces; 2-norm; Paranormed spaces.

REFERENCES

1. Çiğdem A. Bektaş, Yavuz Altın, The sequence space $l_M(p, q, s)$ on seminormed spaces, Indian J. Pure Appl. Math., Vol:34, No:4, 529–534, 2003.
2. Hemen Dutta, Some statistically convergent difference sequence spaces defined over real 2-normed linear spaces, Appl. Sci., Vol:12, 37–47, 2010.
3. Hemen Dutta, Adem Kılıçman, Ömer Altun, Topological properties of some sequences defined over 2-normed spaces, Vol:5, 2-16, 2016.
4. I. J. Maddox, Elements of functional analysis, Cambridge Uni. Press, Cambridge, 1970.
5. J. Lindenstrauss, L. Tzafriri, On Orlicz sequence spaces, Israel J. Math., Vol:101, 379–390, 1971.
6. M. A. Krasnoselskii, Y. B. Rutitsky, Convex functions and Orlicz spaces, Groningen, Netherlands, 1961.
7. M. M. Rao, Z. D. Ren, Theory on Orlicz spaces. Marcel Dekker, New York, 1991.
8. Siegfried Gähler, Lineare 2-normierte Räume, Math. Nachr., Vol:28, 1–43, 1965.
9. P. K. Kamthan, Manjul Gupta, Sequence spaces and series, Marcel Dekker, New York, 1981.

THE SEQUENCE SPACE IN 2-NORMED SPACES DEFINED BY ORLICZ FUNCTIONS

Gülcan Atıcı Turan¹ and Çiğdem Bektaş²

¹Department of Mathematics, University of Muş Alparslan, Muş, Turkey

²Department of Mathematics, University of Firat, Elazig, Turkey

gatici23@hotmail.com and cigdemas78@hotmail.com

Abstract

In this article, we obtain $F(\|\cdot, \cdot\|, M, p, u)$ sequence space over 2-normed spaces defined by Orlicz functions. We study some topological properties of this space.

Keywords: Orlicz function; Sequence Spaces; 2-norm; Paranormed spaces.

REFERENCES

1. Çiğdem A. Bektaş, Yavuz Altin, The sequence space $l_M(p, q, s)$ on seminormed spaces, Indian J. Pure Appl. Math., Vol:34, No:4, 529–534, 2003.
2. Hemen Dutta, Some statistically convergent difference sequence spaces defined over real 2-normed linear spaces, Appl. Sci., Vol:12, 37–47, 2010.
3. Hemen Dutta, Adem Kılıçman, Ömer Altun, Topological properties of some sequences defined over 2-normed spaces, Vol:5, 2-16, 2016.
4. I. J. Maddox, Elements of functional analysis, Cambridge Uni. Press, Cambridge, 1970.
5. J. Lindenstrauss, L. Tzafriri, On Orlicz sequence spaces, Israel J. Math., Vol:101, 379–390, 1971.
6. Mahmut Isık, Some classes of almost convergent paranormed sequence spaces defined by Orlicz functions, Demonstr Math., Vol:45, No:3, 585–591, 2012.
7. Mehmet Güngör, Mikail Et, Yavuz Altin, Strongly $(V\sigma, \lambda, q)$ -summable sequences defined by Orlicz functions, Appl. Math. Comput., Vol:157, No:2, 561–571, 2004.
8. M. A. Krasnoselskii, Y. B. Rutisky, Convex functions and Orlicz spaces, Groningen, Netherlands, 1961.
9. M. M. Rao, Z. D. Ren, Theory on Orlicz spaces. Marcel Dekker, New York, 1991.
10. Siegfried Gähler, Lineare 2-normierte Räume, Math.Nachr., Vol:28, 1–43, 1965.
11. P. K. Kamthan, Manjul Gupta, Sequence spaces and series, Marcel Dekker, New York, 1981.

SOME NEW CHARACTERIZATIONS OF PARALLEL TRANSLATION SURFACE ACCORDING TO BISHOP FRAME WITH TIMELIKE M_1 IN MINKOWSKI 3-SPACE

Gülden Altay Suroğlu¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

guldenaltay23@hotmail.com,

Abstract

In this paper we study parallel translation surfaces, which are generated by spacelike curves, according to Bishop frame with timelike M_1 in Minkowski 3- space. Then, we obtain some characterizations of these surface.

Keywords: Minkowski space, translation surface, parallel surface, Bishop frame.

REFERENCES

1. Giovanni Calvaruso and Joeri Van der Veken, Parallel Surfaces in Three Dimensional Lie Groups, Taiwanese Journal of Mathematics, Vol: 14, No:1, 223-250, 2010.
2. Toshizumi Fukui, Masaru Hasegawa, Singularities of Parallel Surfaces, Tohoku Mathematical Journal, Vol:64, No:3, 387-408, 2012.
3. Sezai Kızıltuğ, Yusuf Yaylı, Timelike Curves on Timelike Parallel Surfaces in Minkowski 3-space E_1^3 , Mathematica Aeterna, Vol:2, No: 8, 689 – 700, 2012.
4. Talat Körpınar, Essin Turhan, Spacelike Biharmonic New Type B-Slant Helices According to Bishop Frame in the Lorentzian Heisenberg Group H^3 , General Mathematics Notes, Vol: 10, No:2, 36-42, 2012.
5. Talat Körpınar, Essin Turhan, Parallel Surfaces to Normal Ruled Surfaces of General Helices in the Sol Space Sol^3 , Boletim Sociedade Paranaense de. Matematica, Vol: 31, No:2, 245-253, 2013.
6. Elena Safiulina, Parallel and Semi- parallel Space-like Surfaces in Pseudo-Euclidean Spaces, Proc.Estonian Acad. Sci. Phys.Math., Vol:50, No:1, 16-33, 2001.
7. Yasin Unluturk, Cumali Ekici, On Parallel Surfaces of Timelike Ruled Weingarten Surfaces, Balkan Journal of Mathematics, Vol: 01, 72-91, 2003.
8. Dae Woon Yoon, Some properties of parallel surfaces in Euclidean 3-spaces, Honam Mathematical Journal, Vol: 30, No:4, 637-644, 2008.
9. Süha Yılmaz, Bishop spherical images of a spacelike curve in Minkowski 3-space, International Journal of the Physical Sciences, Vol: 5, No:6, 898-905, 2010.

SOME NEW CHARACTERIZATIONS OF PARALLEL FACTORABLE SURFACE IN RIEMANNIAN THREE DIMENSIONAL HEISENBERG GROUP

Gülden ALTAY SUROĞLU¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

guldenaltay23@hotmail.com,

Abstract

In this paper, we give some properties of parallel factorable surface which is obtained by group operations in Riemannian three dimensional Heisenberg Group H_3 . Then, we obtain some characterizations of parallel factorable surface according to Levi- Civita connections of H_3 .

Keywords: Heisenberg group, Riemannian metric, factorable surface, parallel surface.

REFERENCES

1. Giovanni Calvaruso and Joeri Van der Veken, Parallel Surfaces in Three Dimensional Lie Groups, Taiwanese Journal of Mathematics, Vol: 14, No:1, 223-250, 2010.
2. Toshizumi Fukui, Masaru Hasegawa, Singularities of Parallel Surfaces, Tohoku Mathematical Journal, Vol:64, No:3, 387-408, 2012.
3. Sezai Kızıltuğ, Yusuf Yaylı, Timelike Curves on Timelike Parallel Surfaces in Minkowski 3-space E_1^3 , Mathematica Aeterna, Vol:2, No: 8, 689 – 700, 2012.
4. Talat Körpınar, Essin Turhan, Spacelike Biharmonic New Type B-Slant Helices According to Bishop Frame in the Lorentzian Heisenberg Group H^3 , General Mathematics Notes, Vol: 10, No:2, 36-42, 2012.
5. Talat Körpınar, Essin Turhan, Parallel Surfaces to Normal Ruled Surfaces of General Helices in the Sol Space Sol^3 , Boletim Sociedade Paranaense de. Matematica, Vol: 31, No:2, 245-253, 2013.
6. Huihui Meng, Huili Liu, Factorable Surfaces in 3- Minkowski Space, Bulletin of the Korean Mathematical Society, Vo: 46, No:2, 155-169, 2009.
7. Elena Safiulina, Parallel and Semi- parallel Space-like Surfaces in Pseudo-Euclidean Spaces, Proc.Estonian Acad. Sci. Phys.Math., Vol:50, No:1, 16-33, 2001.
8. Essin Turhan, Gülden Altay, Maximal and Minimal Surfaces of Factorable Surfaces in $Heis_3$, Int. J.Open Problems Compt. Math., Vol:3, No:2, 200- 212, 2010.
9. Yasin Unluturk, Cumali Ekici, On Parallel Surfaces of Timelike Ruled Weingarten Surfaces, Balkan Journal of Mathematics, Vol: 01, 72-91, 2003.
10. Dae Woon Yoon, Some properties of parallel surfaces in Euclidean 3-spaces, Honam Mathematical Journal, Vol: 30, No:4, 637-644, 2008.
11. Süha Yılmaz, Bishop spherical images of a spacelike curve in Minkowski 3-space, International Journal of the Physical Sciences, Vol: 5, No:6, 898-905, 2010.
12. Yanhua Yu, Huili Liu, The factorable minimal surfaces, Proceedings of The Eleventh International Workshop on Diff. Geom., Vol:11, 33-39, 2007.

Concerning On The New Exponential Travelling Wave Solutions of The (2+1)-dimensional Heisenberg Ferromagnetic Spin Chain Equation

Gulnur Yel¹

¹Department of Mathematics Education, Final International University, Kyrenia, Cyprus
gulnur.yel@final.edu.tr

Abstract

In this manuscript, we investigate new travelling wave solutions of nonlinear Schrödinger –types equation which describes(2+1)-dimensional Heisenberg ferromagnetic spin chain equation by the Improved Bernoulli Sub-Equation Function Method (IBSEFM). We plot 2D and 3D surfaces which are obtained as exponential function solutions. These solutions should be able to benefit especially physical phenomena.

Keywords: Improved Bernoulli Sub-Equation Function Method (IBSEFM), (2+1)-dimensional Heisenberg Ferromagnetic

REFERENCES

1. Jean Pierre Nguenang, Timoleon Crepin Kofane, Nonlinear excitations in 1D ferromagnetic spin chains with anisotropic interactions, Chaos, Solitons & Fractals, Vol.30(3), 552-573, 2006.
- 2 Houria Triki and Abdul-Majid Wazwaz, New solitons and periodic wave solutions for the (2+1)-dimensional Heisenberg ferromagnetic spin chain equation, Journal of Electromagnetic Waves and Applications, 30(6), 788-794, 2016.
3. M. Daniel, V. Veerakumar and Rajamani Amuda, Soliton and electromagnetic wave propagation in a ferromagnetic medium, Phys. Rev., 55(3), 3619, 1997.
4. Hasan Bulut, Tukur Abdulkadir Sulaiman, Hacı Mehmet Baskonus, Dark, bright and other soliton solutions to the Heisenberg ferromagnetic spin chain equation, Superlattices and Microstructures, S0749-6036(17), 32831-8, 2018.
5. Bin Zheng, Application of a generalized bernoulli sub-ODE method for finding traveling solutions of some nonlinear equations. WSEAS Trans. Math. 7, 618–626, 2012.

SIMULATION OF STOCHASTIC DIFFERENTIAL EQUATIONS

Gulsen Orucova Buyukoz¹

¹ Department of Mathematics-Computer Science, Necmettin Erbakan University, Konya, Turkey

gorucova@konya.edu.tr,

Mustafa Bayram²

² Faculty of Engineering and Architecture, Istanbul Gelisim University, Istanbul, Turkey

mbayram@gelisim.edu.tr

Abstract

In this study stochastic differential equations (SDEs) and some numerical methods are considered. Using Ito calculus the exact solution of SDE is obtained. Also numerical solutions are approximated. For efficiency the results are compared with help of graphs and error table.

Keywords: Stochastic differential equations; Ito calculus; numerical methods.

REFERENCES

1. Kloeden, Peter E., and Eckhard Platen, Numerical solution of stochastic differential equations, Springer-Verlag, New York, 1992.
2. Allen, Edward, Modeling with Itô stochastic differential equations, Vol. 22. Springer Science & Business Media, 2007.
3. Bernt Oksandal, Stochastic differential equations, Springer-Verlag Heidelberg, New York, 2003.
4. Gard, Thomas C., Introduction to stochastic differential equations, M. Dekker, 1988.
5. Desmond J Higham, An algorithmic introduction to numerical simulation of stochastic differential equations, SIAM review, 43(3):525-546, 2001.

A fast and accurate skew detection algorithm

Günsu Köksal¹, H. Emre Kankaya², Gölge Ögücü Yetkin³,

¹ Department of Electronics and Computer Engineering, Gaziantep University, Gaziantep, Turkey, gkoksal@ciu.edu.tr,

² Department of Electrical and Electronics Engineering, Final International University, Kyrenia, TRNC, emre.kankaya@final.edu.tr,

³ Department of Electrical and Electronics Engineering, Gaziantep University, Gaziantep, Turkey, ogucu@gantep.edu.tr,

Abstract

A novel iterative approach to find the skew angle of an inclined document is proposed. In the proposed method, the document is divided into rectangular clusters of fixed size and the centroid of each cluster is found. The incline angle of each centroid with its right hand side neighbor is calculated and accumulated in a vector to construct the histogram. The peak point of the histogram is taken to be the first guess of the algorithm. After a correction due to the first guess, detection-correction process is repeated iteratively until a certain difference between successive guesses is reached. The final angle reached is set to be result of the proposed detection algorithm. The proposed method approximates the skew angle fast and accurately. Moreover, it can detect skew angles for different linguistic scripts. Furthermore, the detection range can extent from -45° to $+45^{\circ}$. The results obtained from the proposed method are compared with three main methods used to detect the skew angle namely: (i) Projection Profile, (ii) Hough Transform and (iii) Nearest Neighborhood Clustering.

Keywords: Skew detection; Incline angle of a digital document; Hough Transform; Projection Profile; Nearest Neighbourhood Clustering.

REFERENCES

1. BOUDRAA, Omar; HIDOUCI, Walid Khaled; MICHELUCCI, Dominique. An improved skew angle detection and correction technique for historical scanned documents using morphological skeleton and progressive probabilistic hough transform. In: *Electrical Engineering-Boumerdes (ICEE-B), 2017 5th International Conference on*. IEEE, 2017. p. 1-6.
2. STAHLBERG, Felix; VOGEL, Stephan. Document skew detection based on hough space derivatives. In: *Document Analysis and Recognition (ICDAR), 2015 13th International Conference on*. IEEE, 2015. p. 366-370.

ON APPROXIMATION PROPERTIES OF q - SZÁSZ OPERATORS INCLUDING DUNKL EXPONENTIAL FUNCTIONS

Gürhan İÇÖZ¹, Bayram ÇEKİM²

^{1,2} Department of Mathematics, Gazi University, Ankara, Turkey

¹gurhanicoz@gazi.edu.tr, ²bayramcekim@gazi.edu.tr

Abstract

In this article, we construct a new Szász operators with the help of the q -Dunkl generalization of the exponential function. The approximation properties of the operators are given with Korovkin-type theorem and a weighted Korovkin-type theorem. The rate of convergence by means of the Lipschitz class, the classical, second order, and weighted modulus of continuity are derived.

Keywords: Dunkl analog; generating functions; Szász operator; generalization of exponential function.

REFERENCES

1. M. Rosenblum, Generalized Hermite polynomials and the Bose-like oscillator calculus, Operator Theory: Advances and Applications, 73:369–396, 1994.
2. S. Sucu, Dunkl analogue of Szász operators, Applied Mathematics and Computation, 244:42–48, 2014.
3. Y. Ben Cheikh, Y. Gaied, M. Zaghouni, A q -Dunkl-classical q -Hermite type polynomials, Georgian Mathematical Journal, 21:125–137, 2014.
4. G. İçöz, B. Çekim, Dunkl generalization of szász operators via q -calculus, Journal of Inequalities and Applications, 2015(Article ID 284):1–11, 2015.
5. G. İçöz, B. Çekim, Stancu type generalization of Dunkl analogue of Szász-Kantorovich operators, Mathematical Methods in the Applied Sciences, 39:1803–1810, 2016.

NONLINEAR DYNAMICAL MODEL FOR DNA

Haci Mehmet Baskonus¹, Carlo Cattani²

¹Department of Computer Engineering, Munzur University, Tunceli, Turkey

²University of Tuscia, Engineering School (DEIM), Viterbo, Italy

hmbaskonus@gmail.com, cattani@unitus.it

Abstract

This chapter deals with a nonlinear dynamical system arising in the analysis of the Double-Chain model in deoxyribonucleic acid. Bernoulli-Sub equation function method and Modified $\exp(-\Omega(\xi))$ -expansion function method to obtain some novel dynamical structures to the nonlinear dynamical system are used. We construct some new exponential, hyperbolic and complex periodic wave solutions to this model. Under some suitable values of parameters, we plot the 2D and 3D graphics of the solutions obtained in this study. All the solutions found in this study satisfy the nonlinear dynamical system. Moreover, these solutions can be used to explain some new significant physical meanings of the nonlinear dynamical model for DNA.

Keywords: The new Double-Chain model, Bernoulli-Sub equation function method, Exponential, Rational, Complex function solutions.

REFERENCES

- [1] Atangana and J.F. Botha, Analytical Solution of the Groundwater Flow Equation obtained via Homotopy Decomposition Method, Journal of Earth Science and Climatic Change 3(2), 115, 2012.
- [2] Atangana, A Novel Model for the Lassa Hemorrhagic Fever: Deadly Disease for Pregnant Women, Neural Computing and Applications 26(8), 1895-1903, 2015.
- [3] A.M. Wazwaz, Abundant solutions of various physical features for the (2+1)-dimensional modified KdV-Calogero-Bogoyavlenskii-Schiff equation, Nonlinear Dyn, 89(3), (2017) 1727-1732.
- [4] A.M. Wazwaz and S.A. El-Tantawy, A new integrable (3+1)-dimensional KdV-like model with its multiple-soliton solutions, Nonlinear Dyn, 83(3), (2016) 1529-1534.
- [5] A.M. Wazwaz, Gaussian solitary wave solutions for nonlinear evolution equations with logarithmic nonlinearities, Nonlinear Dyn, 83(1-2), 591-596, 2016.

LANGUAGE PRACTICE WITH FILMS, DISCUSSIONS ON ITS EFFECT IN ENGINEERING CLASSES

Hakan Gokce¹

¹ School of Foreign Languages, University of Pamukkale, Denizli, Turkey

hakang@pau.edu.tr,

Abstract

Films are widely used in the teaching of foreign languages, and researchers argued that they are also useful in testing. Yet in this study we aimed to investigate what the students' views towards viewing films in English were, what difficulties they faced and how non-verbal information provided by films affected their learning English as a foreign language. In this study, Turkish university students were asked to watch a feature film and afterwards data were collected via a questionnaire which was composed of a five point Likert-scale and open ended questions sections. The descriptive statistical analysis of the data reflected positive views of the students toward viewing films in English.

Keywords: foreign language teaching/learning; feature films; subtitle, language skills

REFERENCES

1. Akhmetova, A. 2016. Language Practice with films.
2. Baratta, A., & Jones, S. (2008). Using film to introduce and develop academic writing skills among Uundergraduate students. *Journal of Educational Enquiry*, 8(2), 15-37
3. Bahrani, T., & Tam, S. S. (2012). Informal language learning setting: technology or social interaction? *The Turkish Online Journal of Educational Technology*, 11 (2), 142-149.
4. Brinton, D. (1991). The use of media in language teaching. *Teaching English as a Second or Foreign Language*, Boston: Heinle and Heinle Publishers.
5. Chapple. L., & Curtis. A. (2000). Content based instruction in Hong Kong: Students responses to films. *System*, 28, 419-433.
6. Gilmore, A. (2007). Authentic materials and authenticity in foreign language learning. *Language Teaching*, 40, 97-118.
7. Hanley, J., & Herron, C., A. (1992). Using video to introduce children to a foreign culture. *Foreign Language Annals*, 25, 419-426.
8. Khan, A. (2015). Using films in the ESL classroom to improve communication skills of non-native learners. *ELT Voices*, 5(4), 46-52.
9. Seferoglu, G. 2008. Using feature films in language classes. *Educational Studies*, 34(1), 1-9.

UNIFORM DIFFERENCE METHOD FOR SINGULARLY PERTURBED NONLINEAR REACTION DIFFUSION PROBLEMS

Hakkı Duru¹, Baransel Güneş²

¹ Department of Mathematics, Yüzüncü Yıl University, Van, Turkey

hakkiduru@gmail.com,

² Department of Mathematics, Yüzüncü Yıl University, Van, Turkey

baransel_gunes_91@hotmail.com,

Abstract

In this article, the boundary value problem for singularly perturbed nonlinear reaction diffusion equations are treated. The exponentially fitted difference schemes on a uniform mesh which is accomplished by the method of integral identities with the use of exponential basis functions and interpolating quadrature rules with weight and remainder term in integral form are presented. The stability and convergence analysis of the method is discussed. The fully discrete scheme is shown to be convergent of order 1 in independent variable, independently of the perturbation parameter. Some numerical experiments have been carried out to validate the predicted theory.

Keywords: Singular perturbation; differential equation; Uniform mesh; Difference schemes.

REFERENCES

1. Amiraliyev, G. M., Mamedov, Y. D., 1995. Difference schemes on the uniform mesh for a singularly perturbed pseudo-parabolic equations. Turkish Journal of Mathematics, (19): 207-222.
2. Boglaev, I.P., 1984. Approximate solution of a nonlinear boundary value problem with a small parameter for the highest-order differential. U.S.S.R. Comput.Maths.Math.Phys., (24): No.6, 30-35.
3. Vulanović, R., 1982. An exponentially fitted scheme on a non-uniform mesh, zb.rad. Prirod.-mat.Fak.Univ. u Novom Sadu, Ser.Mat., 12, 205-215.

INVERSE PROBLEM OF TENSION DETERMINATION IN A WAVE EQUATION

Murat Subaşı¹, Hakkı Güngör²

¹ Department of Mathematics, Science Faculty, Ataturk University, Erzurum, Turkey

² Department of Computer Technologies, Vocational School of Higher Education, Ufuk University, Ankara, Turkey

msubasi@atauni.edu.tr, hakki.gungor@ufuk.edu.tr

Abstract

In this article, we consider the problem of determination of an end point tension in a wave equation. Since these types of problems are ill-posed, the regularization process is needed. We use the adjoint method to obtain the gradient of the regularized cost functional. By gradient method we constitute a minimizing sequence which converges to a tension function of the wave equation.

Keywords: Inverse Problem; Adjoint Method; Wave Equation.

REFERENCES

1. Ladyzhenskaya O. A., Boundary Value Problems in Mathematical Physics, Springer-Verlag, 322 p, New York, 1985.
2. Lions J. L., Exact controllability, stabilization and perturbations for distributed systems. SIAM Rev., 30,1–68, 1988.
3. Yamamoto M., Stability, reconstruction formula and regularization for an inverse source hyperbolic problem by a control method. Inverse Problems, 11, (2), 481-496, 1995.
4. Tagiyev R. K., On Optimal Control of the Hyperbolic Equation Coefficients, Automation and Remote Control, Vol. 73, No.7, pp 1145-1155, 2012.
5. Hasanov A., Simultaneous determination of the source terms in a linear hyperbolic problem from the final over determination: weak solution approach, Journal of Applied Mathematics, p 1–19, 2008.

Solving Simplified Modified Form of Camassa-Holm Equation by The sn-ns Method

Hami Gündoğdu¹ and Ömer Faruk Gözükızıl²

¹ Department of Mathematics, Sakarya University, Sakarya, Turkey

1-hamigundogdu@sakarya.edu.tr, 2-farukg@sakarya.edu.tr

Abstract

In this study, the simplified modified form of Camassa-Holm equation is considered. The sn-ns method is applied to this equation. Then, it introduces new solutions to this equation in the form of jacobi elliptic functions in addition to hyperbolic and trigonometric solutions.

Keywords: Camassa-Holm equation (C-H), the sn-ns method, elliptic function solution, hyperbolic solutions, trigonometric solution.

REFERENCES

1. E. Fan and Y.C. Hon, Generalized tanh method extended to special types of nonlinear equations, *Z Naturforsch*, 57 (2002) 692-700.
2. A.-M. Wazwaz, The extended tanh method for new solitons solutions for many forms of the fifth order KdV equations, *Appl Math Comput*, 184 (2007) 1002-1014.
3. A.-M. Wazwaz, New travelling wave solutions of different physical structures to generalized BBM equation, *Phys Lett A*, 355 (2006) 358-362.
4. S. Yadong, Explicit and exact special solutions for BBM-like B(m,n) equations with fully nonlinear dispersion. 25 (2005) 1083-1091.
5. J.-H. He and L.-N. Zhang, Generalized solitary solution and compacton-like solution of the Jaulent-Miodek equations using the Exp-function method, *Phys Lett A*, 372 (2008) 1044-1047.
6. R. Conte and M. Musette, Link between solitary waves and projective Riccati equations, *J Phys A-Math Gen*, 25 (1992) 5609-5623.

MATHEMATICS EDUCATION THROUGH SYSTEMS THINKING IN PRESCHOOL EDUCATION

Hande Güngör¹, Ayşen Musoğlu²

¹ Department of Child Development, University of Pamukkale, Denizli, Turkey

hgungor@pau.edu.tr,

²PEV Schools, Denizli, Turkey

amusoglu@pevkolej.k12.tr

Abstract

System is a concept that sustains its existence and functions as a whole through the interrelationships of its parts. Systems thinking can be described as a viewpoint that allows to see the whole and the network of the relationships rather than focusing on the details of any emerging parts of the events in a defined order. For this reason, it can be stated that systems thinking enables to see the system as a whole instead of the sum of the parts forming the system. As can be understood from its the conceptual definition, systems thinking can be used in a great number of areas. The field of education is one of the areas systems thinking is used theoretically and practically. While systems thinking is employed as a way of thinking or a teaching method in education, it is also a widely used approach in the field of education management. Systems thinking approach can be applied at all the educational levels starting from the pre-school period which is the first stage of education. The aim of the current study is to examine the applications of mathematics teaching through the systems thinking approach in a pre-school institution, and to find out the opinions of teachers and children on these applications. The sampling of the study consisted of 18 pre-school students and their teacher affiliated to a private primary school in Pamukkale District of Denizli province. The data of the study were collected through observations, interviews and the products that the children performed. It is thought that the findings of the present study will contribute to pre-school teachers and researchers who want to work in this area as it will provide examples of mathematics teaching applied through systems thinking approach in pre-school education, and the teacher opinions and students' achievements regarding the approach will be expressed.

Keywords: Pre-school Education; Systems Thinking in Education; Mathematics Education

REFERENCES

1. Özlem Taşdelen, Evaluation of the Perceptions and Skills for Systems Thinking and Biological Logic Approaches of the Pre-Service Biology Teachers. Ph.D Thesis, Gazi Univesity Graduate School of Educational Sciences, Ankara, 2016.

A NEW GENERALIZATION OF THE WREATH PRODUCT OF POLYGROUPS

Hani Khashan¹

¹Department of Mathematics, Al al-Bayt University, Mafraq, Jordan

hakhashan@aabu.edu.jo

Abstract

Let L and H be two polygroups. In this paper, we construct a new generalization of both the direct product $H \times L$ and the wreath product $H[L]$. we investigate many properties of the new product and introduce several examples.

Keywords: wreath product of polygroups, polygroup extensions, normal subpolygroups

REFERENCES

1. S. D. Comer, Extension of polygroups by polygroups and their representations using colour schemes, Lecture notes in Math., 1004: 91-103, 1982.
2. S. D. Comer, Constructions of color schemes, Acta Univ. Carolin. Math. Phys., 24: 39-48, 1983.
3. B. Davvaz, Polygroup Theory And Related Systems, World Scientific Publishing Co., 2013.
4. B. Davvaz, Isomorphism theorems of polygroups, Bull. Malays. Math. Sci. Soc., 33(2): 385-392, 2010.
5. M. De Salvo, Gli (H,G) -ipergruppi, Riv. Mat. Univ. Parma, 10: 207-216, 1984.

On the exact solitary wave solutions to the long-short wave interaction system

Haci Mehmet Baskonus^{1*}, Tukur Abdulkadir Sulaiman^{2,3} and Hasan Bulut^{3,4}

¹Department of Computer Engineering, Munzur University, Tunceli, Turkey

²Department of Mathematics, Firat University, Elazig, Turkey

³Department of Mathematics, Federal University Dutse, Jigawa, Nigeria

⁴Department of Mathematics Education, Final International University, Kyrenia, Cyprus

hmbaskonus@gmail.com, sulaiman.tukr@fud.edu.ng, hbulut@firat.edu.tr

Abstract

In this paper, the application of the simplified the extended sinh-Gordon equation expansion method to the long-short-wave interaction system. We successfully construct various solitary wave solutions to this nonlinear complex model. The long-short-wave interaction system describes the interaction between one long longitudinal wave and one short transverse wave propagating in a generalized elastic medium. The 2D and 3D surfaces to some of the obtained solutions are plotted.

Keywords: Simplified extended ShGEEM; LSWIS; Soliton solutions.

*Corresponding Author

REFERENCES

1. X. Xian-Lin and T. Jia-Shi, Travelling Wave Solutions for Konopelchenko-Dubrovsky Equation Using an Extended sinh-Gordon Equation Expansion Method, Commun. Theor. Phys., Vol:50, 1047 2008.
2. A.H. Khater, M.M. Hassan and D.K. Callebaut, Travelling wave solutions to some important equations of mathematical physics, Reports on Mathematical Physics, Vol:66, No:1, 1-19 2010.
3. Z. Yan, Jacobi elliptic function solutions of nonlinear wave equations via the new sinh-Gordon equation expansion method, MMRC, AMSS, Academia Sinica, Beijing, Vol:22, 363-375 2003
4. H. Bulut, T.A. Sulaiman, H.M. Baskonus and F. Erdogan, On the new hyperbolic and trigonometric structures to the simpli_ed MCH and SRLW equations, Eur. Phys. J. Plus, Vol:132, 350 2017

Mathematical Model for Advanced Sterilization Device Design

Murat TATLILIOĞLU

Gazi Un. Institute of Natural And App. Sci.

Hasan Hüseyin SAYAN

Gazi Un. Faculty of Technology

In this study, it is aimed to design a prototype by integrating ultraviolet radiation technology with ceramic ultrasonic transducer. Ultrasonic wave intensity of $0.6\text{w} / \text{cm}^2$ - $6.2\text{w} / \text{cm}^2$ is expected with the targeted device, and 30% more efficient sterilization is expected in UV sterilization processes compared to existing UV sterilization technology. Ultrasonic generator design, UV drive design and PID controlled resistance technologies will be designed. During the ultrasonic generator design, a mathematical model will be established that will provide the resonance frequency so as to reduce the heat of the transducer material to a minimum.

References

1. Nguyen-Dinh et al., “High Frequency Piezo-Composite Transducer Array Designed for Ultrasound Scanning Applications,” 1996 IEEE Ultrasonics Symposium, 1996, pp. 943-947.
2. P. A. Payne. et al., “Integrated Ultrasound Tranducers,” 1994 Ultrasonics Symposium, 1994, pp.1523-1526.
3. Torben Blume, Uwe Neis Improved wastewater disinfection by ultrasonic pre-treatment 3rd Conference Applications of Power Ultrasound in Physical and Chemical Processing, Paris, 13-14 December 2001 s:6-8.
4. O.E. Mattiat, Springer Science & Business Media, 13 Mar 2013 s:1-3.
5. Patent, Inventor: Susan Brown-Skrobot, James Ebel,John Enns,Gregory Hill,Allan Kimble, Method and apparatus of sterilization using monochromatic UV radiation source Patent no: US13208452 2011.

Image Compressing With Curve Fitting

Hasan Hüseyin SAYAN

Gazi Un. Faculty of Technology

Yusuf SÖNMEZ

Gazi Un. Technical Sciences Vocational School

İbrahim Ethem GÜRSOY

Gazi Un. Faculty of Technology

Various data compression and data transfer methods have been developed with the aim of solving problems such as rapidly increasing data traffic and moving data in communication technologies. In this study, a linear curve fitting method is proposed for compressing photo data. In the proposed algorithm, by transforming the matrix values generated by the RGB values of the photograph into polynomial functions, the average reduction of 35% is achieved. In the compression method, the average loss in the photograph is around 5% compared to the original.

References

1. Amar Majeed Butt, Rana Asif Sattar; (2010) On Image Compression Using Curve Fitting, School of Computing Blekinge Institute of Technology, Master Thesis, Computer Science Thesis no: MCS-2010-35.
2. Saumya Sadanandan, V. K. Govindan; (2013). Image Compression with Modified Skip line Encoding and Curve Fitting, International Journal of Computer Applications (0975 – 8887), Volume 74, No.5, 24-30.
3. R Srinivasa Rao, V. V. Haragopal; (2017), Minimizing Big Data Storage Demand Using Polynomial Curve Fitting: The Case of Block Based Compression of Image Data, Visleshana, Vol. 1, No.4, 14-21.
4. Manjari Singh, Sushil Kumar, Siddharth Singh Chouhan, Manish Shrivastava; (2016) International Journal of Computer Applications (0975 – 8887) Volume 142 – No.6, 23-26.
5. Firas A. Jassim , Hind E. Qassim; (2012), Five Modulus Method For Image Compression, Signal & Image Processing : An International Journal (SIPIJ) Vol.3, No.5, 19-28.

THE SHEAF OF THE GROUPS FORMED BY TOPOLOGICAL GENERALIZED GROUP OVER TOPOLOGICAL SPACES

Hatice Aslan¹ , Hakan Efe²

¹ Department of Mathematics, Firat University , Elazig, TURKEY

² Department of Mathematics, Gazi University , Ankara, TURKEY

haticeaslan2017@gmail.com

hakanefe@gazi.edu.tr

Abstract

In the present paper, we consider both homotopy and sheaf theory and construct an algebraic sheaf by means of the topological generalized group defined by Molei in [3].

Keywords: Generalized groups, sheaves, Whitney sum.

REFERENCES

1. B. Gray, Homotopy Theory, Academic Press New York San Francisco London , 1975.
2. M. Mehrabi, M. R. Molaei, A. Olomi, Generalized subgroups and homomorphisms. Arab. J Math Sci ; 6: 1-7, 2000.
3. M. R. Molei , Topological Generalized Groups, International Journal of Pure and Applied Mathematics, Vol. 2,9, 1055-1060, 2000.
4. M. R. Molaei, Generalized structures based on completely simple semigroups. Florida, USA: Hadronic Press, 2005.
5. C. Yıldız, Topolojik Uzaylar Üzerinde Topolojik Grubun Oluşturduğu Grupların Demeti, Erc. Üni. Bil. Derg., 7, 1, 1112-1120, 1991.

ON APPROXIMATION OF HEXAGONAL FOURIER SERIES IN GENERALIZED HÖLDER METRIC

Hatice Aslan¹, Ali Guven²

¹ Department of Mathematics, Firat University, Elazig, TURKEY

² Department of Mathematics, Balikesir University, Balikesir, TURKEY

haticeaslan2017@gmail.com

Abstract

Let the function f belongs to the generalized Hölder classes of H -periodic continuous functions. Also, let $p = (p_n)$ and $q = (q_n)$ be two sequences of nonnegative real numbers such that $p_n < q_n$ and $q_n \rightarrow \infty$ as $n \rightarrow \infty$. The order of approximation of f by deferred Cesáro means $D_n(p; q; f)$ of its hexagonal Fourier series is estimated in the uniform and generalized Hölder norms.

Keywords: Deferred Cesáro means, Hexagonal Fourier series, Generalized Hölder class.

REFERENCES

1. R. P. Agnew. On deferred Cesáro means. Ann. of Math. (2) 33: 413-421, 1932.
2. R. A. DeVore and G. G. Lorentz. Constructive approximation: Springer-Verlag, 1993.
3. A. Guven, Approximation by means of hexagonal Fourier series in Hölder norms, J. Classical Anal. **1**, 43–52, 2012.
4. L. Leindler, Generalizations of Prössdorf's theorems, Studia Sci. Math. Hung. **14**, 431–439, 1979.
5. H. Li, J. Sun and Y. Xu. Discrete Fourier analysis, cubature and interpolation on a hexagon and a triangle. SIAM J. Numer. Anal. 46: 1653-1681, 2008.
6. Y. Xu. Fourier series and approximation on hexagonal and triangular domains, Constr. Approx. 31: 115-138, 2010.

LN TYPE ESTIMATOR ON ESTIMATING THE FINITE POPULATION VARIANCE IN THE SIMPLE RANDOM SAMPLING

Hatice Oncel Cekim¹, Cem Kadilar²

^{1,2} Department of Statistics, University of Hacettepe, Ankara, Turkey

¹oncelcekim@hacettepe.edu.tr, ²kadilar@hacettepe.edu.tr,

Abstract

The different types of estimators for the population variance have been used by many authors in the simple random sampling up to now. In this paper, we introduce using the ln function to estimate the population variance for the first time in Literature of the Sampling Theory. We propose an ln type estimator to improve the efficiency of the variance estimator. It is found that the ln type estimator is more efficient than the ratio, regression, and exponential type estimators under the obtained conditions. Finally, theoretical results derived in the article have been verified by considering a numerical illustration.

Keywords: Simple random sampling, ln type estimator, efficiency, mean square error, variance estimator.

REFERENCES

1. Adichwal, N. K., Sharma, P., Verma, H. K., Singh, R., Generalized class of estimators for population variance using auxiliary attribute. International Journal of Applied and Computational Mathematics, Vol: 2, No: 4, 499-508, 2016.
2. Asghar A., Sanaullah A., Hanif M., A multivariate regression-cum-exponential estimator for population variance vector in two phase sampling. Journal of King Saud University Science DOI: 10.1016/j.jksus.2017.01.010, 2017.
3. Singh H.P., Pal S.K., Yadav A., A Study on the Chain Ratio-Ratio-Type Exponential Estimator For Finite Population Variance. Communications in Statistics-Theory and Methods Vol: 47, No: 6, 1442-1458, 2017.
4. Yadav, S. K., Kadilar, C., Shabbir, J., Gupta, S., Improved family of estimators of population variance in simple random sampling. Journal of Statistical Theory and Practice, Vol: 9, No: 2, 219-226, 2015.

NUMERICAL STUDY OF NEWTONIAN FLUID IN THE PRESENCE OF HEAT AND MASS TRANSFER IN A CAVITY FILLED WITH A POROUS MEDIUM

Hatice Muti¹ & Hüseyin Demir²

¹Civil Aviation College, University of Ondokuzmayıs, Samsun, Turkey,

hmuti@omu.edu.tr

²Faculty Of Engineering And Natural Sciences Department Of Mathematics Engineering, University of Gümüşhane, Gümüşhane-Turkey,

hdemir@gumushane.edu.tr

Abstract

In this problem, Newtonian fluid flow equations for 2-D unsteady incompressible natural convective heat and mass transfer are solved numerically using Finite Difference Method. We investigate the effects of heater location and heater size together for natural convection heated from below in a uniform porous medium. Stability properties are studied, in particular, for Rayleigh number from 10^4 to 10^6 in an enclosed cavity region.

Keywords: Natural convection, Finite-Element Method, Heat and Mass Transform.

REFERENCES

1. Ali J. Chamkha, Double-Diffusive Convection In A Porous Enclosure With Cooperating Temperature And Concentration Gradients And Heat Generation Or Absorption Effects, Numerical Heat Transfer, Part A, 41: 65-87, 2002
2. D. A. Nield and A. Bejan, Convection in Porous Media, Berlin (1992)
3. Ich-Long Ngo and Chan Byon, Effects of heater location and heater size on the natural convection heat transfer in a square cavity using finite element method, Journal of Mechanical Science and Technology 29 (7) 2995-3003, (2015)
4. N. Yücel, Natural convection in rectangular enclosures with partial heating and cooling, *Wärme-und Stoffübertragung*, 29 (8) (1994) 471–477.

A NOTE ON A BINARY RELATION CORRESPONDING TO A BIPARTITE GRAPH

Hatice Kübra Sarı¹ Abdullah Kopuzlu¹

¹ Department of Mathematics, University of Ataturk, Erzurum, Turkey

hatice.sari@atauni.edu.tr, akopuzlu@atauni.edu.tr

Abstract

In this article, we define a serial nontransitive relation corresponding to a bipartite graph. We also obtain that graph of serial nontransitive relation R is bipartite. Therefore we conclude that bipartite graphs and serial-nontransitive relations are corresponding each other.

Keywords: Rough Set; Graph Theory; Bipartite Graph; Independent Set.

REFERENCES

1. J.A. Bondy, U.S.R. Murty, "Graph Theory with Applications", Elsevier Science Publishing Co., Inc., 1976.
2. J. Chen, J. Li, An application of rough sets to graph theory, Information Sciences, Vol:201, 114-127, 2012.
3. J. Järvinen, Lattice Theory for Rough Sets, Transactions on Rough Sets, VI, LNCS, vol: 4374, Springer-Verlag, Berlin, Heidelberg, 400-498, 2007.
4. Z. Pawlak, Rough Sets, International Journal Computing Information Science, Vol:11, No:5, 341-356, 1982.
5. Y. Y. Yao, Constructive and algebraic methods of the theory of rough sets, Information Sciences, Vol:109, 21-47, 1998.
6. Y.Y. Yao, "Two Views of the Theory of Rough Sets in Finite Universe, International Journal Approximation Reasoning, Vol:15 No:4, 291-317, 1996.

Regional gradient enlarged observability of semilinear parabolic systems

Hayat Zouiten¹ and Ali Bouloulout¹

¹ TSI Team, MACS Laboratory, Department of Mathematics and Computer Science, Faculty of Sciences, Moulay Ismail University Meknes, Morocco

hyata.zouiten@yahoo.fr & boulouloutali@yahoo.fr

Abstract

In The aim of this paper is to study the regional gradient enlarged observability problem of semilinear parabolic systems. This original concept is interested in the reconstruction of the initial gradient state between two prescribed functions only in an internal subregion of the system evolving domain, without the knowledge of the state. The Hilbert uniqueness method combined with fixed point techniques is used to solve this problem.

Keywords: Semilinear systems; Parabolic systems; Enlarged observability; Regional gradient reconstruction; HUM approach.

REFERENCES

1. M. Baroun and B. Jacob (2009), Admissibility and observability of observation operators for semilinear problems, *Integral Equations Operator Theory*, 64, 1-20.
2. A. Boutoulout, H. Bourray and E.Z. El Alaoui (2012), Regional gradient observability for distributed semilinear parabolic systems, *Journal of Dynamical and Control Systems*, Vol. 18, No. 2, 159–179.
3. A. EL Jai, M.C Simon and E. Zerrik (1993), Regional observability and sensors structures, *Sensors and Actuators Journal*, Vol 39, 95–102.
4. J.L. Lions (1989), Sur la contrlabilit exacte largie, *Progress in Nonlinear Differential Equations and Their Applications*, Vol 1, 703–727.
5. K. G. Magnusson (1984), Observability of nonlinear systems, *IMA J. Math. Control Information* 1, 339–358.
6. E. Zerrik and H. Bourray (2003), Gradient observability for diffusion systems, *Int. J. App. Math Comp. Sci.* 13, No. 2, 139–150.
7. H. Zouiten, A. Boutoulout and F.Z. El Alaoui (2017), Enlarged gradient observability for distributed parabolic systems: HUM approach, *Intelligent Control and Automation*, Vol. 8, 15–28.

Multy stage method for solving the Dirichlet problem for Laplace's equation on a rectangle

Adıgüzel A.Dosiyev¹, Hediye Sarıkaya²

^{1,2}Department of Mathematics, Near East University, Nicosia,

K.K.T.C., Mersin 10, Turkey

¹ adiguzel.dosiyev@emu.edu.tr

² sarikayahediye@gmail.com

Abstract

In a rectangular domain, we consider the Dirichlet problem for the Laplace equation, when the boundary values belong to the Holder classes $C^{10,\lambda}$, $0 < \lambda < 1$, on the sides of the rectangle, and as whole are continuous on the vertices. Also the $2q$, $q = 1,2,3,4$ order derivatives satisfy the compatibility conditions on the vertices which result from the Laplace equation. At the first stage, by using the 9-point scheme, the sum of the pure fourth derivatives of the desired solution is approximated of order $O(h^6)$. At the second stage the sum of pure eighth derivatives is approximated of order $O(h^2)$ by the 5-point scheme. At the final third stage, the system of simplest 5-point difference equations approximating the Dirichlet problem is corrected by the quantities determined at the first and second stages. It is proved that, the difference solution obtained at the third stage converges to the exact solution the Dirichlet problem, of order $O(\rho h^8)$ with the weight function ρ , where $\rho = (x, y)$ is the distance from the current grid point (x, y) to the boundary of the rectangle. Numerical experiments are illustrated to support the analysis made. Some difference schemes by correcting the right-hand side were constructed in [1],[2].

Keywords: Finite difference method; Laplace equation; Error Estimations; Dirichlet boundary condition.

REFERENCES

1. E.A. Volkov, A two-stage difference method for solving the Dirichlet problem for the Laplace equation on a rectangular parallelepiped, Computational Mathematics and Mathematical Physics, Vol:49, No:3, 496-501, 2009.
2. G.K. Berikelashvili and B.G. Midodashvili, Compatible convergence estimates in the method of refinement by higher-order differences, Differ. Uravn., Vol:51, No:1, 107-115, 2015.

(Δ, f) -STATISTICAL CONVERGENCE DEFINED BY A MODULUS FUNCTION

Hıfı ALTINOK Derya DENİZ

Department of Mathematics, University of Firat, Elazig, Turkey

hifsialtinok@gmail.com

deryadeniz485@yandex.com

Abstract

In this article, we define the concepts of (Δ, f) -statistical convergence and strongly (Δ, f) -Cesaro summability of order β for $\beta \in (0, 1]$ using an unbounded modulus function f in sequences of fuzzy numbers and examine some inclusion relations between them.

Keywords: Fuzzy sequence; Statistical convergence; Modulus function; Difference sequence.

REFERENCES

1. A. Aizpuru, M.C. Listan-Garcia, F. Rambla-Barreno, Density by Moduli and Statistical Convergence. Quaest. Math. 37, 525-530, 2014.
2. H. Altınok, M. Kasap, f -Statistical Convergence of Order β for Sequences of Fuzzy Numbers. Journal of Intelligent & Fuzzy Systems, 33(2), 705-712, 2017.
3. VK. Bhardwaj, S. Dhawan, f -Statistical Convergence of Order α and Strong Cesàro Summability of Order α with respect to a Modulus, J. Inequal. Appl. 2015:332 DOI 10.1186/s13660-015-0850-x.
4. R. Çolak, Statistical Convergence of Order α , Modern Methods in Analysis and Its Applications, New Delhi, India: Anamaya Pub, 121—129, 2010.
5. J. Fridy, On Statistical Convergence, Analysis 5 301-313, 1985.
6. M. Matloka, Sequences of Fuzzy Numbers, Busefal, 28(1), 28-37, 1986.
7. F. Nuray, E. Savaş, Statistical Convergence of Sequences of Fuzzy Numbers. Mathematica Slovaca, 45(3), 269-273, 1995.

A NOTE ON MATRIX TRANSFORMATION

Hikmet Seyhan Özarlan¹

¹ Department of Mathematics, Erciyes University, Kayseri, Turkey

seyhan@erciyes.edu.tr

Abstract

In this article, a general theorem concerned with $\varphi - |A, \delta|_k$ summability of an infinite series has been proved by virtue of the definition of quasi β -power increasing sequences and matrix transformations. This theorem includes some new and known results.

Keywords: Riesz mean; Almost increasing sequences; Quasi power increasing sequences; Hölder inequality; Minkowski inequality; Matrix transformation.

REFERENCES

1. Bor, Hüseyin, On two summability methods, Math. Proc. Cambridge Philos. Soc., Vol:97, No:1, 147-149, 1985.
2. Bor, Hüseyin and Özarlan, Hikmet Seyhan, On the quasi power increasing sequences, J. Math. Anal. Appl., Vol:276, No:2, 924–929, 2002.
3. Leindler, László, A new application of quasi power increasing sequences, Publ. Math. Debrecen., Vol:58, No:4, 791-796, 2001.
4. Mazhar, Syed Mohammad, Absolute summability factors of infinite series, Kyungpook Math. J., Vol:39, No:1, 67-73, 1999.
5. Özarlan, Hikmet Seyhan and Ari, Tuba, Absolute matrix summability methods, Appl. Math. Lett., Vol:24, No:12, 2102-2106, 2011.
6. Özarlan, Hikmet Seyhan and Yavuz, Enes, A new note on absolute matrix summability, J. Inequal. Appl., Vol:474, 1-7, 2013.

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OPERATOR (α, m) -PREINVEX FUNCTIONS

Erdal Ünlüyol¹ and Hümeyra Karbuz¹

¹Department of Mathematics, University of Ordu, Ordu, Turkey

erdalunluyol@odu.edu.tr, humeyrakarbuz15@hotmail.com

Abstract

In this article, we define a new class of operator preinvex function in Hilbert space, namely operator (α, m) -preinvex. And then we obtain some new inequalities of Hermite-Hadamard in terms of this class.

Keywords: Hilbert space; Bounded self-adjoint operator; Operator preinvex functions; Operator (α, m) -preinvex.

REFERENCES

1. Yang X. M. (2001) On Properties of Preinvex Functions, Journal of Mathematical Analysis and Applications 256, 229-241.
2. Amir Ghazanfari, Mahmood Shakoori, Ali Barani, Silvestru Sever Dragomir, Hermite-Hadamard Type Inequality For Operator Preinvex Functions, arXiv:1306.0730v1
3. Shu-Hong Wang, Xiao-Wei Sun, Hermite-Hadamard type inequalities for operator alpha-preinvex functions J. Ana. Num. Theor. 5, No. 1, 13-17.
4. Erdal Ünlüyol, Elif (Ünal) Başköy, Elif Başköy, On operator m-preinvex functions, International Conference on Computational and Statistical Methods in Applied Sciences (COSTAS 2017), 9-11 Nov. 2017, Samsun, Turkey, p. 54.

IGNITION LASER SYSTEMS, EVALUATION OF UTILIZATION

Hüseyin Özden

Department of Mechanical Engineering, Ege University, İzmir, Turkey

h.ozden@yahoo.de

Abstract

Classical methods are not enough for the solution of technical and economic problems encountered in today's ignition systems such as spark plugs and Pyrotechnic application. In search of an alternative solution, the firing Lasers were developed. In parallel with the advances in laser technology, the ignition lasers are used instead of conventional ignition systems in internal combustion engines. The principle structure of the ignition laser is investigated in this study. Compared to conventional spark ignition and pyro-ignition systems, positive and negative features are presented and discussed. And the common areas of use today and in the future have been analyzed. The ignition has the capability of increasing efficiency in the laser, internal combustion liquid, gas-fired power engines and solid, liquid gas fired rocket, missile propulsion engines, especially natural gas power generation production plants. It contributes to reduce harmful gases from internal combustion vehicles, automobiles and natural gas power plants. Future use of ignition lasers is expected to become more widespread. The firing lasers in Turkey, our universities, TUBITAK, R & D-activities does not have any remarkable studies abroad as Germany, Austria, R & D-intensive activities are underway in countries such as The structure of the laser ignition is simple in principle, it can be easily developed and produced in Turkey. Another purpose of the broadcast work is to draw attention to the firing lasers in Turkey.

Keywords: Ignition Laser, Principle Structure, Research, Uses, Automobile, Rocket, Power Plants

REFERENCES

- [1] A. Burkert, Wann ersetzt die Laserzündung die konventionelle Zündkerze, Motorentechnik, 2014. 83(1-2), 591-596, 2016.
- [2] J. Tauer, H. Kofler, E. Wintner, Laser-initiated ignition, Laser-Photonics, Vol.4, 2010,
- [3] Chiara Manfletti, Michael Börner, u.A., Zukünftige Trägerraketen zünden mit Lasern, Deutsches Zentrum für Luft- und Raumfahrt, e. V. (DLR), Köln, 2017
- [4] H. Özden, Lasertechnik, Lasertechnolojisi uygulama alanları, Ders Notları, EÜ, Mak. Müh. Böl. 2016

COMPUTER AIDED TOPOLOGY OPTIMIZATION APPLICATIONS IN MACHINE DESIGN

Hüseyin Özden

Department of Mechanical Engineering, Ege University, İzmir, Turkey

h.ozden@yahoo.de

Abstract

Computer aided topology optimization applications in designs are made for various purposes such as reducing the weight of the machine designs, decreasing the form resistance and changing the frequency, under working conditions without compromising strength and reliability. The necessary information about the application of computer aided dimension-, form-, topology- and topography-optimization methods in the activities of machine designs is given in working with practical examples. The results are compared with different packet programs and iteration counts. In optimization, three-dimensional industrial design is defined by complex mathematical equations. According to the maximum or minimum target values, three dimensional shape solutions are obtained according to the iterative number of this equation. As a result: - As shown in the computer-aided design examples, machine designs and optimizations are easily realized with today's possibilities in the terms of time and cost. - Optimization programs facilitate the designer's work in many ways while contributing to the emergence of inventions with the new ideas as much as designs are improved. - There is no general use of a large number of packaged programs which are ready for the optimization. While some optimization programs give satisfactory, usable results for certain industrial designs, they can give results that are not used for other designs. - As expected, the number of iterations does not show any significant difference in the design after a certain value. Compared to the past, today's optimization programs give more reliable values and usable design drawings.

Keywords: Topology Optimization, Machin Design, Computer Aided, Packet Programs, Applications,

REFERENCES

- [1] S. Hernandez, A. N. Fontan, Practical Application Of Design Optimization, Wit Press, Boston, 2004
- [2] H. Özden, Makine Tasarımında Bilgisayar Destekli Topoloji Optimizasyon, Doktora Ders Notları, EÜ, Fen Bilim. Enstitüsü, 2016
- [3] S. Fiebig, Form- Und Topologie Optimierung Mittels Evolutionärer Algorithmen Und Heuristischer Strategien, Logos Verlag Berlin 2016
- [4] H. Özden, Computer Aided Optimization Methods For Innovative Industrial Design, 1. Intern. University Industry Cooperation, R&D And Innovation Congress, CBÜ, 18-19 December 2017

A SERIES METHOD FOR THE SOLUTION OF FRICTIONAL CONTACT PROBLEM BETWEEN PUNCH SYSTEM AND ELASTIC LAYER

Huseyin OGUZ¹

¹ Dumlupinar University, Kutahya, Turkey

huseyin.oguz@dpu.edu.tr,

Elcin YUSUFOGLU²

² Usak University, Usak, Turkey

elcin.yusufoglu@usak.edu.tr,

Abstract: In this study, a series method for the solution of frictional contact problem between punch system and elastic layer was developed.

The proposed algorithm is applied to a multi contact problem in order to show the effectiveness of the algorithm.

Keywords: Singular Integral Equation, Plane Contact Problem, Cauchy kernel, Gauss–Jacobi quadrature, A system of linear algebraic equation.

REFERENCES

- [1] Muskhelishvili, N.I, (1958), Singular Integral Equations, Wolters-Noordhoff Publishing, Groningen
- [2] Erdoğan, F., (1969), Approximate Solutions of Systems of Singular Integral Equations, Society for Industrial and Applied Mathematics, 17, 1041-1059.
- [3] F. Erdogan and G.D. Gupta, Cook T.S, The numerical solution of singular integral equations, Q. J. Appl. Math. 29 (1973),pp. 525–534.
- [4] Galin L. A., (1976), Development of the Theory of Contact Problems in the USSR, Nauka, Moskow.

ON MAJORIZATION PROBLEMS ASSOCIATED WITH THE SUBCLASS $Q(j, \lambda, \alpha, n)$ OF STARLIKE FUNCTIONS WITH POSITIVE COEFFICIENTS

Hüseyin BABA¹

¹ Department of Mathematics, Çölemerik Vocational School, University of Hakkari, Hakkari, Turkey

huseyinbaba@hakkari.edu.tr

Abstract

We consider the subclass $Q(j, \lambda, \alpha, n)$ of starlike functions by using the differential D^n operator and functions of the form $f(z) = z - \sum_{k=j+1}^{\infty} a_k z^k$ which are analytic in the open unit disk. In this paper is to investigate an majorization problem for the class $Q(j, \lambda, \alpha, n)$. Relevant connections of the main result obtained in this paper with those given by earlier workers on the subject are also pointed out.

Keywords: Univalent function; Starlike; Convex.

REFERENCES

1. Sălăgean, G.Şt., Subclasses of univalent functions, in "Complex Analysis: Fifth Romanian-Finnish Seminar." Part I (Bucharest, 1981), pp. 362-372. Lecture Notes in Mathematics, Vol. 1013, Springer-Verlag, Berlin/Newyork, 1983.
2. M.K. Aouf, and Srivastava, H.M., 1996. Some families of starlike functions with negative coefficients, J. Math. Anal. Appl. 203, 762-790, Article No:0411.
3. A.W. Goodman, Univalent Functions-I. Mariner Publishing Company., 245p, Tapma, FL, 1983.
4. T.H. MacGregor, Majorization by univalent functions, Ann. Math. 37(1936) 374-408.

ON PROPERTIES OF THE SUBCLASS $P(j, \lambda, \alpha, n, z_0)$ OF STARLIKE FUNCTIONS INVOLVING ANY FIXED POINT

Hüseyin BABA¹

¹ Department of Mathematics, Çölemerik Vocational School, University of Hakkari, Hakkari, Turkey

huseyinbaba@hakkari.edu.tr

Abstract

In this paper, we study the subclass $P(j, \lambda, \alpha, n, z_0)$ of starlike functions involving any fixed point and with negative coefficients by using the differential D^n operator and functions of the form $f(z) = z - \sum_{k=j+1}^{\infty} a_k z^k$ which are analytic in the open unit disk. We consider the class $P(j, \lambda, \alpha, n, z_0)$ for which $f(z_0) = z_0$, z_0 real where $a_k \geq 0$. Some properties belonging to the class $P(j, \lambda, \alpha, n, z_0)$ are obtained. We also determine the radii of close-to-convexity, starlikeness and convexity for the class $P(j, \lambda, \alpha, n, z_0)$.

Keywords: Univalent function; Starlike; Convex; Fixed point.

REFERENCES

1. H. Kızıltunç, and H. Baba, 2012. Inequalities for Fixed Points of the Subclass $P(j, \lambda, \alpha, n, z_0)$ of Starlike Functions with Negative Coefficients, *Advances in Fixed Point Theory*, Vol.2, 197-202.
2. H. Silverman, Extreme points of univalent functions with two fixed points, *Trans. Amer. Math. Soc.* Vol. 219 (May, 1976), pp. 387-395.
3. M.K. Aouf, and H.M. Srivastava, Some families of starlike functions with negative coefficients, *J. Math. Anal. Appl.* 203 (1996), 762-790, Article No: 0411.
4. G. Şt. Sălăgean, Subclasses of univalent functions, in "Complex Analysis: Fifth Romanian-Finnish Seminar." Part I (Bucharest, 1981), pp. 362-372. *Lecture Notes in Mathematics*, Vol. 1013, Springer-Verlag, Berlin/Newyork, 1983.
5. A. Schild, 1974. On a class of functions schlicht in the unit circle, *Proc. Amer. Math. Soc.* 5 (1974) 115-120. MR 15, 694.
6. Barbara, Pilat, Sur une classe de fonctions normées univalentes dans le cercle unité, *Ann.Univ. Mariae Curie-Skłodowska Sect. A* 17 (1963), 69-73 (1965). MR 33 #28033.
7. H. Silverman, Univalent functions with negative coefficients, *Proc. Amer. Math. Soc.* 51 (1975), 109-116.

On The Solutions Of Odd-Order Nonlinear Dispersive Equations

Zehra Pinar¹, Huseyin Kocak²

¹Namık Kemal University, Faculty of Arts and Science, Department of Mathematics, 59030 Tekirdağ, Turkey

²Quantitative Methods Division, Pamukkale University, 20160 Denizli, Turkey

zpinar@nku.edu.tr , hkocak@pau.edu.tr

Abstract

In this study, we study the exact solutions of the odd-order semi-linear and nonlinear dispersive equations containing diffusion-like (porous-type) nonlinearity, i.e. dispersion-reaction models, which can be used in physical and engineering applications, such as fiber optics, communication theory and transport in porous media. The variants of auxiliary equation method, which are based on Mathieu, Bernoulli and classical Riccati equations, are used for these equations. Obtained solutions are discussed and illustrated in details. Although studies on the odd-order equations have been intriguing for many years, the proposed equations were not studied in the literature. We believe that the proposed results will be key part of further analytical and numerical studies for waves in the dispersive medium with reaction.

Keywords: Auxiliary equation method; Bernoulli equation; Mathieu equation; Tanh-method; Third-order equation; Exact solutions; Fifth-order dispersive equation; Porous medium type.

REFERENCES

1. A. M. Wazwaz, Partial Differential Equations: Methods and Applications, Balkema, Leiden, 2002.
2. Zehra Pinar, Huseyin Kocak, Exact solutions for the third-order dispersive-Fisher equations, Nonlinear Dyn, 91 (1), 421-426, 2018.
3. Huseyin Kocak, Zehra Pinar, On solutions of the fifth-order dispersive equations with porous medium type non-linearity, Waves in Random and Complex Media, DOI:10.1080/17455030.2017.1367438, 2017.

Existence and Uniqueness Results for a Complex Chaotic Fractional Order System

İlknur Koca

Department of Mathematics, University of Mehmet Akif Ersoy, Burdur, Turkey

ikoca@mehmetakif.edu.tr

Abstract

In this work, we obtain some new results for a complex chaotic system of fractional order. We present the results via Picard's theorem that is very easy to understand and has same idea with classical theorems known in the case of ordinary differential equations. We prove the theorems by successive approximation.

Keywords: Fractional order complex system, existence and uniqueness, Picard's theorem

REFERENCES

1. A. Atangana, D. Baleanu, New fractional derivatives with nonlocal and non-singular kernel: Theory and application to heat transfer model, *Thermal Science*, pp. 1-7, 2016.
2. A. Atangana, I. Koca, Chaos in a simple nonlinear system with Atangana-Baleanu derivatives with fractional order, *Chaos, Solitons and Fractals: the interdisciplinary journal of Nonlinear Science, and Nonequilibrium and Complex Phenomena*, In press, 10.1016/j.chaos.2016.02.012, 2016.
3. M. Caputo, M. Fabrizio, A new definition of fractional derivative without singular kernel. *Progress in Fractional Differentiation and Applications*, 1, pp. 73-85, 2015.
4. K. Vishal; Saurabh K., Agrawal, On the dynamics, existence of chaos, control and synchronization of a novel complex chaotic system, *Chinese Journal of Physics*, ISSN: 0577-9073, Vol: 55, Issue: 2, Page: 519-532, 2017

Investigation of Human Development Index of EU and OECD Countries Between 2000-2015: Panel Data Analysis

İsmail GÜR¹ , Hüseyin TATLIDİL²

¹ Department of Actuarial Sciences, University of Firat, Elazig, Turkey

² Department of Statistics, Hacettepe University, Ankara, Turkey

ismail.gur@firat.edu.tr

tatlidil@hacettepe.edu.tr

Abstract

The aim of this study is to propose an alternative application approach by using panel data analysis method for economical, demographical and socio-cultural variables which are thought to be effective on the human development index (HDI). European Union and OECD members(41 countries) are evaluated from 2000 to 2015. By this purpose, before analysis, Significant variables were obtained by running step-wise regression at 5-year intervals. As a result of step-wise regressions , the mortality rate under the age of 5 year, merchandise trade, export rates and GDP per capita and life expectancy variables are found as significant for HDI. After then, panel data analysis are performed on these variables from 2000 to 2015.

According to analysis, from the perspective of human development level, the most successful countries have been Northern European and Western European countries. In addition, as the time progressed, the effects of years on human development index are also increasing. Both technological advances and developments in economic indicators have been shown to have an impact on human development.

Keywords: Human Development Index, Panel Data Analysis, Step-wise Regression

REFERENCES

1. databank.worldbank.org/data/home.aspx Access Date:04/02/2018
2. <http://hdr.undp.org/en/content/human-development-index-hdi> Access Date:04/02/2018
3. Kelley, Allen C. ,The Human Development Index:" Handle with Care"., Population and Development Review , 315-324,1991
4. Anand, Sudhir, and Amartya Sen. "The income component of the human development index." Journal of Human Development, Vol 1. No. 1,83-106,2000
5. Murray, C. JL.,Development data constraints and the Human Development Index." , Monitoring social progress in the 1990s. Avebury/UNRISD,1994
6. Welzel, Christian, Ronald Inglehart, and Hans-Dieter Klingemann,Human development as a general theory of social change: A multi-level and cross-cultural perspective". No. FS III 01-201. WZB Discussion Paper, 2001

FUNDAMENTAL FORM OF A GRAPH

**Ismail Naci Cangul, Sadik Delen, Aysun Yurttas,
Muge Togan**

¹ Department of Mathematics, Uludag University, Bursa 16059, Turkey

cangul@uludag.edu.tr,

Abstract

In this talk, we define a new notion of the fundamental form of a graph to help with the classification of the realizations of any given degree sequence. This notion depends on a newly defined graph theoretical invariant related to the degree sequence only. According to the values of this invariant, we give three algorithms of obtaining the family of graphs which are the possible realizations of a given degree sequence.

Keywords: graph invariant, degree sequence, fundamental form of a graph

REFERENCES

1. Sadik Delen, Ismail Naci Cangul, A New Graph Invariant, Turkish Journal of Analysis and Number Theory, Vol: 6, No: 1, 30–33, 2018.

CONCIRCULAR CURVATURE TENSOR ON GENERALIZED KENMOTSU MANIFOLDS

İnan ÜNAL¹, Ramazan SARI² and Aysel TURGUT VANLI³

¹ Department of Computer Engineering, University of Munzur, Tunceli, Turkey

² Gümüşhacıköy Vocational School, University of Amasya, Amasya, Turkey

³ Department of Mathematics, University of Gazi, Ankara, Turkey

inanunal@munzur.edu.tr, ramazan.sari@amasya.edu.tr, avanli@gazi.edu.tr

Abstract

The aim of the present paper is to study on concircular curvature tensor on generalized Kenmotsu manifolds. Concircular flat and ϕ -concircular flat generalized Kenmotsu manifolds are examined. Also some results are given about ϕ -semi symmetric and ϕ -concircular semi symmetric generalized Kenmotsu manifolds.

Keywords: generalized Kenmotsu manifold, concircular curvature tensor, ϕ -concircular flat, ϕ -concircular semi symmetric

REFERENCES

1. A. Turgut Vanli and R. Sari, Generalized Kenmotsu manifolds, Com. Math. Appl. 7(4) (2016), 311-328.
2. K. Kenmotsu, A class of almost contact Riemannian manifolds, TohokuMath. J. II Ser. 24 (1972), 93-103.
3. K. Yano, (1940). Concircular geometry I. Concircular transformations. Proceedings of the Imperial Academy, 16(6), 195-200.
4. D.E. Blair, Riemannian geometry of contact and Symplectic Manifolds, Birkhauser. Boston, Second Edition (2010).
5. M. Falcitelli and A.M. Pastore, f-structures of Kenmotsu Type, Mediterr. J. Math. 3 No.3-4 (2006), 549-564.
6. D.E. Blair, K. Jeong-Sik and M.M. Tripathi (2005), On the concircular curvature tensor of a contact metric manifold, J. Korean Math. Soc. 42 (5) , 883 – 892.

Almost Semi Invariant Submanifolds of Para Kenmotsu Manifold

Ramazan SARI¹, İnan ÜNAL², Elif AKSOY SARI³

¹ Gümüşhacıköy Hasan Duman Vocational Schools, Amasya University, Amasya, TURKEY

² Department of Computer Engineering, Munzur University, Tunceli, TURKEY

³ Merzifon Vocational Schools, Amasya University, Amasya, TURKEY

ramazan.sari@amasya.edu.tr, inanunal@munzur.edu.tr, elif.aksoy@amasya.edu.tr

Abstract

The purpose of this paper is to study almost semi invariant submanifolds of para Kenmotsu manifold. We studied integrabilities and parallel conditions of the distributions on almost semi invariant submanifold. Also we investigate some properties of almost semi invariant submanifolds of a para Kenmotsu space form whose sectional curvature is constant. We consider bisectional curvature of almost semi invariant product of a para Kenmotsu space form.

Keywords: Almost semi invariant submanifolds, para Kenmotsu manifold, sectional curvature

REFERENCES

- [1] Bejancu, A., and Papaghiuc, N., Almost semi-invariant submanifolds of Sasakian manifold, Bull. Math., 28(76)1, 13-30, 1984.
- [2] Papaghiuc, N., Some result on almost semi-invariant submanifolds in Sasakian manifolds, bull. Math., 28(76)3, 354-367, 1984.
- [3] Ronsse GS. Generic and skew CR-submanifolds of a Kahler manifold. Bull Inst Math Acad Sinica 18: 127–141,1990.
- [4] Sarı R, Akyol M.A., Aksoy,E. Some curvature properties of CR-submanifolds of an S-manifold with a quarter-symmetric non-metric connection, Int. J. App. Math. And Statis., 56, 93-102,2017.
- [5] Şahin B. Skew CR-warped product submanifolds of a Kahler manifolds. Math Commun 15: 189–204,2010

GENERALIZED M-SERIES AND ITS CERTAIN PROPERTIES*

İ. Onur Kıymaz¹, Ayşegül Çetinkaya¹, Recep Şahin²

¹Department of Mathematics, University of Ahi Evran, Kırşehir, Turkey

²Department of Mathematics, University of Kırıkkale, Kırıkkale, Turkey

iokiyamaz@ahievran.edu.tr, acetinkaya@ahievran.edu.tr, recepshahin@kku.edu.tr

Abstract

M-series and its modification is defined by Sharma in [6,7]. In this study, by using generalized beta function which defined by Chaudry et al. [1], generalization of M-series is introduced. Then, its certain properties such as integral representations, fractional integral and derivative formulas are investigated. Laplace, Mellin and Beta transforms of generalized M-series are also obtained.

Keywords: Generalized beta function; M-series; Integral transforms; Fractional integral formulas; Fractional derivative formulas.

REFERENCES

1. Chaudhry M. A., Qadir A., Rafique M., Zubair S. M., Extension of Euler's beta function, J. Comput. Appl. Math., 78, 19-32, 1997.
2. Chaudhry M. A., Qadir A., Srivastava H. M., Paris R. B., Extended hypergeometric and confluent hypergeometric functions, Appl. Math. Comput., 159 (2), 589-602, 2004.
3. Kıymaz İ. O., Çetinkaya A., Agarwal P., An extension of Caputo fractional derivative operator and its applications, J. Nonlinear Sci. Appl., 9, 3611-3621, 2016.
4. Özarslan M. A., Özergin E., Some generating relations for extended hypergeometric functions via generalized fractional derivative operator, Mathematical and Computer Modelling, 52, 1825-1833, 2010.
5. Özarslan, M. A., Yılmaz, B. The extended Mittag-Leffler function and its properties, Journal of Inequalities and Applications, 2014.85, 2014.
6. Sharma, M., Fractional integration and fractional differentiation of the M-series, Fract. Calc. Appl. Anal., 11 (2), 187-191, 2008.
7. Sharma, M., Jain, R., A note on a generalized M-series as a special function of fractional calculus, Fract. Calc. Appl. Anal., 12 (4), 449-452, 2009.

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A CRYPTOGRAPHICAL METHOD VIA TOPOLOGICAL CONCEPTS

Kadirhan POLAT¹, Abdullah ÇAĞMAN²

¹ Department of Mathematics, Ağrı İbrahim Çeçen University, Ağrı, Turkey

kadirhanpolat@hotmail.com,

² Department of Mathematics, Ağrı İbrahim Çeçen University, Ağrı, Turkey

cagmanz@hotmail.com

Abstract

In this study, we investigate a cryptographical method by using topological concepts and obtain some interesting and useful results.

Keywords: topology; cryptography; topological concept.

REFERENCES

1. Munkres, J. R. Topology. Prentice Hall, 2000.
2. Menezes, A. J., Van Oorschot, P. C., & Vanstone, S. A. Handbook of applied cryptography. CRC press, 1996.
3. Mao, W. Modern cryptography: theory and practice. Prentice Hall Professional Technical Reference, 2003.

PARACOMPACTNESS ON MULTISSET TOPOLOGICAL SPACES

Kadirhan POLAT¹, Abdullah ÇAĞMAN²

¹ Department of Mathematics, Ağrı İbrahim Çeçen University, Ağrı, Turkey

kadirhanpolat@hotmail.com,

² Department of Mathematics, Ağrı İbrahim Çeçen University, Ağrı, Turkey

cagmanz@hotmail.com

Abstract

In this work, we study the concept of paracompactness on multiset topological spaces and obtain some interesting and useful results.

Keywords: Multiset; mutiset topology; paracompactness.

REFERENCES

1. El-Sheikh, S. A., Omar, R. A. K., Raafat, M. Separation axioms on multiset topological space. Journal of New Theory, Vol:7, 11-21, 2015.
2. Syropoulos, A. Mathematics of multisets, In Workshop on Membrane Computing, Springer, Berlin, Heidelberg, 347-358, 2000.
3. Girish, K. P., & Jacob, J. S. On multiset topologies. Theory and Applications of Mathematics, Computer Science, Vol:2, No:1, 37-52, 2012.
4. Girish, K. P., & John, S. J. Relations and functions in multiset context. Information Sciences, Vol:179, No:6, 758-768, 2009.

P-Expandable Spaces

HEYAM H. AL-JARRAH¹ and KHALID Y. AL ZOUBI²

¹Department of Mathematics, Faculty of Science
Yarmouk University, Irbed Jordan

²Department of Mathematics, Faculty of Science
Yarmouk University, Irbed Jordan

hiamaljarah@yahoo.com

Khalidz@yu.edu.jo

Abstract

We introduce the concept of P-expandable spaces as a variation of expandable spaces. A space (X, T) is said to be P-expandable if every locally finite collection $F = \{F_\alpha : \alpha \in \Delta\}$ of subsets of X , there exists a p-locally finite collection $G = \{G_\alpha : \alpha \in \Delta\}$ of preopen subsets of X such that $F_\alpha \subseteq G_\alpha$ for each $\alpha \in \Delta$. We characterize P-expandable spaces and study their basic properties. We show that if a space (X, T) is a quasi submaximal space, then (X, T) is P-expandable if and only if it is expandable.

Keywords: preopen set, p-locally finite collection, expandable space, P-expandable space.

REFERENCES

- [1] A. Okuyama, Some generalizations of metric spaces, their metrization theorems and product spaces, Sci. Rep. Tokyo Kyoiku Daigaku Sect., A9 (1967), 60-78.
- [2] A. S. Mashhour, M. E. Abd El-Monsef and I. A. Hasanein, On pretopological spaces, Bull. Math. De la Soc. R.S. de Roumanie, 28(76) (1984), 39-45.
- [3] A. S. Mashhour, M. E. Abd El-monsef and N. El-Deeb, On precontinuous and weak precontinuous mappings, Proceedings of the Mathematical and Physical Society of Egypt, 53 (1982), 47-53.
- [4] B. Al-Nashef, On semipreopen sets, Questions and Answers in General Topology, 19 (2001), 203-212.
- [5] I. L. Reilly and M. K. Vamanamuthy, On π -continuity in topological spaces, Acta Math. Hung., 45(1-2) (1985), 27-32.
- [6] J. Dontchev, M. Ganster and T. Noiri, On P-closed spaces, Intern. J. Math. Math. Sciences, 24 (2000), 203-212.

THE EFFECT OF MECHANICAL PROPERTIES OF CONCRETE ON IMPACT STRENGTH

Kürşat Kaymaz¹ Erdinç Arıcı²

¹ Department of Civil Engineering, University of Munzur, Tunceli, Turkey
kkaymaz@munzur.edu.tr,

² Department of Civil Engineering, University of Firat, Elazig, Turkey
earici1@firat.edu.tr,

Abstract

In this study, impact strength of concrete is investigated with the effect of mechanical properties such as compressive strength, flexural tensile strength and splitting tensile strength. For this purpose, six serial specimens with three different maximum aggregate diameter (4, 8, and 16 mm) and whose water/cement (w/c) ratio of 0.50 to 0.55 were prepared. The compressive, bending, splitting and impact strength of the prepared specimens were determined.

As a result of study; The mechanical properties of the concrete were positively effected by the increase in the aggregate size, while the increase in the W/C ratio adversely effected. The change in the impact strength of concrete has also been the same. But the impact strength is less effected than the increase in W/C ratio.

Keywords: Concrete, Compressive Strength, Tensile Strength, Impact Strength, Charpy Experiment

REFERENCES

1. ACI Committe 116, (116R-90), "Cement and Concrete Terminology,"ACI Manual of Concrete Practice, Part I,1994.
2. Arıcı, E., Dursun, R., İnce, R., 2007. "Determination of Impact Strength of Concrete", 8th International Fracture Conference, 628-633
3. Johnston, C. D., "Steel fiber reinforced mortar and concrete: a review of mechanical properties", Fiber Reinforced Concrete, Publication SP-44, American Concrete Institute, Detroit, pp.127-142.1974.

Four Point Implicit Methods for the Second Derivatives of the Solution of First Type Boundary Value Problem for One Dimensional Heat Equation

S.C. Buranay¹ and L.A. Farinola¹

¹ Department of Mathematics, Faculty of Arts and Sciences, Eastern Mediterranean University, Famagusta North Cyprus, Via Mersin 10 Turkey

suzan.buranay@emu.edu.tr,

lawrence.farinola@emu.edu.tr

Abstract

We construct four point implicit difference boundary value problem for the first derivative of the solution $u(x,t)$ of the first type boundary value problem for one dimensional heat equation with respect to the time variable t . Also, for the second derivatives of $u(x,t)$ special four point implicit difference boundary value problems are proposed. It is assumed that the initial function belongs to the Hölder space $C^{8+\alpha}$ $0 < \alpha < 1$, the heat source function given in the heat equation is from the Hölder space $C^{6+\alpha, 3+\frac{\alpha}{2}}$, the boundary functions are from $C^{4+\frac{\alpha}{2}}$, and between the initial and the boundary functions the conjugation conditions of orders $q=0,1,2,3,4$ are satisfied. We prove that the solution of the proposed difference schemes converge uniformly on the grids of the order $O(h^2 + \tau)$ (second order accurate in the spatial variable x and first order accurate in time t) where h is the step size in x and τ is the step size in t . Theoretical results are justified by numerical examples.

Keywords: Finite difference method, Approximation of derivatives, Uniform error, Heat conduction equation

REFERENCES

1. O.A. Ladyženskaja, V.A. Solonnikov, N.N. Ural'ceva, Linear and Quasi-linear Equations of Parabolic Type, Translation of Mathematical Monographs, Vol. 23, American Mathematical Society, USA, (1967).
2. A.A. Samarskii, The Theory of Difference Schemes, Marcel Dekker, Inc. New York (2001).

HYDROGEN ENERGY POTENTIAL DETERMINATION WITH COMPUTATIONAL MATHEMATICS

Levent Yilmaz

Nisantasi University, Civil Engineering Department, Neocampus 1453, Maslak, Istanbul, Turkey
levent.yilmaz@nisantasi.edu.tr

Abstract

Hydrogen is the simplest element. An atom of hydrogen consists of only one proton and one electron. It's also the most plentiful element in the universe. Despite its simplicity and abundance, hydrogen doesn't occur naturally as a gas on the Earth - it's always combined with other elements. Water, for example, is a combination of hydrogen and oxygen (H₂O). Hydrogen is also found in many organic compounds, notably the hydrocarbons that make up many of our fuels, such as gasoline, natural gas, methanol, and propane. Hydrogen can be separated from hydrocarbons through the application of heat - a process known as reforming. Currently, most hydrogen is made this way from natural gas. An electrical current can also be used to separate water into its components of oxygen and hydrogen. This process is known as electrolysis. Some algae and bacteria, using sunlight as their energy source, even give off hydrogen under certain conditions.



NASA uses hydrogen fuel to launch the space shuttles. Credit: NASA

Keywords: Hydrocarbons, Energy, Elektrolysis, water

REFERENCES

- [1] www.eia.gov/energy
- [2] www.eia.gov

REVERSE SUPPLY CHAIN NETWORK DESIGN FOR E-WASTE INCLUDING ENVIRONMENTAL IMPACTS

Leyla ÖZGÜR POLAT, Aşkiner GÜNGÖR*

Department of Industrial Engineering of Pamukkale University, Denizli, Turkey

lozgur@pau.edu.tr, * askiner@pau.edu.tr

Abstract

Many electronic products become electronic waste (e-waste) without completing their economic lives due to rapid changes in technology and fashion. The resulting electronic waste cause environmental pollution and depletion of natural resources in the environment. In recent years, there has been a growing interest in the process of collecting, dismantling and processing of e-waste, as well as the necessity of the regulations and economic and environmental benefits. Significant responsibilities have been imposed on producers by the “Regulation on the Control of E-waste”. For this reason, redesigning e-waste reverse supply chain networks for producers brings additional competitive advantages. In this study, a reverse supply chain network design model was implemented to represent a real system for producers aiming to meet the regulatory and environmental targets. The proposed mixed integer linear programming model has been solved with a theoretical case study by using the CPLEX 12.7.1 solver.

Keywords: Reverse supply chain, network design, e-waste, environmental impacts

REFERENCES

1. Akçalı, E., Çetinkaya, S., & Üster, H. Network design for reverse and closed-loop supply chains: An annotated bibliography of models and solution approaches. *Networks*, 53(3), 231-248, 2009.
2. Chatterjee, A., & Abraham, J. Efficient management of e-wastes. *International Journal of Environmental Science and Technology*, 14(1), 211-222, 2017.
3. Govindan, K., & Soleimani, H. A review of reverse logistics and closed-loop supply chains: a Journal of Cleaner Production focus. *Journal of Cleaner Production*, 142, 371-384, 2017.
4. Huscroft, J. R., Hazen, B. T., Hall, D., Skipper, J. B., & Hanna, J. B. Reverse logistics: past research, current management issues, and future directions. *International Journal of Logistics Management*, 24(3), 304-327, 2013.

INVESTIGATION OF A CORRELATION BETWEEN AIR EXCESS COEFFICIENT (λ) AND THE FLAME IMAGE IN COAL COMBUSTORS

Cem Onat¹, Mahmut Daşkın², Mehmet Emin Tağluk³, Muhammed Fatih Talu⁴,
İsmail Yüksek⁵

¹ Department of Airframe and Powerplant, University of Firat, Elazig, Turkey

² Department of Mechanical Engineering, University of Inonu, Malatya, Turkey

³ Department of Electrical and Electronics Engineering, University of Inonu, Malatya, Turkey

⁴ Department of Computer Engineering, University of Inonu, Malatya, Turkey

⁵ Department of Industrial Engineering, University of Antalya Bilim, Antalya, Turkey

conat@firat.edu.tr, mahmut.daskin@inonu.edu.tr, mehmet.tagluk@inonu.edu.tr,
fatih.talu@inonu.edu.tr, yukseki@yildiz.edu.tr

Abstract

The online accusation of instantaneous images of flame in the burning chamber lets one to real time analyze the flame images and accordingly design the controllers for coal burning systems. In this particular work the association of air excess coefficient (λ) to the characteristic properties of flame image was investigated. Characteristic properties of flame images were obtained from the linear regression conducted on the images. Then the flue gas temperature and derived properties such as the norm, second norm, infinity norm, Frobenius norm, normalised sum of pixel values, matrix trace, matrix rank, sum of the pixel threshold value greater than 30, smallest eigen value, sum of the smallest 10 eigen values and sum of all eigen values of source (image) matrix were together appraised.

In accordance with the results obtained from the regression analysis carried out on eleven different flame's characteristic properties, it was found that the matrix trace of the image showed the most precious and dynamic correlation with the air excess coefficient.

Keywords: Coal burning system; Flame image features; Image processing; Air excessive coefficient, Coal burning control.

REFERENCES

1. Wayne Wilson, Lynn Geiger, Sean P. Madden, Christopher J. Mecklin, Aichun Dong. Multiple linear regression using a graphing calculator, Journal of Chemical Education, Vol:81, No:6, 903–907, 2004.
2. Muhammed Fatih Talu, Cem Onat, Mahmut Daskin. Prediction of Excess Air Factor in Automatic Feed Coal Burners by Processing of Flame Images, Chinese Journal of Mechanical Engineering Vol:30, No:3, 722-731, 2017.

MODEL OF DETERMINING THE OPTIMAL SUPPLY TIME OF PRODUCTS

Maryna Iurchenko¹

¹ Department of Information Systems in Economics, Chernihiv National University of Technology, Chernihiv, Ukraine

maarinaiurchenko@gmail.com,

Abstract

Considerable amounts of money are spent on maintaining inventory at enterprises, so it is strategically important to manage them effectively. One of the methods lies in defining the optimal moment of supplying new shipments. Optimizing the new shipment supply moment is a problem that was considered under deterministic conditions. However, in reality a set of random factors have a significant influence, so it is necessary to take them into account.

The main goal is to present a new probabilistic model of supplying goods and to optimize the moment of the new shipment under conditions of stochastic demand.

We minimize the loss function which takes into account both cases: when the new shipment was delivered both before and after the actual running out of products (i.e. the storage expenses and deficit losses). Under conditions of normality of the actual moment of running out of goods we obtain the explicit form for the optimal supply moment.

The stochastic model for the new shipment supply moment was presented. The optimal moment of supply was found under the condition of normality of the moment of running out of goods.

Keywords: Stochastic models; demand; inventory control; profit; optimization.

REFERENCES

1. Brodetskiy, G.L. (2004). *Metody stokhasticheskoy optimizatsii* [Methods of stochastic optimization]. Moscow: REA [in Russian].
2. Prosvetov, G.I. (2008). *Matematicheskie metody v logistike* [Mathematical models in logistics]. Moscow: AFC [in Russian].
3. Schreiberfeder, D. (2006). *Effektivnoe upravlenie zapasami* [Effective inventory management]. Moscow: Alpina Business [in Russian].
4. Aggoun, L. (2001). On a stochastic inventory model with deteriorating items. *IJMMS*, 25(3), 197-203 [in English].
5. Chang, C.-T., Ouyang, L.-Y., Teng, J.-T., Cheng, M.-C. (2010). Optimal ordering policies for deteriorating items using a discounted cash-flow analysis when a trade credit is limited to order quantity. *Computers & Industrial Engineering*, 59, 770-777 [in English].
6. Hung, K.C. (2011). Continuous review inventory models under time value of money and crashable lead time consideration. *Yugoslav Journal of Operations Research*, 21(2), 293-306 [in English].
7. Feliksov, G.I. (1977). *Matematicheskoye obespechenie system upravleniya zapasami* [Mathematical support for inventory management systems]. Moscow: Statistika [in Russian].
8. Kopytov, E., Greenglaz, L., Muravyov, L., Puzinkevich, E. (2007). Modelling of two strategies in inventory control system with random lead time and demand. *Computer Modelling and New Technologies*, 1, 21-30 [in English].

Some New Characterizations of Symplectic Curve in 4-Dimensional Symplectic Space

Esra ÇİÇEK ÇETİN and Mehmet BEKTAŞ*

Department of Mathematics, Firat University, 23119 ELAZIĞ/TÜRKİYE

*Corresponding author: e-mail:mbektas@firat.edu.tr

Abstract: It is well known that there exist characterizations for curve in Euclidean space. Also, a lot of authors extended this characterizations for Minkowski space and obtained very different results.

In this paper, we introduce the geometric properties of Symplectic Curve in 4-Dimensional Symplectic Space which given by [12,15]. Later we obtained the conditions for Symplectic Curve to lie on some subspaces of 4-Dimensional Symplectic Space and we give some characterizations and theorems for these curves.

Keywords and phrases: symplectic curve, .Symplectic Space

REFERENCES

- [1] Akgün, M., and Sivridağ, A.İ., Some characterizations of a Spacelike Curve in R_1^4 , Pure Math. Sci., V.4. 2015, N.1, 43-55.
- [2] Ilarslan., K, Nešovic, E, Petrovic-Torgašev M., Some characterizations of rectifying curves in the Minkowski 3-space, Novi Sad J. Math, Vol. 33, No. 2, 2003, 23--32.
- [3] Ilarslan., K, Nešovic, E, Some Characterizations of Rectifying Curves in the Euclidean Space E^4 , Turk J Math, 32 (2008), 21 -- 30.
- [4] Kamran, N., Olver, P., & Tenenblat, K. (2009). Local symplectic invariants for curves. Communications in Contemporary Mathematics, 11(02), 165-183.
- [5] Libermann, P., & Marle, C. M. (2012). Symplectic geometry and analytical mechanics (Vol. 35). Springer Science & Business Media.
- [6] Saitoh, I., Suzuki, Y., & Takahashi, N. (2001). The symplectic finite difference time domain method. IEEE Transactions on magnetics, 37(5), 3251-3254.
- [7] Valiquette, F. (2012). Geometric affine symplectic curve flows in R^4 . Differential Geometry and its Applications, 30(6), 631-641.
- [8] Xie, H. B., Dokos, S., Sivakumar, B., & Mengersen, K. (2016). Symplectic geometry spectrum regression for prediction of noisy time series. Physical Review E, 93(5), 052217.
- [9] Xie, H. B., Guo, T., Sivakumar, B., Liew, A. W. C., & Dokos, S. (2014, October). Symplectic geometry spectrum analysis of nonlinear time series. In Proc. R. Soc. A (Vol. 470, No. 2170, p. 20140409). The Royal Society.
- [10] Yang, H. W., & Song, H. (2013). Symplectic FDTD method study left-handed material electromagnetic characteristics. Optik-International Journal for Light and Electron Optics, 124(14), 1716-1720.Zhong,

SOME SPECIAL CURVES IN E_2^4

Fatma Almaz¹, Mihriban Alyamaç Külahcı², and Mehmet Bektaş³

^{1,2,3} Department of Mathematics, University of Firat, Elazig, Turkey

fb_fat_almaz@hotmail.com, mihribankulahci@gmail.com, mbektas@firat.edu.tr

Abstract

The Euclidean 4-Space E_2^4 is the Euclidean 4-space E^4 provided with an indefinite metric given by $g = -dx_1^2 - dx_2^2 + dx_3^2 + dx_4^2$, where (x_1, x_2, x_3, x_4) is a rectangular coordinate system of E_2^4 . Let $\{T, N, B_1, B_2\}$ be the non-null moving Frenet frame along a unit speed non-null curve x in E_2^4 , consisting of the tangent, principal normal, first binormal and second binormal vector field, respectively. If x is a non-null curve with non-null vector fields, then $\{T, N, B_1, B_2\}$ is a orthonormal frame and the Frenet equations gives

$$T' = k_1 N; N' = -\epsilon_0 \epsilon_1 k_1 T + k_2 B_1; B_1' = -\epsilon_1 k_2 N + k_3 B_2; B_2' = -\epsilon_2 \epsilon_3 k_3 B_1 \quad (*)$$

where the following conditions are satisfied

$$g(T, N) = g(T, B_1) = g(T, B_2) = g(N, B_1) = g(B_1, B_2) = 0, g(T, T) = \epsilon_0, g(N, N) = \epsilon_1, g(B_1, B_1) = \epsilon_2, g(B_2, B_2) = \epsilon_3, \epsilon_i \in \{-1, 1\}, i \in I = \{0, 1, 2, 3\}, [5].$$

Let x be a non-null curve in E_2^4 . We define that x is the normal curve in E_2^4 , if its position vector with respect to some chosen origin always lies in the orthogonal complement T^\perp . The orthogonal complement T^\perp is non-degenerate hyperplanes of E_2^4 , spanned by $\{T, N, B_1, B_2\}$ definition, for a normal curve in E_2^4 , the position vector x satisfies

$$x(s) = \mu(s)N(s) + \gamma(s)B_1(s) + \theta(s)B_2(s) \text{ or } g(x, T) = 0$$

for some differentiable functions μ, γ, θ of $s \in I \subset \mathbb{R}$. In this paper, we examine the notion of the normal curves for the curves in E_2^4 . We call these new associated curves as normal and by using the (*) frame of the curves. We give the representation formulae for normal curves in E_2^4 and using this formulae, we give some characterizations of these curves.

Keywords: Semi-Euclidean Space E_2^4 , Normal curve.

REFERENCES

1. Babadag, F., On The Quaternionic Bertrand Curves In Semi-Euclidean 4-Space E_2^4 , International J. of Research in Engineering and Science, 4(5), 47-50, 2016.
2. Ilarslan, K. Kılıc, N., Erdem, H. A., Osculating curves in 4-dimensional Semi-Euclidean space with index 2, Open Math., 15, 562-567, 2017.
3. Ilarslan, K., Spacelike Normal curves in Minkowski space E_1^3 , Turk J. Math., 29, 53-63, 2005.
4. Kulahci, M., Almaz, F., Some Characterizations of osculating Curves in the Lightlike Cone, Bol. Soc. Paran. Math., 35(2), 39-48, 2017.

BEHAVIOURS OF RANDOM EFFECTED FREDHOLM INTEGRAL EQUATION

Mehmet Merdan¹, Özge Altay¹

¹*Department of Mathematical Engineering, Faculty of Engineering,*

Gumushane University 29100, Gumushane, Turkey

E-mail: mmerdan@gumushane.edu.tr

Abstract

In this study, the probability characteristics of random fredholm integral equation obtained when fredholm integral equations are taken as a random variable with coefficient beta distribution are calculated. Also, the approximate analytical solutions are obtained by applying random differential transformation method to random fredholm integral equation. Solutions for the expected value and variance were found using these solutions. Also obtained the approximate expected value and variance formulas converging to a wider region by applying the modified DTM. Finally, these solutions are compared.

Keywords: Fredholm Integral Equation, Expected Value, Variance, Differential Transformation Method, Modified DTM.

REFERENCES

1. Cherruault, Y., Saccomandi, G. & Some, B., New results for convergence of Adomian's method applied to integral equations, *Mathl. Comput. Modelling* 16(2), pp. 85–93, 1993.
2. Lovitt, W.V. *Linear Integral Equations*, Dover Publications, Inc.: New York, 1950.
3. Wazwaz, A.M., *A First Course in Integral Equations*, World Scientific: Singapore, 1997.
4. A.-M. Wazwaz, Analytical approximations and Padé approximants for Volterra's population model, *Appl. Math. Comput.*, 100(1), 13-25, 1999.
5. S. T. Mohyud-Din, A. Yildirim, and Y. Gülkanat, Analytical solution of Volterra's population model, *J. King Saud Univ. - Sci.*, 22(4), 247-250, 2010.
6. Arikoglu A, Ozkol I, Solution of boundary value problems for integrodifferential equations by using differential transform method. *Appl Math Comput* 168: 1145-1158, 2015.
7. Arikoglu A, Ozkol I, Solution of integral and integro-differential equation systems by using differential transform method. *Comput Math Appl* 56: 2411-2417, 2008.

MODELLING AND SIMULATION OF A CELL OF A FLEXIBLE MANUFACTURING SYSTEM AS A SET OF WORKFLOW PROCESSES USING EXTENDED PETRI NETS

Mehmet KARAY¹

¹ Department of Business Administration, Final International University, Girne, Cyprus

mehmet.karay@final.edu.tr,

Abstract

A manufacturing cell is a component of a distributed flexible manufacturing system at some factory. This component is itself a distributed subsystem. It is assumed that the cell consists of two machines, one industrial robot, a buffer of slots between two machines and input and output conveyors. The main goals of this paper are to develop a model of a cell of a flexible manufacturing system (FMS) as a set of distributed flow processes, to represent the developed model in terms of extended Petri nets, to investigate the developed model in a series of simulation experiments in the simulation system Winsim, and to analyse the results of simulation along with comparing them with the results of analytical modeling.

Keywords: Flexible manufacturing systems; Workflow processes; extended Petri nets; simulation, discrete event.

REFERENCES

1. Workflow Management Coalition: Workflow Management Coalition – Terminology & Glossary. Technical Report. Document Number WPMC-TC-1011 (1999).
2. W. M. P. van der Aalst, K. M van Hee: Workflow Management – Models, Methods, and Systems, The MIT Press, Cambridge, Massachusetts, London, England, 2002.
3. Hollingsworth, D.: Workflow Reference Model. Technical Report. The Workflow Management Coalition, Document Number WPMC-TC-1003 (1995).
4. Desrochers, A., and R. Ai-Jaar. 1995. Applications of Petri Nets in Manufacturing Systems: Modeling, Control and Performance Analysis. IEEE Press.
5. A. Kostin and Ilushechkina L, “Modeling and simulation of distributed systems”, World Scientific Publ. Co., 2010.
6. T. Murata, Petri nets: Properties, Analysis and Applications, Proc. IEEE, vol. 77, no. 4, pp. 541 – 580, 1989.
7. Y. Fanaeian and A. Kostin, “Simulated Study of an Anycast – Based Routing Method for Wireless Sensor Networks with the use of Petri nets”, International Journal of Science and Advanced Technology, vol. 3, no. 4, pp.18 – 27, 2013.
8. Lu, R., Sadiq, S.: A Survey of Comparative Business Process Modeling Approaches. BIS 2007, 82-94 (2007).
9. M. Karay and A. Kostin, “Using Extended Petri Nets for Modeling and Simulation of Queuing Systems with Priorities”, International Journal of Science and Advanced Technology, vol. 4, no. 7, pp. 1-6, 2014.

ON THE SOLUTIONS OF FRACTIONAL CAUCHY PROBLEM FEATURING CONFORMABLE DERIVATIVE

Mehmet Yavuz¹ and Necati Özdemir²

¹Department of Mathematics-Computer Sciences, Necmettin Erbakan University, Konya,
Turkey

mehmetyavuz@konya.edu.tr,

²Department of Mathematics, Balikesir University, Balikesir, Turkey

nozdemir@balikesir.edu.tr,

Abstract

In this research, we have obtained analytical solutions of fractional Cauchy problem by using q-Homotopy Analysis Method (q-HAM) featuring conformable fractional derivative. We have considered different situations according to the homogeneity and linearity of the fractional Cauchy differential equation. A detailed analysis of the results obtained in the study has been reported. According to the results, we have found out that our obtained solutions converge very speedily to the exact solutions.

Keywords: q-homotopy analysis method; Fractional Cauchy problem, Conformable derivative.

REFERENCES

1. El-Tawil, M.A., Huseen, S.N., The q-homotopy analysis method (q-HAM), International Journal of Applied Mathematics and Mechanics, Vol:8, No:15, 51-75, 2012.
2. Iyiola, O.S., Ojo, G.O., On the analytical solution of Fornberg–Whitham equation with the new fractional derivative, Pramana, Vol:85, No:4, 567-575, 2015.
3. Baleanu, D., Agheli, B., Al Qurashi, M.M., Fractional advection differential equation within Caputo and Caputo–Fabrizio derivatives, Advances in Mechanical Engineering, Vol:8, No:12, 1-8, 2016.

NOVEL RECURSIVE APPROXIMATION FOR FRACTIONAL NONLINEAR EQUATIONS WITHIN CAPUTO-FABRIZIO DERIVATIVE

Mehmet Yavuz¹

¹Department of Mathematics-Computer Sciences, Necmettin Erbakan University, Konya, Turkey

mehmetyavuz@konya.edu.tr,

Abstract

This study displays a novel method for solving time-fractional nonlinear partial differential equations. The suggested method namely variational homotopy perturbation iteration method (VHPIM) is considered with Caputo-Fabrizio fractional derivative operator. In order to show the efficiency and accuracy of the mentioned method, we have applied it to some special time-fractional nonlinear partial differential equations. Comparisons between obtained solutions and the exact solutions have been made and the analysis shows that recommended solution method presents a rapid convergence to the exact solutions of the problems.

Keywords: Variational homotopy perturbation iteration method; Caputo-Fabrizio fractional derivative; Nonlinear partial differential equation.

REFERENCES

1. Caputo, M., Fabrizio, M., A new definition of fractional derivative without singular kernel, Progress in Fractional Differentiation and Applications, Vol:1, No:2, 1-13, 2015.
2. Neamaty, A., Agheli, B., Darzi, R., Numerical solution of high-order fractional Volterra integro-differential equations by variational homotopy perturbation iteration method, Journal of Computational and Nonlinear Dynamics, Vol:10, No:6, 2015.
3. Baleanu, D., Agheli, B., Al Qurashi, M.M., Fractional advection differential equation within Caputo and Caputo–Fabrizio derivatives, Advances in Mechanical Engineering, Vol:8, No:12, 1-8, 2016.

Molecular simulation of PcCel45A protein expressed from *Aspergillus Nidulans* to understand its structure, dynamics and thermostability

Mehmet Altay Unal^{1,2}, Bahadır Boyacıoğlu³, Huseyin Unver⁴, Ayhan Elmali¹

¹Department of Physics Engineering, Ankara University, Ankara, Turkey

altay.unal@ankara.edu.tr

²Biotechnology Institute, Ankara University, Ankara, Turkey

³Vocational School of Health Services, Ankara University, Ankara, Turkey

⁴Department of Physics, Faculty of Sciences, Ankara University, Ankara, Turkey

Abstract

Molecular Dynamic Simulation is very usable tool to understand various factors, including structure, dynamics and stability. Cellulose is the major component of plant cell walls and is the most abundant organic compound on the earth. Somewhat organisms can use cellulose as a food source, possessing cellulases (cellobiohydrolases and endoglucanases) that can catalyze the hydrolysis of the β -(1,4) glycosidic bonds. In this work, we investigated the relationship between changes in protein stability caused by temperature changes and changes in conformational properties of amino acid residues. We found that the ASN92 residue was the major contributor to the stability of structure; some other residues correlated significantly with stability. We also compared the theoretical results of the current study with the experimental ones published in previous studies.

Keywords: PcCel45A; Molecular Modelling; Cellulases.

REFERENCES

1. Bussi Giovanni, Davide Donadio and Michele Parrinello, "Canonical Sampling through Velocity Rescaling.", The Journal of Chemical Physics Vol:126; No:1, 14101, 2007.
2. Clarke Anthony J, Biodegradation of Cellulose : Enzymology and Biotechnology. Technomic Pub. Co., 2018
3. D'haeseleer, Patrik et al. "Proteogenomic Analysis of a Thermophilic Bacterial Consortium Adapted to Deconstruct Switchgrass" edited by Y. Xu. PLoS ONE Vol:8; No7, 68465, 2018

PREDICTION OF HAMSTRING AND QUADRICEPS MUSCLE STRENGTH USING MULTIPLE LINEAR REGRESSION

Mehmet Fatih Akay¹, Murat Can Yüksel¹, Sevtap Erdem¹, Ebru Çetin², İmdat Yarım²

¹Department of Computer Engineering, Cukurova University, Adana, Turkey

²College of Physical Education and Sport, Gazi University, Ankara, Turkey

mfakay@cu.edu.tr

Abstract

The strength of hamstring and quadriceps muscles plays an important role for athletes and sportspeople in determining their performance. The purpose of this study is to predict the hamstring and quadriceps muscle strength using Multiple Linear Regression (MLR). The data set used for this study includes the data of 70 athletes from the College of Physical Education and Sport at Gazi University, consisting of the features gender, sports branch, height, weight and age, as well as the hamstring and quadriceps muscle strength values measured with two types of activities (static training and classic training) used as the target variables. MLR has been used for the development of prediction models using different types of validation options including cross validation and random percentage data split. The Root Mean Square Error (*RMSE*) has been utilized as the main error metric for evaluating the performance of the prediction models. The *RMSE* values of the prediction models range between 14.91 and 32.41 Nm, showing that in addition to machine learning methods, MLR can also be used for predicting the hamstring and quadriceps muscle strength with acceptable error rates.

Keywords: Multiple linear regression, Hamstring; Quadriceps; Prediction

REFERENCES

1. Boubacar Sow, "Prediction of Hamstring and Quadriceps Muscle Strength of Athletes Using Machine Learning Methods". MSc Thesis, Department of Computer Engineering, Çukurova University, 2017, Adana, Turkey.
2. Mehmet Fatih Akay, Fatih Abut, Ebru Çetin, İmdat Yarım, Boubacar Sow, "Support Vector Machines for Predicting the Hamstring and Quadriceps Muscle Strength of College-Aged Athletes", Turk J Elec Eng & Comp Sci, Vol:25, 2567-2582, 2017.

DEVELOPMENT OF PHYSICAL FITNESS PREDICTION MODELS FOR TURKISH SECONDARY SCHOOL STUDENTS USING MACHINE LEARNING METHODS

M. Fatih Akay¹, Ebru Çetin², İmdat Yarım², Özge Bozkurt¹, Sevtap Erdem¹

¹Department of Computer Engineering, Çukurova University, Adana, Turkey

²School of Physical Education and Sport, Gazi University, Ankara, Turkey

mfakay@cu.edu.tr

Abstract

Physical fitness is a set of attributes that are either health or skill-related which can be measured with specific tests. Maintaining physical fitness is essential for health and wellbeing. However, since measurement of physical fitness requires improved professional equipment, experienced staff and lots of time, researchers need different ways to determine physical fitness. The aim of this study is to develop new prediction models for predicting the physical fitness of Turkish secondary school students by using machine learning methods including Support Vector Machines (SVM), Radial Basis Function Neural Network (RBFNN) and Tree Boost (TB). The dataset comprises data of various number of subjects according to the target variables such as the test scores of the 30m speed, 20m stage run, balance and agility. The predictor variables used to develop the prediction models are gender, age, height, weight, body fat, number of curl-up and push-ups in 30 seconds. Eight physical fitness prediction models have been created with the variables listed above. The performance of the prediction models has been calculated by using standard error of estimate (SEE). The results show that SVM based prediction models outperform other models based on RBFNN and TB. Also, this study shows that the predictor variables body fat, push-up and curl-up play a significant role when used all together for physical fitness prediction.

Keywords: Physical fitness; Machine learning; Prediction.

REFERENCES

1. Jay Hoffman, Norms for Fitness, Performance and Health, Vol: 2, 97–104, 2006.
2. Ian Witten, Eibe Frank, Mark Hall and Christopher Pal, Data Mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann, San Mateo, CA, 4th edition, 2016.

DEVELOPMENT OF INTERNET TRAFFIC PREDICTION SOFTWARE USING TIME-SERIES MULTILAYER PERCEPTRON

Murat Can Yüksel¹, Mehmet Fatih Akay¹, Selami Çiftçi²

¹Department of Computer Engineering, Cukurova University, Adana, Turkey

²Research and Development Center, Turk Telekom, İstanbul, Turkey

muratacanyuksel@windowslive.com, mfakay@cu.edu.tr, selami.ciftci@turktelekom.com.tr

Abstract

Internet traffic prediction plays a fundamental role in network design, management, control and optimization. Although there exist several studies in literature that focus on predicting Internet traffic using statistical and machine learning methods, to the best of our knowledge, a fully functional off-the-shelf software with different optimization capabilities has not been developed. The purpose of this study is to develop a new software for prediction of Internet traffic data based on time-series Multilayer Perceptron (MLP). The software includes features such as the optimization of the number of hidden layers and neurons in each layer and feedback delay optimization with respect to autocorrelations. The Internet traffic data from two different Internet Service Providers, varying by 1-hour and 5-minute time frequencies, have been used for testing the software. The datasets have been split into training and testing sets via 70-30% and 80-20% split ratios. The Mean Absolute Percentage Error (MAPE) has been utilized as the main error rate metric in order to evaluate the accuracy of the prediction models. It has been observed that the MAPE's of the Internet traffic prediction models change between 3.25 and 9.09. One can conclude that the developed software can be used for Internet traffic prediction within acceptable error rates.

Keywords: Time-Series; Multilayer perceptron; Internet traffic; Prediction

REFERENCES

1. Paulo Cortez, Miguel Rio, Miguel Rocha, Pedro Sousa, Multi-scale Internet traffic forecasting using neural networks and time series methods, *Expert Systems*, Vol: 29, 143–155, 2012.
2. Tak-chung Fu, A review on time series data mining, *Engineering Applications of Artificial Intelligence*, Vol: 24, No: 1, 164-181, 2011.

REPRODUCING KERNEL METHOD FOR TIME FRACTIONAL ADVECTION EQUATION

Mehmet Gıyas Sakar, Fevzi Erdoğan, Onur Saldır

Department of Mathematics, Faculty of Science, Van Yuzuncu Yıl University, Van, Turkey

giyassakar@hotmail.com, ferdogan@yyu.edu.tr, onursaldır@gmail.com

Abstract

In this study, we give an iterative reproducing kernel method for numerical solution of Advection equation with time fractional Caputo derivative. Convergence analysis is constructed theoretically. The results show that the given method very efficient for time fractional Advection equation.

Keywords: Iterative reproducing kernel method; Advection equation; Caputo derivative.

REFERENCES

1. M. Cui, Y. Lin, Nonlinear Numerical Analysis in the Reproducing Kernel Space, Nova Science, New York, USA, 2009.
2. D. Zwillinger, Handbook of Differential Equations, Academic Press, New York, (1992).
3. Abdul-Majid Wazwaz, Partial Differential Equations and Solitary Waves Theory, Springer, New York, 2009.
4. Mehmet Gıyas Sakar, Iterative reproducing kernel Hilbert space method for Riccati differential equations, Journal of Computational and Applied Mathematics, 309, 163-174, 2017.

STRENGTHENING THE ENCODING ALGORITHMS IN EMBEDDED SYSTEMS TO SIDE CHANNEL ATTACKS

M.Şahin Açikkapı¹, A.Bedri Özer²

¹ Çemişgezek MYO, Munzur University, Tunceli, Turkey

mehmetacikkapi@gmail.com

² Engineering Faculty, Firat University, Elazığ, Turkey

bozer@firat.edu.tr

Abstract

In order to be able to create strong encoding systems, they have to be resistant to the decoding methods of encryption algorithms. In addition, the algorithms should be attempted with tests that will be resistant to decoding. Otherwise, encryption algorithms that are thought to be very powerful can be cracked in a short time. The cryptographic algorithm can be viewed from two perspectives. First perspective; is a black box that generates output information by receiving an abstract mathematical object or hidden key and input information, second perspective is to look at as a program implemented on a known processor. The first is the subject of classical cryptanalysis. The second is a subject that bases on physical attacks. Encryption algorithms are usually strong in terms of algorithmic structure, and they protect against attacks with their large key space. However, even if the algorithm key spaces are wide in the side channel attacks from physical attacks, they may be inadequate against this method. This attack is particularly effective in cryptographic embedded devices. The cryptographic system can be cracked with interpretations to be made from the electromagnetic fields, sound, heat levels, power consumption, and running time of the algorithms during the workings of the side channel attacks and cryptographic devices[1]. In order not to be able to understand the power consumption values obtained by side channel attacks, it is ensured that the measured power consumption values do not allow correlation. On the other hand, it is tried to ensure that safe hardware implementation with working on the matching of the processed data in the algorithm with the masking method in the same way as not to adversely affect the performance very much[2].

Keywords: Embedded Systems; Side Channel Attacks; Hiding; Masking.

REFERENCES

1. Kocher, P., Jaffe, J., & Jun, B. (1999, August). Differential power analysis. In *Annual International Cryptology Conference* (pp. 388-397). Springer, Berlin, Heidelberg.
2. Prouff, E., & Rivain, M. (2013, May). Masking against side-channel attacks: A formal security proof. In *Annual International Conference on the Theory and Applications of Cryptographic Techniques* (pp. 142-159). Springer, Berlin, Heidelberg.

STABILITY ANALYSIS, NUMERICAL AND EXACT SOLUTIONS OF THE (1+1)-DIMENSIONAL NDMBBM EQUATION

Asif Yokus¹, Tukur Abdulkadir Sulaiman¹, Mehmet Tahir Gulluoglu², Hasan Bulut¹

¹Firat University, Department of Mathematics, Elazig, Turkey,

²Harran University, Department of Electrical and Electronic, Sanliurfa, Turkey,

asfyokus@yahoo.com, sulaiman.tukur@fud.edu.ng, thrgll@gmail.com, hbulut@firat.edu.tr

Abstract

A newly propose mathematical approach is presented in this study. We utilize the new approach in investigating the solutions of the (1+1)-dimensional nonlinear dispersive modified Benjamin-Bona-Mahony. The new analytical technique is based on the popularly known sinh-Gordon equation and a wave transformation. In developing this new technique at each every steps involving integration, the integration constants are considered to not be zero which gives rise to new form of travelling wave solutions. The (1+1)-dimensional nonlinear dispersive modified Benjamin-Bona-Mahony is used in modelling an approximation for surface long waves in nonlinear dispersive media. We construct some new trigonometric function solution to this equation. Moreover, the finite forward difference method is utilized in investigating the numerical behavior of this equation by taking one of the analytical solutions obtained by using the new approach into consideration. We finally, give a comprehensive conclusions.

Keywords: (1+1)-dimensional nonlinear dispersive modified Benjamin-Bona-Mahony equation, Sinh-Gordon function method.

REFERENCES

- [1] Z. Fu, S. Liu, Q. Zhao, New Jacobi elliptic function expansion and new periodic solutions of nonlinear wave equations, *Physics Letters A*, 290 (2011), 72-76.
- [2] H.M. Baskonus, H. Bulut and F.B.M. Belgacem, Analytical Solutions for Nonlinear Long-Short Wave Interaction Systems with Highly Complex Structure, *Journal of Computational and Applied Mathematics*, 312 (2017), 257-266.
- [3] H.M. Baskonus, H. Bulut and Abdou Atangana, On the Complex and Hyperbolic Structures of Longitudinal Wave Equation in a Magneto-Electro-Elastic Circular Rod, *Smart Materials and Structures*, 25(3) (2016), 035022.

TAUTOMERISM AND SPECTROSCOPIC PROPERTIES OF TRITHIOCYANURIC ACID

Y. Erdogdu¹ and M. T. Güllüoğlu²

¹Department of Physics, University of Gazi, Ankara, Turkey (yusuferdogdu@gmail.com)

²Dept. Elect. and Electro. Engin., University of Harran, Sanliurfa, Turkey

Abstract

The molecular structure and the relative stabilities of the possible tautomers of the Trithiocyanuric acid are calculated by DFT/B3LYP method using 6-311G(d,p) basis sets [1-3]. The results of the energy analysis and thermodynamic treatment of the obtained data are used to predict the relative stabilities of the tautomers. The vibrational spectra of Trithiocyanuric acid are calculated using the same level of theory and the results are compared with the experimentally measured FTIR spectra. Good correlation is obtained between the experimental and calculated vibrational frequencies. The electronic spectra of Trithiocyanuric acid in gas phase are calculated using the TD-DFT method. The calculations predicted bathochromic shift in all the spectral bands in presence of solvent compared to the gas phase. Also the NMR spectra of all tautomers are calculated and the results are correlated with the experimental NMR chemical shifts where the most stable tautomer gives the best correlation coefficient.

Keywords: Tautomers, FT-IR, FT-Raman, NMR, DFT, Trithiocyanuric acid

References

1. TA Halgren (1996), J. Comput. Chem. 17:490–519.
2. MJ Frisch et all. (2009) Gaussian 09 Revision B.01. Gaussian Inc, Wallingford CT
3. A Frisch, AB Nielson and AJ Holder, Gaussview User Manual, Pittsburgh, PA: Gaussian Inc., 2000.

FT-IR, FT-RAMAN, NMR AND DFT STUDIES OF 4-AMINO-8-TRIFLUOROMETHOXYQUINOLINE

M. T. Güllüoğlu¹, T.R. Sertbakan² and Y. Erdogdu³

¹Dept. Elect. and Electro. Engin., University of Harran, Sanliurfa, Turkey (thrgll@gmail.com)

²Department of Physics, University of Ahi Evran, Kirsehir, Turkey

³Department of Physics, University of Gazi, Ankara, Turkey

Abstract

In the present work, the quantum chemical calculations were performed by means of the Gaussian09 software package, using hybrid density functional theory at the B3LYP level and with 6-311G(d, p) basis set [1-3]. All the computations have been carried out in gas phase. In order to establish the stable possible conformations, the conformational space of 4-amino-8-trifluoromethoxyquinoline molecule was scanned with theoretical methods. The harmonic vibrational frequencies have been calculated at the same level of theory. The vibrational frequencies were calculated and scaled, and subsequently values have been compared with the experimental Infrared and Raman spectra. The vibrational modes were assigned on the basis of TED analysis for 6-311G(d,p) basis set, using SQM program. The observed and calculated frequencies are found to be in good agreement.

Keywords: FT-IR, FT-Raman, NMR, DFT, 4-Amino-8-TrifluoroMethoxyQuinoline

References

1. TA Halgren (1996), J. Comput. Chem. 17:490–519.
2. MJ Frisch et all. (2009) Gaussian 09 Revision B.01. Gaussian Inc, Wallingford CT
3. A Frisch, AB Nielson and AJ Holder, Gaussview User Manual, Pittsburgh, PA: Gaussian Inc., 2000.

SOLVABILITY OF A SYSTEM OF HIGHER ORDER NONLINEAR DIFFERENCE EQUATIONS

Merve KARA¹, Yasin YAZLIK², Durhasan Turgut TOLLU³

¹ Ortaköy Vocational School, University of Aksaray, Aksaray, Turkey,
mervekara@aksaray.edu.tr,

² Department of Mathematics, University of Nevşehir Hacı Bektaş Veli, Nevşehir, Turkey
yyazlik@nevsehir.edu.tr,

³ Department of Mathematics, University of Necmettin Erbakan, Konya, Turkey
dtollu@konya.edu.tr,

Abstract

In this paper, we show that the system of difference equations

$$x_n = ay_{n-k} + \frac{dy_{n-k}x_{n-(k+l)}}{bx_{n-(k+l)} + cy_{n-l}}, y_n = \alpha x_{n-k} + \frac{\delta x_{n-k}y_{n-(k+l)}}{\beta y_{n-(k+l)} + \gamma x_{n-l}}, n \in \mathbb{N}_0,$$

where k and l are fixed natural numbers, the parameters $a, b, c, d, \alpha, \beta, \gamma, \delta$ are real numbers and the initial values $x_{-j}, y_{-j}, j = \overline{1, k+l}$, are real numbers, can be solved in the closed form. Also, we investigate some particular cases of aforementioned system and give a study of the long-term behavior of its solutions for the case $l = 1$.

Keywords: Asymptotic behavior; Forbidden set; Higher order difference equation; System of difference equations.

REFERENCES

1. Elsayed EM. Qualitative properties for a fourth order rational difference equation, Acta Appl. Math. Vol:110, No:2, 589-604, 2010.
2. McGrath LC, Teixeira C. Existence and behavior of solutions of the rational equation $x_{n+1} = \frac{ax_{n-1} + bx_n}{cx_{n-1} + dx_n} x_n$, Rocky Mt. J. Math. Vol: 36, 649-674, 2006.
3. Stevic S, Diblik J, Iricanin B, Smarda Z. Solvability of nonlinear difference equations of fourth order, Electron. J. Differential Equations, Vol:2014, No:64, 1-14, 2014.
4. Yazlik Y, Tollu DT, Taskara N. On the behaviour of solutions for some systems of difference equations, J. Comput. Appl. Math. Vol:18, No:1, 166-178, 2015.

ON A SOLVABLE THREE-DIMENSIONAL SYSTEM OF DIFFERENCE EQUATIONS

Merve KARA¹, Yasin YAZLIK²

¹ Ortaköy Vocational School, University of Aksaray, Aksaray, Turkey,
mervekara@aksaray.edu.tr,

² Department of Mathematics, University of Nevşehir Hacı Bektaş Veli, Nevşehir, Turkey
yyazlik@nevsehir.edu.tr,

Abstract

In this paper, we show that the following three-dimensional system of difference equations

$$x_n = \frac{z_{n-2}x_{n-3}}{ax_{n-3} + by_{n-1}}, y_n = \frac{x_{n-2}y_{n-3}}{cy_{n-3} + dz_{n-1}}, z_n = \frac{y_{n-2}z_{n-3}}{ez_{n-3} + fx_{n-1}}, n \in \mathbb{N}_0,$$

where the parameters a, b, c, d, e, f and the initial values $x_{-i}, y_{-i}, z_{-i}, i \in \{1, 2, 3\}$, are real numbers, can be solved, extending further some results in literature. Also, we determine the asymptotic behavior of solutions and the forbidden set of the initial values by using the obtained formulae.

Keywords: Difference equation system; Solution in closed-form; Forbidden set; Asymptotic behavior.

REFERENCES

1. Elmetwally ME, Elsayed EM. Dynamics of a rational difference equation, Chinese annals of Mathematics, Series B, Vol: 30B, No:2, 187-198, 2009.
2. El-Dessoky MM, Elsayed EM. On the solutions and periodic nature of some systems of rational difference equations, Journal of Computational analysis and Applications, Vol: 18, No:2, 206-218, 2015.
3. Stevic S, Diblik J, Iricanin B, Smarda Z. On the system of difference equations $x_n = \frac{x_{n-1}y_{n-2}}{ay_{n-2} + by_{n-1}}, y_n = \frac{y_{n-1}x_{n-2}}{cx_{n-2} + dx_{n-1}}$, Applied Mathematics and Computation, Vol:270, 688–704, 2015.
4. Yazlik Y, Tollu DT, Taskara N. On the solutions of a three-dimensional system of difference equations, Kuwait Journal of Science, Vol:43, No:1, 95-111, 2016.

RISK ANALYSIS OF PORTS IN MARITIME INDUSTRY IN TURKEY USING FUZZY FAILURE MODE AND EFFECT ANALYSIS

Mine Şenel¹, Bilgin Şenel¹, Celal Alpay Havle²

¹Department of Industrial Engineering, Munzur University, Tunceli, Turkey

²Department of Professional Flight, Özyeğin University, İstanbul, Turkey

mines@anadolu.edu.tr, senelbilgin@gmail.com, celal.alpay.havle@gmail.com

Abstract

In this study, risk analysis of international trade ports is performed with maritime industry perspective. Main dimensions and their sub-criteria are collected via experts' opinions and literature survey to construct a structure. Due to fuzziness of evaluations via experts from maritime industry in Turkey, this structure is analyzed by using fuzzy failure mode and effect analysis (F-FMEA) approach. Remarks and proposals are given according to results of the study.

Keywords: Failure mode and effect analysis (FMEA), fuzzy sets, maritime industry, Turkey analysis, risk analysis.

REFERENCES

1. Sayareh, J., Ahouei, V.R. Failure mode and effects analysis (FMEA) for reducing the delays of cargo handling operations in marine bulk terminals, *Journal of Maritime Research*, Vol:10, No:2, 43-50, 2013.
2. Akyuz, E., Akgun, I., Celik, M. A fuzzy failure mode and effects approach to analyse concentrated inspection campaigns on board ships, *Maritime Policy & Management*, Vol: 43, No:7, 887-908, 2016.
3. Helvacioğlu, Ş., Özen, E. Fuzzy based failure modes and effect analysis for yacht system design, *Ocean Engineering*, Vol:79, 131-141, 2014
4. Qingji Zhou, Vinh V. Thai. Fuzzy and grey theories in failure mode and effect analysis for tanker equipment failure prediction, *Safety Science*, Vol:83,74-79, 2016
5. Hu-Chen Liu, Long Liu, Nan Liu, Ling-Xiang Mao. Risk evaluation in failure mode and effects analysis with extended VIKOR method under fuzzy environment, *Expert Systems with Applications*, Vol: 39,12926–12934, 2012
6. Chian Haur Jong, Kai Meng Tay, Chee Peng Lim. Application of the fuzzy Failure Mode and Effect Analysis methodology to edible bird nest processing, *Computers and Electronics in Agriculture*, Vol:96, 90-108, 2013

ON NUMERICAL SOLUTION OF BURGERS' EQUATION BY USING HOMOTOPY ANALYSIS METHOD

Mine Babaoglu Gurunlu¹, Etibar S. Panakhov²

¹ Department of Mathematics and Science Education, University of Kahramanmaras Sutcu Imam, Kahramanmaras, Turkey

¹ Institute of Applied Mathematics, University of Baku State, Baku, Azerbaijan

mnbabaoglu@gmail.com¹, epenahov@hotmail.com²

Abstract

The present work examines the well-known partial differential equation that arises in nonlinear science, namely; the Burgers' Equation. Then, Homotopy Analysis Method (HAM) has been applied to Burgers' equation with initial conditions. Some problems are investigated to illustrate the efficiency of the method. Approximate solutions obtained by HAM are compared with exact solution. The comparison shows that the achieved solutions are in excellent agreement. We also plot the two-three dimensional graphics and tables of obtained results with the help of the computer program in the Wolfram Mathematica. Convergence analysis is also provided by using some related theorems. The newly acquired results show that HAM is highly effective technique for solving nonlinear partial differential equations.

Keywords: Homotopy Analysis Method; Burgers' Equation; Approximate solution; Auxiliary parameter.

REFERENCES

1. S. J. Liao, Beyond Perturbation: Introduction to the Homotopy Analysis Method, Boca Raton.: Chapman & Hall/CRC Press, 3-38, 2003.
2. A. M. Wazwaz, Partial Differential Equations: Methods and Applications, Balkema Publishers, The Netherlands, 2002.
3. Y. Tan, S. Abbasbandy, Homotopy analysis method for quadratic Riccati differential equation, Communications in Nonlinear Science and Numerical Simulation, 13, 539-546, 2008.

THE NUMERICAL SOLUTION OF KDV EQUATIONS

Mine Babaoglu Gurunlu¹

¹ Department of Mathematics and Science Education, University of Kahramanmaras Sutcu Imam, Kahramanmaras, Turkey

mnbabaoglu@gmail.com

Abstract

The aim of this study is to analyse the numerical behaviour of the Korteweg-de Vries (KdV) Equation using analytic technique, namely the Homotopy Analysis Method (HAM). Two illustrative examples have also been presented. Solutions two-three dimensional graphics and tables are performed and necessary comparisons are obtained. Note that the analytic technique has also been compared with the exact solutions. The computed results are seen to be highly accurate and very good agreement with the literature. Convergence analysis is also provided. The proposed method has been shown to be unconditionally stable. Moreover, they indicate that only a few terms are sufficient to obtain accurate solutions.

Keywords: Homotopy Analysis Method; Korteweg-de Vries (KdV) Equation; Approximate solution; Auxiliary parameter.

REFERENCES

1. S. J. Liao, Beyond Perturbation: Introduction to the Homotopy Analysis Method, Boca Raton.: Champan & Hall/CRC Press, 3-38, 2003.
2. A. M. Wazwaz, Partial Differential Equations: Methods and Applications, Balkema Publishers, The Netherlands, 2002.
3. S. J. Liao, On the Homotopy analysis method for nonlinear problems, Applied Mathematics and Computation, 147, 499-513, 2004.
4. S. Abbasbandy, The application of Homotopy analysis method to solve a generalized Hirota-Satsuma coupled KdV equation, Phys. Lett. A, 361, 478-483, 2007.

ON SOFT VECTOR SPACES

Mihriban Durmuş¹ and Yıldırım Çelik²

^{1,2} Department of Mathematics, University of Ordu, Ordu, Turkey

mihribandurmus6161@gmail.com, ycelik61@gmail.com

Abstract

In this article, we introduce the concepts of soft vector space and soft subvector space over a vector space and some related properties are investigated. Also we give the notions of soft linear transformation and soft vector homomorphism, and then give theorems about homomorphic image and homomorphic pre-image of soft vector spaces under a soft linear transformation.

Keywords: Soft set; Vector space; Soft vector space.

REFERENCES

1. Hacı Aktaş, Naim Çağman, Soft sets and soft groups, Information Sciences, Vol:177, 2726-2735, 2007.
2. Muhammad Irfan Ali, Muhammad Shabir, Kar Ping Shum, On soft ideals over semigroups, Southeast Asian Bulletin Mathematics, Vol:34, No:4, 595-610, 2010.
3. Muhammad Irfan Ali, Feng Feng, Xiaoyan Liu, Won Keun Min, Muhammad Shabir, On some new operations in soft set theory, Computers and Mathematics with Applications, Vol:57, No:9, 1547-1553, 2009.
4. Papitra Kumar Maji, Ranjit Biswas, Akhil Ranjan Roy, Soft set theory, Computers and Mathematics with Applications, Vol:45, No:4, 555-562, 2003.
5. Dmitri Molodtsov, Soft set theory-first results, Computers and Mathematics with Applications, Vol:37, No:4, 19-31, 1999.

On the soliton solutions to some complex nonlinear Schrödinger equations

Hasan Bulut¹, Tukur Abdulkadir Sulaiman¹

Mirac Kayhan² Emine Nesligul Aksan²

hbulut@firat.edu.tr, mtukur74@yahoo.com

nesligul.aksan@inonu.edu.tr, mirackayhan@yandex.com

¹ Department of Mathematics, University of Firat, Elazig, Turkey

² Department of Mathematics, University of Inonu, Malatya, Turkey

Abstract

In this study, singular soliton solutions are extracted from the five complex nonlinear Schrödinger equations describing various complex phenomena in nonlinear science by using the improved Bernoulli sub-equation function method. Under suitable values of the parameters involved, the 2D, 3D and contour plots of all the acquired solutions are presented.

Keywords: The IBSEFM; the NLSEs; singular solitons

REFERENCES

1. H.M. Baskonus and H.Bulut, Exponential Prototype Structure for (2+1) Dimensional Boiti-Leon-Pempinelli systems in Mathematical Physics, Waves in Random and Complex Media, Vol:26, No:2, 189–196, 2016.
2. V.E. Pedlosky, Finite-amplitude baroclinic waves, J. Atmos. Sci. , Vol:27,15-30,1970.
3. S. Arbabi and M. Najafi, Exact solitary wave solutions of the complex nonlinear Schrödinger equations, Optik-Int. J. Light and Electron Optics, Vol:127, No:11, 4682-4688, 2016.
4. J.-I. Segata, Final State Problem for the Cubic Nonlinear Schrödinger Equation with Repulsive Delta Potential, Communications in Partial Differential Equations, , Vol: 40, No:2 , 309-328, 2015.

Best Uniform Approximation of Offset Curves

Abedallah Rababah and Moath Jaradat,

Department of Mathematics, Jordan University of Science and Technology, Irbid, Jordan

The offset curves play important task in Computer Aided Geometric Design (CAGD). In the recent years, researchers illustrated some methods to approximate offset curves. In 1996, Lee, Kim, and Elber approximated the offset curve using the convolution curve between the approximation B'ezier curve and the curve itself. In this talk, approximation of offset curve is considered that is based on the best uniform approximation of circular arc. In 2015, Rababah presented the best uniform approximation of the circular arc of degree 2 and order 4. The error function is the Chebyshev polynomial of degree 4.

In this talk, the best uniform approximation of the circular arc is used to construct a new method for approximation offset curve by a polynomial parametric defined curve of degree 2 and order 4.

References:

Lee, I. K., Kim, M. S., & Elber, G. (1996). Planar curve offset based on circle approximation. *Computer-Aided Design*, 28(8), 617-630.

Rabah, A. (2016). The best uniform quadratic approximation of circular arcs with high accuracy. *Open Mathematics*, 14(1), 118-127

AN AUTOMATED DRONE NAVIGATION SYSTEM

Mohammad Ali H. Eljinini¹, Ahmad Tayyar²

¹ Department of Computer Science, Isra University, Amman, Jordan

ma.eljinini@iu.edu.jo,

² Department of Computer Science, Jerash University, Jerash, Jordan

ahmad.tayyar@hotmail.com,

Abstract

In modern warfare, swarms of unmanned aircrafts and drones are used to perform various tasks ranging from taking surveillance data to sensing enemy's targets to enhance monitoring in disputed territories. In hostile zones, flying drones from one point to another in straight lines are vulnerable to anti-air defense systems and therefore are easy targets. The generation of random paths between two points in real time, which cannot be predicted in advance, can be of great value to flying drones. In previous work, a novel computer algorithm has been proposed to generate a random path between two points in space. A random path consists of finite number of randomly generated adjacent points that satisfy the condition: $L(p_i p_n) < L(p_{i-1} p_n)$. Where $L(p_i p_n)$ is the length of the path between the two adjacent points p_i and p_n . Our algorithm has been coded and evaluated. Experiments showed that the randomly generated points were converged to the target point. The main importance of this method is the ability to generate paths between two points in real time, which cannot be predicted in advance. In this research work, we applied our method to the problem of drone navigation system. An ontology has been developed that describes the domain of automated navigation system. The ontology is designed to guide the process of generating acceptable vertices based on some criteria described in the ontology. Adding intelligence to the navigation system has provided us with a better solution. Initial findings are leading to the applicability of the randomly generated paths to the drone navigation system.

Keywords: Random Paths, Mobile Robots, Intelligence Computing, Military Applications.

REFERENCES

1. Tayyar A, Generating Random Paths between Two Points in Space: Proposed Algorithm, Proceedings of the International Conference on Computer Science, Computer Engineering, and Social media, Thessaloniki, Greece, 2014.
2. Horowitz M, Kreps S, Fuhrmann M, The consequences of Drone Proliferation: Separating Fact from Fiction. International Security, Forthcoming, (January 25, 2016).
3. Barraquand J, Langlois B, Latombe J, Numerical potential field techniques for robot path planning. *IEEE Trans. Syst., Man, Cybern.*, 22(2), pp.224-241.
4. Fridman N, Hafner D, The state of the art in ontology design. *AI Magazine*, 18(3): 53-74.

ON IDEAL FLUID FLOW IN COMPLEX PLANE

Mohammed Garba

Department of Mathematics, Bauchi State University Gadau, Nigeria

Mohammedgarba18@gmail.com

Abstract

In this article, we associated to every analytic function $f(z)$ defined on an open domain Ω or on the entire complex plane a vector field $\vec{F}(x, y) = [u(x, y), v(x, y)]$, where $u(x, y)$ and $v(x, y)$ are the real and imaginary components of the analytic function $f(z)$. Following the fact that the velocity vector $V(z) = (u(x, y), v(x, y))^T$ induced an ideal fluid flow iff $f(z) = u(x, y) - iv(x, y)$ is a complex analytic function of complex variable z , where $z \in \Omega$, we considered a steady state fluid flow with velocity vector field $V(z) = (u(x, y), v(x, y))$ at the point $z = (x, y) \in \Omega$. Thus Ω is assumed the domain occupied by the fluid in the complex plane, while the vector $V(z)$ represents the instantaneous velocity of the fluid at the point $z \in \Omega$ usually termed as the complex potential of the fluid flow. The potential function and the stream function were obtained, from which we generate the level curves and used it to describe the flow and the direction velocities of the flow.

Keywords: Complex Potential, Potential function, Stream function, Level curves.

REFERENCES

1. Broom, D.R.. Interactive graphics display of Inviscid fluid flows developed using conformal transformations. *International Journal of Mechanical Engineering*. 6,191-195. 2015
2. Churchill, R.V. (2008, March, 20). Equipotential and Stream function. Retrieved November 11, 2016 from www.en.m.wikipedia.org/wiki/Equipotential_and_stream_function.
3. Fenaish, T.A., Numerical experiments on Potential flow configurations, *Computer in Education Journal*. 4, 17-20, 1992
4. Huang, X. & Qiuyan, F., Boundary value problem of the Analytic functions and its Application *International Journal of Scientific Research and Engineering Studies*, 23, 31-45, 2011.
5. Kapania. *et al.*, Inviscid Flow Theory, *Journal of Physics* 44, 025301, 2010

A COMPUTATIONAL METHOD FOR SOLVING A CLASS OF FRACTIONAL NON-LINEAR SINGULARLY PERTURBED VOLTERRA INTEGRO-DIFFERENTIAL BOUNDARY-VALUE PROBLEMS

Mohammed Abuomar¹

¹Department of Mathematics, UAE University, Al Ain, UAE

moh168@live.com, 201150326@uaeu.ac.ae

Abstract

In this thesis, we present a computational method for solving a class of fractional singularly perturbed Volterra integro-differential boundary-value problems with a boundary layer at one end. The implemented technique consists of solving two problems which are a reduced problem and a boundary layer correction problem. The reproducing kernel method is used to the second problems. The Pade' approximation technique is used to satisfy the conditions at infinity. Existence and uniformly convergence for the approximate solution will be investigated. Numerical results will be presented to show the efficiency of the proposed method.

Keywords: Singularly perturbed Volterra integro-differential, Caputo fractional derivative, nonlinear initial value problem.

REFERENCES

1. Kilbas, A. A., Srivastava, H. M., & Trujillo, J. J. (2006). Preface.
2. Aygören, A. (2014). Fractional Derivative and Integral (Doctoral dissertation, Eastern Mediterranean University (EMU)-Doğu Akdeniz Üniversitesi (DAÜ)).
3. De Oliveira, E. C., & Tenreiro Machado, J. A. (2014). A review of definitions for fractional derivatives and integral. *Mathematical Problems in Engineering*, 2014.
4. Li, C., Chen, A., & Ye, J. (2011). Numerical approaches to fractional calculus and fractional ordinary differential equation. *Journal of Computational Physics*, 230(9), 3352-3368.
5. Ray, S. S., Atangana, A., Noutchie, S. C., Kurulay, M., Bildik, N., & Kilicman, A. (2014). Fractional calculus and its applications in applied mathematics and other sciences. *Mathematical Problems in Engineering*, 2014.

q -SERIES A BRIDGE BETWEEN ANALYSIS AND DISCRETE MATHEMATICS

Mourad E. H. Ismail¹

¹ Department of Mathematics, University of Central Florida, Orlando, FL, USA

mourad.eh.ismail@gmail.com

Abstract

We discuss the connection between partitions and allied areas of combinatorics and the q -series identities. We shall illustrate this interaction by several examples.

Keywords: q -series identities ; Partitions; Discrete Mathematics

REFERENCES

1. G. E. Andrews, Applications of basic hypergeometric functions. SIAM Rev. 16 , 441-484, 1974.
2. G. Andrews, The Theory of Partitions, Addison-Wesley, Reading, Massachusetts, 1976, reissued by Cambridge University Press, Cambridge, 1998.
3. G. E. Andrews and M. E. H. Ismail, in preparation.
4. K. Garrett, M. E. H. Ismail, and D. Stanton Variants on the Rogers-Ramanujan identities, joint with , Advances in Applied Math. 23 , 274-299, 1999.
5. M. D. Hirschhorn, A simple proof of Jacobi's two-square theorem, Amer. Math. Monthly 92 , no. 8, 579-580, 1985.

Effects of chemical reaction and radiation on MHD free convection flow of generalized Walters'-B fluid with heat and mass transfer analysis over an exponential isothermal vertical plate

Muhammad Bilal Riaz¹

¹Department of Mathematics, University of Management and Technology, Lahore, Pakistan

bilal.riaz@umt.edu.pk

Abstract

The present article reports the applications of Caputo-Fabrizio time-fractional derivatives. This article generalizes the idea of unsteady MHD free convection flow in a Walters.-B fluid with heat transfer analysis over an exponential isothermal vertical plate embedded in a porous medium. The classical model for Walters.-B fluid is written in dimensionless form with the help of non-dimensional variables. Furthermore, the dimensionless model is converted into a fractional model called as a generalized Walters.-B fluid model. The governing equations of generalized Walters-B fluid model have been solved analytically using the Laplace transform technique. They satisfy all imposed initial and boundary conditions and for $\Gamma \rightarrow 0$ can be reduce to the similar solutions for Newtonian fluids. The corresponding expressions for skin friction and Nusselt number are also evaluated. Numerical results for velocity and temperature are displayed graphically for various parameters of interest and discussed. This study is of fundamental importance and frequently arises in many practical situations such as chemical engineering and polymer extrusion processes..

Keywords: Free convection; Heat and mass transfer; Chemical reaction; Caputo-Fabrizio time derivative; Radiation; MHD.

REFERENCES

1. K. B. Oldham and J. Spanier. The fractional calculus. Academic Press, New York-London, 1974.
2. M. Caputo and M. Fabrizio. A new definition of fractional derivative without singular kernel. *Progress in Fractional Differentiation and Applications*, 1(2):73–85, 2015.
3. J Beard D. W. and Walters, K., "Elastico-Viscous Boundary-Layer Flows. I. Two-Dimensional Flow Near a Stagnation Point," *Mathematical Proceedings of the Cambridge Philosophical Society*, 60, pp.667-674 (1964).

ON λ -STATISTICAL CONVERGENCE OF DOUBLE SEQUENCE OF FUNCTIONS OF ORDER α

Muhammed Çınar¹ ,Dilan Şeker² ,Mikail Et³

¹ Department of Mathematics Education, University of Muş Alparslan, Muş , Turkey

m.cinar@alparslan.edu.tr

² Department of Mathematics ,University of Muş Alparslan, Muş , Turkey

dilann.seker@gmail.com

³ Department of Mathematics, University of Fırat, Elazığ , Turkey

mikailet68@gmail.com

Abstract

In this article, we introduce the concepts statistical convergence of order α for generalized difference double sequences of real valued functions. Furthermore we give the concept of α -statistically Cauchy sequence for Δ^m -double sequences of real valued functions and prove that it is equivalent to pointwise statistical convergence of order α for Δ^m --double sequences of real valued functions. Also some relations between $S_{(\lambda, \mu)}^\alpha(\Delta^m, f)$ -statistical convergence and strong $w_{(\lambda, \mu)}^\beta(\Delta^m, f)$ -summability are given.

Keywords: Statistical Convergence, Function Sequences, Cesaro Summability

REFERENCES

1. Çolak ,Rıfat ,Statistical convergence of order α , Modern Methods in Analysis and Its Applications, New Delhi, India: Anamaya Pub, 121-129, 2010.
2. Kızmaz ,Hüsnü ,On certain sequence spaces, Canad. Math. Bull.Computation, Vol:24, No:2, 169–176, 1981.
3. Jeffrey ,Connor, The Statistical and strong p-Cesàro convergence of sequences, Analysis, Vol:8, 47–63, 1988.
4. Gökhan, Ayşegül ,Güngör , Mehmet, On pointwise statistical convergence, Indian J. Pure Appl. Math., Vol:33, No:9, 1379–1384, 2002.

IMAGE CODING USING LAPLACE TRANSFORM

Muharrem Tuncay Gençoğlu¹ Mehmet Vural²

¹ Fırat University, Elazığ/National Defense University, Ankara, Türkiye

mtgencoglu23@gmail.com

² Fırat University, Elazığ, Türkiye

Abstract

In this paper a different cryptographic method is introduced by using Power series transform. A new algorithm for cryptography is produced. The extended Laplace transform of the exponential function is used to encode an explicit text. The key is generated by applying the modular arithmetic rules to the coefficients obtained in the transformation. Here, ASCII codes used to hide the mathematically generated keys strengthen the encryption. Text steganography is used to make it difficult to break the password. The made encryption is reinforced by image steganography. To hide the presence of the cipher text, it is embedded in another open text with a stenographic method. Later, this text is buried in an image. For decryption it is seen that the inverse of the Power series transform can be used for decryption easily.

Experimental results are obtained by making a simulation of the proposed method. As a result, it is stated that the proposed method can be used in crypto machines.

Keywords: Cryptography, Power Series Transform, Data Encryption, Embedded Image

REFERENCES

1. Koç, Ç.K. Cryptographic Engineering, Springer. PP 125-128, 2009.
2. Gençoğlu, M.T. Use of Integral Transform in Cryptology. Science and Eng. J of Fırat Univ.,28 (2), 217-220, 2016.
3. Martin, K.M. Everyday Cryptography Fundamental Principles and Applications, Oxford University Press 2012.
4. Delfs, H. and Knebl, H. Introduction to Cryptography Principles and Applications, Springer 2007.
5. Paar, C. and Pelzl, J. Understanding Cryptography, Springer 2010.

Moisture sorption isotherms and thermodynamic functions of chickpea (*Cicer arietinum* L.) stored in a chamber under controlled humidity

Mukaddes Karataş¹ and Nurhan Arslan¹

¹ Department of Chemical Engineering, University of Firat, Elazig, Turkey

mkozturk@firat.edu.tr,

Abstract

The moisture sorption isotherms and the thermodynamic functions of chickpea stored in a chamber the relative humidity of which is controlled by an atomizing humidifier were determined at relative humidity ranging from 10 % to 90 % and 25, 35, 45 °C. The sorption isotherms of chickpea were Type III isotherms according to the BET classification. Moisture content decreased with increase in temperature at a given water activity. The sorption isotherms exhibited hysteresis effect over entire water activities. The experimental sorption data were fitted to many well-known isotherm models. The goodness of fit was evaluated by using statistical tests such as r^2 , P % and RMSE. Peleg model was found to be the best model for predicting the equilibrium moisture content-water activity relationship and the moisture sorption behaviour of chickpea. The thermodynamic functions such as isosteric heat of sorption and sorption entropy were determined using the sorption isotherms data. The isosteric heats of sorption were calculated using the Clausius-Clapeyron equation and the isosteric heats of sorption were found to decrease with increasing moisture content. Firstly, the desorption entropy remained constant, then it decreased with an increase in equilibrium moisture content while the adsorption entropy decreased with an increase in equilibrium moisture content.

Keywords: Chickpea; Moisture sorption isotherms; Thermodynamic; Atomizing humidifier.

REFERENCES

1. Al-Muhtaseb, A.H., McMinn, W.A.M., Magee, T.R.A., Water sorption isotherms of starch powders Part 1: mathematical description of experimental data, Journal of Food Engineering, Vol: 61, 297-307, 2004.

On The Solutions of Some Difference Equations Systems and Analytical Properties

Münevver Tuz¹, Keziban Taş²

¹Department of Mathematics, Firat University, Elazığ, Turkey

²Department of Electronic and Auotomation , Munzur University, Tunceli, Turkey

mtuz@firat.edu.tr , kezibantas@munzur.edu.tr

Absract

In this study, we have investigated the global asymptotic behavior of the solutions of the system of the difference equation

$$k_n \frac{d^2 y_n(t)}{dt^2} = h_n \frac{dy_n(t)}{dt} + a_{n-1} y_{n-1}(t) + b_n y_n(t) + q a_n y_{n+1}(t)$$

$$n \in \{0, 1, \dots, N - 1\}, \quad t \geq 0$$

where $N \geq 2$ is a fixed integer and $q > 1$ is a fixed real number, k_n, h_n, a_n, b_n real parametres and $\{y_n(t)\}_{n=1}^N$ find the solution. We have examined the difference equation which examines the limitations, persistence, asymptotic behavior and global asymptotic behavior of positive equations according to given conditions. We have obtained some asymptotic results for the positive balance of this system. We have obtained some asymptotic results for the positive equilibrium of this system.

Keywords: Difference equations, Asymptotic behavior, Global attractivity, Monotone.

REFERENCES

1. Kelley, W.C. and Peterson, A.C. The Theory of Differential Equations, Classical and Qualitative. Pearson Education Inc. , New Jersey, 2004.
2. Mason, T. E. On properties of the solutions of linear q – difference equations with entire function coefficients. Amer. J. Math. 37, 439 – 444, 1915.
3. Gaspard Bangerezako, Mahouton Hounkonnou, The transformation of polynomial eigenfunctions of linear second-order q-difference operators: a special case of q-Jacobi polynomials. Contemporary problems in mathematical physics (Cotonou, 2001), 427-439, World Sci. Publishing, River Edge, NJ, 2002.
4. S Barnett, Introduction to mathematical control theory, Oxford Press 1975.
5. Jean Paul Bézivin, On functional q-difference equations ,(in french) Aequationes Math. 43, 159-176, 1992.

An Interior Inverse Problem for The Sturm Liouville Operator With Discontinuous Conditions

Münevver Tuz¹, Etibar Penahlı²

^{1,2}Department of Mathematics, Firat University, Elazığ, Turkey

mtuz@firat.edu.tr, epenahov@firat.edu.tr

Abstract

In this paper the eigenvalue problem ,

$$-u'' + h(x)u = \lambda u$$

on the interval $0 \leq x \leq \pi$ with the boundary conditions;

$$\alpha u(0) - u'(0) = \alpha u(\pi) - u'(\pi) = 0$$

and symmetric discontinuities at $x = \mu$ and $x = (\pi - \mu)$ satisfying the symmetric jump condition

$$u(\mu +) = hu(\mu -), u'(\mu +) = h^{-1}u'(\mu -) + ku(\mu -)$$

where $|h - 1| + |k| > 0$ and $0 \leq \mu < \frac{\pi}{2}$. Here the Sturm Liouville problem meets different symmetric limits and splash conditions with different symmetrical potentials. What is achieved is that if a limited number of eigenvalues is different then it is a simple statement of the difference of the potentials.

Keywords: Inverse problem, discontinuities, symmetric potential, jump conditions, second-order differential equation.

REFERENCES

1. Makoto Kobayashi, An algorithm for discontinuous inverse Sturm-Liouville problems with symmetric potentials. Computers Math. Applic. 18, 349-356 ,1989.
2. Makoto Kobayashi, Discontinuous inverse Sturm-Liouville problems with symmetric potentials. Ph.D. Thesis, U.C. Berkeley ,1988.
3. Boris M.Levitan, On the determination of a Sturm-Liouville equation by two spectra. Amer. Math. Soc. Transl. Series 2, 68, 1-20 , 1968.
4. Catherine Willis, Inverse Sturm- Liouville problems with two discontinuities. Inverse problems 2, 111-130 ,1986.

CONTROL OF THERMAL CONDUCTIVITY BY DESIRED FINAL TIME HEAT

Murat Subaşı¹

¹ Department of Mathematics, Science Faculty, Ataturk University, Erzurum, Turkey

msubasi@atauni.edu.tr,

Abstract

In this article, we consider the problem of control of the thermal conductivity in a heat equation. Since these types of problems are ill-posed, the regularization process is needed. We use the adjoint method to obtain the gradient of the regularized cost functional. By gradient method we constitute a minimizing sequence which converges to a thermal conductivity function of the heat equation.

Keywords: Inverse Problem; Adjoint Method; Heat Equation.

REFERENCES

1. Ladyzhenskaya O. A., Boundary Value Problems in Mathematical Physics, Springer-Verlag, 322 p, New York, 1985.
2. Lions J. L., Exact controllability, stabilization and perturbations for distributed systems. SIAM Rev., 30,1–68, 1988.
3. Lelevkina, L. G., Sklyar, S. N. and Khlybov, O. S., Optimal Control of Heat Conductivity, Automation and Remote Control, 2008, Vol. 69, No. 4, pp. 654–667.
4. Teymurov, R., Optimal control of mobile sources for heat conductivity processes, International Journal of Control, Volume 90, Issue 5, 2017.
5. Kovtanyuk, A. E., Chebotarev, A. Yu, Botkin, N. D., Hoffmann, K. H., Theoretical analysis of an optimal control problem of conductive–convective–radiative heat transfer, Journal of Mathematical Analysis and Applications, Volume 412, Issue 1, pp. 520-528, 2014.

New Exponential and Complex Traveling Wave Solutions to the Konopelchenko-Dubrovsky Model

Faruk DÜŞÜNCELİ¹, Murat ŞAN² and Büşra BULUR³

¹ Faculty of Architecture and Engineering, University of Mardin Artuklu, Mardin, Turkey

² Artvin Vocational School, University of Artvin Çoruh, Artvin, Turkey

³ Department of Mathematics, University of Atatürk, Erzurum, Turkey

farukdusunceli@artuklu.edu.tr, muratsan@artvin.edu.tr, bulurbusra@gmail.com

Abstract

In this study, the application of the improved Bernoulli sub-equation function method to the Konopelchenko-Dubrovsky system is presented. Some new and important solitary wave solutions with complex and exponential function structures are successfully constructed. All the obtained solutions in this study satisfy the Konopelchenko-Dubrovsky model. The interesting three- and two- dimensional surfaces of the obtained solutions are plotted. We carried out all the computations and the graphics plot in this paper by using some software program.

Keyword; Improved Bernoulli sub-equation function method, Konopelchenko-Dubrovsky system, Complex and exponential solutions

5. REFERENCES

- [1] Evans, L.C. Entropy and Partial Differential Equations. Lecture Notes at UC Berkeley, 2004. Available online: <https://math.berkeley.edu/~evans/entropy.and.PDE.pdf>
- [2] Jüngel, A. Entropy Dissipation Methods for Nonlinear Partial Differential Equations; Lecture Notes, Spring School, Bielefeld, March, 2012. Available online: <http://www.asc.tuwien.ac.at/~juengel/scripts/Bielefeld1203.pdf>
- [3] Parsani, M.; Carpenter, M.H. Nielsen, E.J. Entropy Stable Wall Boundary Conditions for the Three-Dimensional Compressible Navier–Stokes Equations. *J. Comput. Phys.* 2015, 292, 88–113.
- [4] Zhao, Y.; Yuan, M.; Su, G.; Chen, T. Crowd Macro State Detection Using Entropy Model. *Physica A* 2015, 431, 84–93.

Complete Lifts of Projectable Vector Fields to Semi-tensor Bundles

Murat POLAT¹ and Nejmi CENGİZ²

Department of Mathematics, Faculty of Sci. Atatürk University,
25240, Erzurum, Turkey

murat_sel_22@hotmail.com

ncengiz@atauni.edu.tr

Abstract

Using the fiber bundle M over a manifold B , we define a semi-tensor (pull-back) bundle tB of type (p,q) . We consider complete lifting problem of projectable vector fields on M to the semi-tensor (pull-back) bundle tB of type (p,q) .

Keywords: Vector field, complete lift, pull-back bundle, semi-tensor bundle.

REFERENCES

1. T.V. Duc, Structure presque-transverse. *J. Diff. Geom.*, 14 (1979), no. 2, 215-219.
2. H. Fattaev, The Lifts of Vector Fields to the Semitensor Bundle of the Type $(2, 0)$, *Journal of Qafqaz University*, 25 (2009), no. 1, 136-140.
3. D. Husemoller, *Fibre Bundles*. Springer, New York, 1994.
4. V. Ivancevic and T. Ivancevic, *Applied Differential Geometry, A Modern Introduction*, World Scientific, Singapore, 2007.
5. H.B. Lawson and M.L. Michelsohn, *Spin Geometry*. Princeton University Press., Princeton, 1989.
6. A. Salimov, *Tensor Operators and their Applications*. Nova Science Publ., New York, 2013.
7. A. A. Salimov and E. Kadioğlu, Lifts of derivations to the semitangent bundle, *Turk J. Math.* 24 (2000), no. 3, 259-266.
8. N. Steenrod, *The Topology of Fibre Bundles*. Princeton University Press., Princeton, 1951.

COMPARISON OF ENCRYPTION ALGORITHMS IN WIRELESS SENSOR NETWORKS

Murat Dener¹

¹ Graduate School of Natural and Applied Sciences, Gazi University, Ankara, Turkey

muratdener@gazi.edu.tr

Abstract

In general, Wireless Sensor Networks occur when sensor nodes are randomly left in an unreliable environment. Sensor node has limited processor, limited memory, limited radio capacity and low cost. In sensor network applications, security mechanisms must be used, because of unsafe environments, excessive number of sensor nodes, and wireless communication environments. Ensuring confidentiality, the primary goal of security, is one of the most important problems to be solved in order to realize time and vital objectives. While ensuring security, it is also necessary to consider other important criteria such as memory usage, energy and latency of Sensor Networks. In this study, encryption is described in Wireless Sensor Networks and Skipjack, XXTEA and AES encryption algorithms are compared using TOSSIM simulation program in TinyOS operating system considering memory usage, energy and delay criteria. The study is considered to be useful academicians who study security in Wireless Sensor Networks.

Keywords: Wireless Sensor Networks; Encryption; XXTEA; AES; Skipjack; TinyOS; TOSSIM;

REFERENCES

1. Chong, C-Y., Kumar, S.P., Sensor Networks : Evolution, opportunities, and challenges, Proc IEEE, Vol:91, No:8, 1247-1256, 2003.
2. Dener, M., Security Analysis in Wireless Sensor Networks, International Journal of Distributed Sensor Networks, Vol:2014, 1-9, 2014.
3. Lin, R., Wang, Z., Sun, Y., Energy Efficient Medium Access Control Protocols for Wireless Sensor Networks and Its State-of-Art, IEEE, 669-674, 2004.
4. Akyıldız, I.F., Su, W., Sankarasubramaniam, Y., Çayırıcı, E., A survey on sensor networks, IEEE Communications Magazine, Vol:40, No:8, 102-114, 2002.
5. Kavitha, T., Sridharan, D., Security Vulnerabilities in Wireless Sensor Networks: A Survey, Journal of Information Assurance and Security, Vol: 5, 31-44, 2010.

INVERSE SPECTRAL PROBLEM FOR DIRAC OPERATORS WITH FROZEN ARGUMENT

Murat Sat¹

¹ Department of Mathematics, University of Erzincan, Erzincan, Turkey

murat_sat24@hotmail.com

Abstract

In this article, we consider Dirac operators possessing a term depending on the unknown functions with a fixed argument and study the uniqueness of recovering the operators from the spectrum. We also obtain a constructive procedure for solving this inverse spectral problem along with necessary and sufficient conditions of its solvability [1-4].

Keywords: Frozen argument; Eigenvalue.

REFERENCES

1. Yurko Vyacheslav Anatolevich, Introduction to the Theory of Inverse Spectral Problems. Moscow, Fizmatlit, 2007.
2. Albeverio Sergio, Hryniv Rostyslav, Nizhnik Leonid, Inverse spectral problems for non-local Sturm-Liouville operators, Inverse Problems, Vol:23, No:2, 523–535, 2007.
3. Buterin Sergey Aleksandrovich, Vasiliev S., An inverse spectral problem for Sturm-Liouville operators with frozen argument, in Aktual. Probl. Prikl. Mat., Inf. i Mekh. Voronezh, Velborn, 4-6, 2015.
4. Buterin Sergey Aleksandrovich, Vasiliev S., On recovering Sturm-Liouville operators with frozen argument, in Sovr. Probl. Teor. Funct. i ikh Pril. Saratov, Nauchnaya Kniga, 7-9 2016.

THE CALCULATION OF THE REGULARIZATION TRACE OF THE SCHRODINGER EQUATION WITH ENERGY-DEPENDENT POTENTIAL

Murat Sat¹ and Muhlis Cetin²

^{1,2} Department of Mathematics, University of Erzincan, Erzincan, Turkey

murat_sat24@hotmail.com, cetinmuhlis@gmail.com

Abstract

In this article, we consider the eigenvalue problem for Schrödinger equation with energy-dependent potential in the finite interval. The regularized trace formula of this operator is established with Levitan's method [1].

Keywords: Trace formula; Eigenvalue asymptotics; Eigenvalue.

REFERENCES

1. Levitan Boris Moiseevic, Sargsian, I. S. Introduction to spectral theory: Selfadjoint Ordinary Differential Operators, American Mathematical Society, Vol: 39, 1975.

INVESTIGATION OF FINITE ELEMENT METHOD PARAMETERS AFFECTING THE DISPLACEMENT BEHAVIOUR OF HIGHWAY PAVEMENTS

Murat Bostancıoğlu¹

¹ Department of Civil Engineering, University of Cumhuriyet, Sivas, Turkey

bostancioglu@cumhuriyet.edu.tr

Abstract

Flexible pavements are a type of superstructure constructed using bitumen and granular materials. The methods used in the design of flexible pavements can be examined in five categories. Empirical methods, limiting shear failure methods, limiting deflection methods, regression methods and mechanistic-empirical methods. There has been a dramatic change in the design methods for flexible pavements from the early purely empirical methods to the modern mechanistic-empirical methods [1-4]. Due to the heterogeneous pavement layers and dynamic and cycling loading instead of static loading, researchers diverted their research to the finite element method [1,3]. However, in finite element method, parameters such as the definition of the model as 2D or 3D, the loading condition, the types and formulation of contact between layers, size of mesh, boundary conditions and dimensions of the model have a significant effect on the results. In this study, finite element model parameters affecting the pavement responses under static loading were investigated on a typical superstructure configuration consists pavement, base and subgrade layers.

Keywords: Pavement responses; Mechanistic-empirical design; Finite element model.

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REFERENCES

1. Huang Yang, Pavement analysis and design, Pearson Prentice Hall, USA, 2004.
2. Ahmed Abubeker, Erlingsson Sigurdur, Viscoelastic response modelling of a pavement under moving load, Vol:14, 748-757, 2016
3. Hadi Muhammad N.S., Bodhinayake B.C., Non-linear finite element analysis of flexible pavements, Vol:34, 657-662, 2003.
4. Sarkar Alireza, Numerical comparison of flexible pavement dynamic response under different axles, Vol:17, No:5, 377-387, 2016.

INVESTIGATION OF EARTHQUAKE BEHAVIOR OF CONSTRUCTION SYSTEM AND MATERIALS IN TRADITIONAL TURKISH ARCHITECTURE

Seyhan Yardımlı¹ Murat Dal² Esmâ Mihlayanlar³

¹ Faculty of Architecture and Design, Istanbul Aydın University, İstanbul, Turkey

² Munzur University Faculty of Engineering, Tunceli, Turkey

³T.R. Trakya University Faculty of Architecture, Edirne, Turkey

seyhanyardimli@aydin.edu.tr, muratdal@munzur.edu.tr, emihlayanlar@hotmail.com

Abstract

In this study, it is aimed to present a point of view regarding the behaviour of construction systems implemented in traditional Turkish architecture against earthquakes. In the scope of the study, examples of civil architecture were considered and their structures were evaluated as building elements such as foundation, wall and flooring.

Traditional Turkish architecture construction systems can be evaluated in two parts. One of them is the wooden carcass system and the other is the unreinforced masonry system. In the wooden carcass system, the carrier is the load bearing elements used in horizontal and vertical directions. Intermediate parts (strut, diagonal etc.) are placed between these elements to form triangles. The gaps between the elements forming the structure are filled with various materials such as wood, mud brick, brick and stone. The triangles (strut, diagonal) used in the wooden skeleton system comprise highly resistant forms against earthquakes. Moreover, due to the internal structure and physical properties of the wood, which is the skeleton material, the flexibility that it maintains can meet the lateral loads of earthquakes.

The second construction system which is the system addressed in this application, is the unreinforced masonry system. In this system, the loadbearing system itself is the walls, which are not resistant to lateral loads. Hence ensuring that the walls can act against lateral loads provides flexibility allowing the earthquake load to be absorbed.

In order to provide this flexibility beams (hatıllar) are installed at certain intervals. After the wall is built to a certain height, a different material is laid allowing a plane of movement on the wall. Thus, when the wall is exposed to a lateral load, it escapes from the planes where the beams (hatıllar) are present, and is protected against large damages by absorbing the earthquake load. The material for the beam (hatıl) can vary according to different wall types. It can be a layer of mortar, wood, concrete, or brickwork made of two or three rows.

In order to establish that the foundation of the structure can withstand earthquakes by movement, wood is placed at the lower part of the foundation above a layer of sand ensuring lateral movement and flexibility of the building.

De Moivre Formula for Hybrid Numbers and Some Applications

Mustafa Özdemir

Department of Mathematics, Akdeniz University, Antalya, Turkey

mozdemir07@gmail.com
mozdemir@akdeniz.edu.tr

Abstract

In this paper, we express de Moivre formula for hybrid numbers according to their characters and types and examine the roots of a hybrid number using de Moivre formula.

Keywords: *Dual Numbers, Hyperbolic Numbers, Hybrid Numbers, Quaternions*

REFERENCES

1. Borota N. A., Flores E., and Osler T.J., Spacetime numbers the easy way, *Mathematics and Computer Education* 34: 159-168 (2000).
2. Catoni F., Cannata R., Catoni V., Zampetti P., Two dimensional Hypercomplex number and related trigonometries, *Advances in Applied Clifford Algebras*, Vol.14, Issue 1, 47-68, (2004).
3. Fjelstad P., Extending special relativity via the perplex numbers. *Am. J. Phys.* 54(5), 416--422 (1986).
4. Fischer I., *Dual-Number Methods in Kinematics, Statics and Dynamics*. CRC Press, (1999).
5. Harkin A. A., Harkin J. B., *Geometry of Generalized Complex Numbers*, *Mathematics Magazine* 77(2):118--29 (2004).
6. Kisil Vladimir V., *Geometry of Mobius Transformations: Elliptic, Parabolic and Hyperbolic Actions of $SL_2(\mathbb{R})$* , Imperial College Press, 208 pages, (2012).
7. Miller W., Boehning R., *Gaussian, Parabolic and Hyperbolic Numbers*, *The Mathematics Teacher* 61(4): 377--82, (1968).
8. Özdemir M., The roots of a split quaternion, *Applied Mathematics Letters*, Vol.22, Issue 2, 258-263, (2009).
9. Özdemir M., Introduction to Hybrid , *Advances in Applied Clifford Algebras*, Volume 28, Issue 1, (2018).
10. Rooney J., On the three types of complex number and planar transformations, *Environment and Planning B*, Volume 5, pages 89-99, (1978).
11. Sobczyk G. *Hyperbolic Number Plane*, also published in *College Mathematics Journal* 26: 268--80 (1995).

The Characterizations of Self-Similar Curve

Mehmet Bektaş^{*} and Mustafa Altın^{**}

* *Firat University, Faculty of Art and Science, Department of Mathematics, 23000, Elazığ, TURKEY, e-mail: mbektas@firat.edu.tr*

** *Bingöl University, Vocational School of Technical Sciences, 12000, Bingöl, TURKEY, e-mail: maltin@bingol.edu.tr*

ABSTRACT

In this paper, we introduce the geometric properties of self-similar curve in the Euclidean space which given by[1]. Later, we obtained the conditions for self-similar curve to Euclidean space and we give some theorems, characterizations and results for these curves.

Key Words: Osculating Circles, Osculating sphere, Self-similar curve.

References

- [1] R. P. Encheva and G. H. Georgiev, “Similar Frenet curves,” *Results Math.*, vol. 55, no. 3, pp. 359–372, 2009.
- [2] R. Uribe-Vargas, “On Vertices, focal curvatures and differential geometry of space curves,” *Bull. Brazilian Math. Soc.*, vol. 36, no. 3, pp. 285–307, 2005.
- [3] S. Izumiya and N. Takeuchi, “Generic properties of helices and Bertrand curves,” *J. Geom.*, vol. 74, no. 1, pp. 97–109, 2002.
- [4] R. Encheva and G. Georgiev, “Shapes of space curves,” *J. Geom. Graph.*, vol. 7, no. 2, pp. 145–155, 2003.
- [5] E. Cartan, “La Méthode de Repère Mobile, La Théorie des Groupes Continus, et Les Espaces Généralisés,” *Actual. Sci. Ind.*, vol. 194, p. 774, 1960.
- [6] A. Gray, *Modern differential geometry of curves and surfaces with mathematica*. Boca Raton: CRC Press, 1997.
- [7] M. Babaarslan and Y. Yayli, “On helices and Bertrand curves in Euclidean 3-space,” *Math. Comput. Appl.*, vol. 18, no. 1, pp. 1–11, 2013.
- [8] Altın M., “Öklid uzayında Benzer Frenet Eğrileri”, *Y.L.T.,Elazığ*, 2013.
- [9] B. Etemoglu, E., Arslan, K., Bulca, “Self similar surfaces in Euclidean space,” *Selcuk J. Appl. Math.*, vol. 14, no. 1, pp. 71–81, 2013.
- [10] H. Anciaux, “Construction of Lagrangian Self-similar Solutions to the Mean Curvature Flow in C_n ,” *Geom. Dedicata*, vol. 120, no. 1, pp. 37–48, 2006.
- [11] H. Schlichtkrull, *Curves and Surfaces - Lecture Notes for Geometry 1*. 2010.
- [12] B. O’Neill, *Elementary Differential Geometry*. Academic Press Inc, 1966.
- [13] Arif sabunuoğlu, *Diferensiyel Geometri*, ANKARA: NOBEL, 2010.
- [14] H. H. HACISALİHOĞLU, *Diferensiyel Geometri*. ANKARA: Gazi Üniversitesi Basın Yayın Yüksekokulu Basımevi, 1983.

Self-Similar Surfaces in four-Dimension Euclidean Space

Mustafa Altın, * Müge Karadağ ** and H. Bayram Karadağ ***

* Bingöl University, Vocational School of Technical Sciences,12000, Bingöl, TURKEY, e-mail: maltin@bingol.edu.tr

** İnönü University, Faculty of Art and Science, Department of Mathematics,44280, Malatya, TURKEY, e-mail: muge.karadag@inonu.edu.tr

*** İnönü University, Faculty of Art and Science, Department of Mathematics, 44280, Malatya, TURKEY, e-mail: bayram.karadag@inonu.edu.tr

ABSTRACT

In this paper, we study some geometric properties of self-similar surfaces in 4–dimension Euclidean space. In addition, we investigate to be self-similar of generalized rotational surfaces and tensor product surfaces in 4–dimension Euclidean space. Also, we give some theorems and results of self-similar surfaces in 4–dimension Euclidean space.

Key Words: Self-similar surfaces, tensor product surfaces, generalized rotating surfaces.

REFERENCES

- [1] Gray, A. “Modern Differential Geometry of Curves and Surfaces”, CRS Press, Inc,1993.
- [2] Anciaux H., “Construction of equivariant self-similar solutions to the mean curvature flow in C^n ”, *Geom. Dedicata*, 120 (1): 37.48, 2006.
- [3] Etemoğlu, E., Arslan, K., Bulca, B., “Self similar surfaces in Euclidean space”, *Selçuk J. of Appl. Math*, 2013.
- [4] Aminov, Yu. A., “Surfaces in E^4 with a Gaussian curvature coinciding with a Gaussian torsion up to the sign”, *Mathematical Notes*, 56(6): 1211-1215, 1994.
- [5] Ganchev, G., Milousheva V., “On the Theory of Surfaces in the Four Dimensional Euclidean Space”, *Kodai Math. J.*, 31: 183-19, 2008.
- [6] Moore C., “Surfaces of Rotations in a Space of Four Dimensions”, *Ann. Math.*, 21(2): 81-93, 1919.
- [7] Arslan, K., Bayram B.K., Bulca B., Öztürk G. “Generalized Rotation Surfaces in E^4 ”, *Results. Math. Online First* 2011 Springer Basel AG, DOI 10.1007/s00025-011-0103-3, 2011a.
- [8] Vranceanu G., “Surfaces de Rotation dans E^4 ”, *Rev. Roum. Math. Pures Appl.* XXII, 6: 857-862, 1977.
- [9] Mihai, A., Rosca R., Verstraelen L., Vrancken L., “Tensör product surfaces of Euclidean planer curves”, *Rend. Sem. Mat. Messina*, 3: 173-184, 1995.
- [10] Bulca B., “ E^4 deki Yüzeylelerin Bir Karakterizasyonu”, *Doktora tezi* ; Bursa, 2012.
- [11] Kazan, A. and Karadağ, H. B., “Rotation Surfaces in 4-Dimensional Pseudo-Euclidean Spaces,” *I.J.I.S.M.*, Vol 2, Issue 2, 264-269, 2014.

The Bertrand Curve for Couple of Similar Frenet Curve

Mustafa Altın * and **Mehmet Bektaş** **

* Bingöl University, Vocational School of Technical Sciences, 12000, Bingöl, TURKEY, e-mail: maltin@bingol.edu.tr

** Firat University, Faculty of Art and Science, Department of Mathematics, 23000, Elazığ, TURKEY, e-mail: mbektas@firat.edu.tr

ABSTRACT

In this paper, we introduce the involute-evolute curve couple and Bertrand curve for similar frenet curve in the Euclidean space, which given by[1]. Besides, we give some theorem and results related to similar frenet curve. Also, we examined some new conditions of which similar frenet curve in the Euclidean space.

Key Words: Bertrand curve mate, Involute-Evolute curve couple, Similar frenet curve

References

- [1] R. P. Encheva and G. H. Georgiev, “Similar Frenet curves,” *Results Math.*, vol. 55, no. 3, pp. 359–372, 2009.
- [2] Altın M., “Öklid Uzayında Benzer Frenet Eğrileri”, Y.L.T.,Elazığ, 2013.
- [3] Chuan-Chih Hsiung, *A First Course in Differential Geometry*, New York: Wiley, 1981.
- [4] A. Sabuncuoğlu, *Differensiyel Geometri*, ANKARA: NOBEL, 2010.
- [5] H. H. Hacısalihoğlu, *Differensiyel Geometri*, ANKARA: Gazi Üniversitesi Basın Yayın Yüksekokulu Basımevi, 1983.
- [6] B. Etemoğlu, E., Arslan, K., Bulca, “Self similar surfaces in Euclidean space,” *Selcuk J. Appl. Math.*, vol. 14, no. 1, pp. 71–81, 2013.
- [7] H. Anciaux, “Construction of Lagrangian Self-similar Solutions to the Mean Curvature Flow in C_n ,” *Geom. Dedicata*, vol. 120, no. 1, pp. 37–48, 2006.
- [8] M. Do Carmo, *Differential geometry of curves and surfaces*. New Jersey: Prentice-Hall, 1976.
- [9] H. Schlichtkrull, *Curves and Surfaces - Lecture Notes for Geometry 1*. 2010.
- [10] S. Izumiya and N. Takeuchi, “Generic properties of helices and Bertrand curves,” *J. Geom.*, vol. 74, no. 1, pp. 97–109, 2002.
- [11] P. Griffiths, “On Cartan’s method of Lie groups and moving frames as applied to uniqueness and existence questions in differential geometry,” *Duke Math. J.*, vol. 41, pp. 775–814, 1974.

EXTENSION OF HADAMARD CODES DEFINED ON RINGS

Mustafa Özkan¹ and Figen Öke¹

¹Department of Mathematics, University of Trakya, Edirne, Turkey

mustafaozkan@trakya.edu.tr, figenoke@gmail.com

Abstract

In this study, some special matrices are constructed by choosing certain elements of a finite rings. Codes are written by using these matrices.

These codes are extended to a field. Moreover these codes are classified and more good new codes are written.

Keywords: Hadamard Codes; Recurrent Codes; Finite Rings and Fields.

REFERENCES

1. M. Ozkan, F. Oke, , Repeat codes, Even codes, Odd codes and Their equivalence, General Letters in Mathematics, Vol:2, No:1, 110–118, 2017.
2. M. Ozkan, F. Oke, , On Codes written by matrices Lexicographically ordered, AIP Conf. Proc., Vol:1926, 020035-1–020035-3, 2018.
3. D. S. Krotov, Z4-linear perfect codes , Diskretn. Anal. Issled. Oper. Ser.1.,Vol. 7, No: 4 78–90,2000.
4. W. C. Huffman, V. Pless, Fundamentals of Error Correcting Codes, Cambridge, 2003.
5. J. Qian, L. Zhang and S. Zhu, Constacyclic and cyclic codes over $\mathbb{F}_2 + u\mathbb{F}_2 + u^2\mathbb{F}_2$, IEICE Trans. Fundamentals, E89-A, No.6, 1863-1865,2006.
6. M. Ozkan, F. Oke, , A relation between Hadamard codes and some special codes over $\mathbb{F}_2 + u\mathbb{F}_2$, App Mathematics and Inf. Sci., Vol:10, No:2, 701–704, 2016.

THE LOWER BOUNDS OF SOME SUMMABILITY METHODS

Mustafa Yildirim¹, Nuh Durna² and Özkan Karadaş³

^{1,2,3} Cumhuriyet University Faculty of Sciences Department of Mathematics SİVAS

¹ yildirim@cumhuriyet.edu.tr, ² ndurna@cumhuriyet.edu.tr, ³ karadas.ozkan.88@gmail.com

Abstract

Bennet [1] gave a method of how to find the lower bounds of infinite matrices with positive entries: [Let (x_n) be a monotone decreasing nonnegative sequence, $A \in B(l^p)$ with nonnegative entries, $1 < p < \infty$. Then

$$\|Ax\|_p \geq L\|x\|_p$$

where

$$L^p = \inf_r (r+1)^{-1} \sum_{j=0}^{\infty} \left(\sum_{k=0}^r a_{jk} \right)^p =: \inf_r f(r).]$$

By applying this method, the lower bounds for some summability methods have been calculated more precisely. In this study, we will also determine the lower bounds of some summability methods.

Keywords: Lower bound; Cesaro operator; weighted mean operators.

REFERENCES

1. G. Bennett. Lower bounds for matrices, *Linear Algebra and Appl. Soc.* 82 (1986), 81-98.
2. Bennett, G., Lower bounds for matrices II, *Canad. J. Math.* 44 (1992), 54-74.
3. Lyons, R., (1982) A lower bound on the Cesàro operator, *Proc. Anzer. Math. Soc.* 86 (1987), 694.
4. Rhoades, B. E., Lower Bounds for Some Matrices, *Linear and Multilinear Algebra*, 20, 347-352.
5. Rhoades, B. E., Lower Bounds for Some Matrices II, *Linear and Multilinear Algebra*, 26 (1990), 49-58.

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THE SPECTRUM OF DISCRETE GENERALIZED CESARO OPERATORS ON l^p ($1 < p < \infty$).

Mustafa Yıldırım¹, Nuh Durna²

^{1,2,3} Cumhuriyet University Faculty of Sciences Department of Mathematics SİVAS

¹ yildirim@cumhuriyet.edu.tr, and ² ndurna@cumhuriyet.edu.tr

Abstract

$A = (a_{nk})$ matrix defined as $a_{nk} = \frac{\alpha^{n-k}}{n+1}$, $0 < \alpha < 1$ is called discrete generalized

Cesàro operators. In [1], the spectrum of the discrete generalized Cesàro operator on l^2 was given by Rhaly. Rhoades [2] also specifies the lower bound on l^p ($1 < p < \infty$) of the discrete generalized Cesàro operator. In this study we will also determine the spectrum of the discrete generalized Cesàro operator on l^p ($1 < p < \infty$).

Keywords: spectrum, fine spectrum, discrete generalized Cesàro operator, Cesàro operator.

REFERENCES

1. Rhaly, H.C. JR: Discrete Generalized Cesàro operator, Proc. Amer. Math. Soc. 86(3) (1982), 405-409.
2. Rhoades B.E: Lower bounds for some matrices, II. Linear And Multilinear Algebra 26(1-2) (1990), 49-58.

VECTORIAL MOMENTS OF RIBBON CURVES IN E^3

Mustafa Yeneroğlu¹, Talat Körpınar², Vedat Asil³, Selçuk Baş⁴

^{1,3} Department of Mathematics, University of Firat, Elazig, Turkey, ^{2,4} Department of Mathematics, University of Mus Alparslan, Mus, Turkey

mustafayeneroglu@gmail.com, talatkorpınar@gmail.com, vasil@firat.edu.tr,
s.bas@alparslan.edu.tr

Abstract

In this article, we study the vectorial moments based on dual curve which defined by the ribbon frame on the ribbon curves in E^3 . We obtain the ribbon apparatus of dual curves.

Keywords: Vectorial moments, ribbon curves, ribbon frame,

REFERENCES

1. Y. Tunçer, Vectorial moments of curves in Euclidean 3-space, International Journal of Geometric Methods in Modern Physics, Vol:14, No:2, 2017.
2. J. Bohr and S. Markvorsen, Ribbon Crystals, Plos one, Vol:8, No:10, 2013.
3. L. Gioni, L. Mahadevan, Statistical mechanics of developable ribbons, Phys. Rev. Lett., 104, 2010).
4. H. H. Hacısalihoğlu, Hareket Geometrisi ve Kuarterniyonlar Teorisi, Gazi Üniversitesi Yayını, 1983.
5. M.P. Carmo, Differential Geometry of Curves and Surfaces, Pearson Edu., 1976.

NEW FOCAL CURVE ACCORDING TO THE MODIFIED ORTHOGONAL FRAME

Mustafa Yeneroglu¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

mustafayeneroglu@gmail.com,

Abstract

In this article, we study new focal curve according to the modified orthogonal frame in Euclidean 3-space E^3 . We obtain some new characterizations for focal curvatures of this curve.

Keywords: Focal curve, focal curvature, modified orthogonal frame

REFERENCES

1. Bahaddin Bukcu and Murat Kemal Karacan, On the modified orthogonal frame with curvature and torsion 3-space, Mathematical Sciences and Applications E-Notes, Vol:4, No:1, 184-188, 2016.
2. P. Alegre , K. Arslan, A. Carriazo , C. Murathan and G. Öztürk, Some Special Types of Developable Ruled Surface, Hacettepe Journal of Mathematics and Statistics, Vol:39, No:3, 319-325, 2010.
3. R. Uribe-Vargas, On vertices, focal curvatures and differential geometry of space curves, Bull. Brazilian Math. Soc. Vol:36, No:3, 285-307, 2005.
4. M. Yeneroglu, New focal curves according to ribbon frame, Prespacetime Journal, Vol:7, No:5, 500-5003, 2016.

REPRESENTATION OF THE MATRIX FOR CONVERSION BETWEEN TRIANGULAR BEZIER PATCHES AND RECTANGULAR BEZIER PATCHES

Pembe Sabancıgil, Mustafa Kara¹

¹ Department of Mathematics, Eastern Mediterranean University, T.R.N.C.

pembe.sabancigil@emu.edu.tr, mustafa.kara@emu.edu.tr

Abstract

In this paper we studied Bezier surfaces that are very famous techniques and widely used in Computer Aided Geometric Design. Mainly there are two types of Bezier surfaces which are rectangular and triangular Bezier patches. They have different geometric properties so it is not easy to use both of them in the same CAD. Here we will give a different representation for the conversion matrix which converts one type to another.

Keywords: Bèzier curves; Bèzier rectangles; Bèzier triangles; Degree reduction; Degree elevation.

REFERENCES

1. Shi-Min Hu, Conversion between triangular and rectangular Bèzier patches, Computer Aided Geometric Design, 18 (2001) 667-671.

On Rough Convergence Variables of Triple Sequences

M. Kemal Ozdemir¹, Ayhan Esi², Ayten Esi²

¹ Department of Mathematics, Inonu University, Malatya, Turkey

² Department of Mathematics, Adiyaman University, Adiyaman, Turkey

kozdemir73@gmail.com, aesi23@hotmail.com, aytenesi@yahoo.com

Abstract

Triple sequence convergence plays an extremely important role in the fundamental theory of mathematics. This paper contains four types of convergence concept of convergence almost surely, convergence incredibility, trust convergence in mean and convergence in distribution and discuss the relationship among them and some mathematical properties of those new convergence.

Keywords: Triple sequences, Rough convergence almost surely, Convergence in credibility, Trust convergence, Convergence distribution.

REFERENCES

1. Aytar S., Rough statistical convergence, Numer. Funct. Anal. Optim. 29(3-4) (2008), 291--303.
2. Aytar S., The rough limit set and the core of a real sequence, Numer. Funct. Anal. Optim. 29(3-4) (2008), 283--290.
3. Esi A., On some triple almost lacunary sequence spaces defined by Orlicz functions, Research and Reviews: Discrete Mathematical Structures 1(2) (2014), 16--25.
4. Datta A. J., Esi A. and Tripathy B. C., Statistically convergent triple sequence spaces defined by Orlicz function, J. Math. Anal. 4(2) (2013), 16--22.
5. Dundar E. and Cakan C., Rough I-convergence, Demonstr. Math., 47(3) (2014), 638--651.
6. Phu H. X., Rough convergence in normed linear spaces, Numer. Funct. Anal. Optim. 22(1-2) (2001), 199--222.
7. Sahiner A., Gurdal M. and Duden F. K., Triple sequences and their statistical convergence, Selcuk J. Appl. Math. 8(2) (2007), 49--55.

Bernstein Operator of Rough I- core of Triple Sequences

M. Kemal Ozdemir¹, Ayhan Esi², Ayten Esi²

¹ Department of Mathematics, Inonu University, Malatya, Turkey

² Department of Mathematics, Adiyaman University, Adiyaman, Turkey

kozdemir73@gmail.com, aesi23@hotmail.com, aytenesi@yahoo.com

Abstract

We introduce and study some basic properties of Bernstein polynomials of rough I-convergent of triple sequence spaces and also study the set of all Bernstein polynomials of rough I-limits of a triple sequence spaces and relation between analytic ness and Bernstein polynomials of rough I-core of a triple sequence spaces.

Keywords: Ideal, Triple sequences, Rough convergence, Closed and convex, Cluster points and rough limit points, Bernstein operator.

REFERENCES

1. S. Aytar, Rough statistical convergence, Numer. Funct. Anal. Optim. 29(3-4) (2008), 291 - 303.
2. S. Aytar, The rough limit set and the core of a real sequence, Numer. Funct. Anal. Optim. 29(3-4) (2008), 283 - 290.
3. A. Esi, On some triple almost lacunary sequence spaces defined by Orlicz functions, Research and Reviews: Discrete Mathematical Structures 1(2) (2014), 16 - 25.
4. A. Esi, S. Araci and M. Acikgoz, Statistical convergence of Bernstein operators, Appl. Math. Inf. Sci. 10(6) (2016), 2083 - 2086.
5. E. Dundar and C. Cakan, Rough I-convergence, Demonstr. Math., 47(3) (2014), 638 - 651.
6. H. X. Phu, Rough convergence in normed linear spaces, Numer. Funct. Anal. Optim. 22(1-2) (2001), 199 - 222.
7. A. Sahiner and B. C. Tripathy, Some I related properties of triple sequences, Selcuk J. Appl. Math. 9(2) (2008), 9 - 18.

THE STABILIZED FEM SOLUTION OF THE MHD FLOW IN A RECTANGULAR DUCT WITH PERTURBED BOUNDARY

Münevver Tezer-Sezgin¹ Selçuk Han Aydın²

¹Department of Mathematics, Middle East Technical University, Ankara, Turkey

munt@metu.edu.tr,

²Department of Mathematics, Karadeniz Technical University, Trabzon, Turkey

shaydin@ktu.edu.tr,

Abstract

In this study, we investigate the effects of small boundary perturbation on the magnetohydrodynamic (MHD) duct flow when the Hartmann walls of which the upper one is perturbed, are perfectly conducting and the side walls are insulated. The numerical results are obtained by solving the MHD flow equations with the stabilized finite element method (FEM) for Hartmann number values $Ha \leq 50$ and for perturbation parameter $\varepsilon = 0.1, 0.2, 0.3$. The velocity and the induced magnetic field behaviors with respect to the perturbed upper wall are simulated in terms of equivelocity and current lines, and also in terms of velocity and induced magnetic field level curves.

It is deduced that, the flow and the induced current contain the influence of the boundary perturbation which is significant near the perturbed boundary (upper wall), and also it is present to some extent in the whole duct. As the perturbation parameter is increased, the flow tends to move through the perturbed boundary and the induced current increases taking its maximum value in a region around the maximum point of the perturbed curve. Further increase in Ha retards the effect of the boundary perturbation leaving its place to flattened flow with side layers and stagnant fluid at the central part of the duct. The stabilized FEM captures all the influences of the perturbed boundary on the MHD rectangular duct flow.

Keywords: *MHD duct flow, Boundary perturbation*

REFERENCES

1. Ulavathi Shettar Mahabaleshwar, Igor Pažanin, Marko Radulović, and Francisco Javier Su´arez-Grau, Effects of Small Boundary Perturbation on the MHD Duct Flow, Theoretical and Applied Mechanics, Vol:44, No:1, 83-101, 2017.

Positive Solutions of a Singular Integro-differential Boundary Value Problem in Perspective of Caputo-Fabrizio Fractional Derivative

Naseer Ahmad Asif¹

¹ Department of Mathematics, University of Management and Technology, Lahore, Pakistan

naseerasif@yahoo.com

Abstract

We formulate Green's function and present sufficient conditions for existence of positive solutions for a fractional order integro-differential boundary value problem containing some nonlinear singular terms. Moreover, fractional derivative in integro-differential equation is of Caputo-Fabrizio type. We use results from functional analysis and fixed point theory to establish existence of positive solution.

Keywords: Caputo-Fabrizio derivative; Fractional calculus; Integro-differential equations; Positive solutions; Singular boundary value problems.

REFERENCES

1. K. Balachandran, J.J. Trujilla, Nonlocal Cauchy problem for nonlinear fractional integro-differential equations in Banach spaces, *Nonlinear Analysis* 72 (2010) 4587-4593.
2. Y.K. Chang, V. Kavitha, M. Mallika Arjunnan, Existence and uniqueness of mild solutions to semilinear integro-differential equation of fractional order", *Nonlinear Analysis; Theory, Methods and Applications*, 71 (2009) 5551-5559.
3. V. Kavitha, M. Mallika Arjunnan, Controllability of impulsive quasil-linear fractional mixed volterra-fredholm-type integro-differential equations in Banach spaces, *The Journal Nonlinear of Sciences and Applications* 4 (2011) 152-169.

Asimptotic behavior of solutions of higher order “Emden-Fouler’s” type Equations

Natia Khachidze¹

Department of Mathematics, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia

natia.khachidze988@ens.tsu.edu.ge,

Abstract

This report deals with the study of oscillatory properties of solutions of nonlinear higher order difference equation with delayed argument. There are established sufficient conditions for the difference equation to have properties A or B.

Keywords: Solution, Oscillation, Property A, Property B.

REFERENCES

1. Natia Khachidze, Higher Order Difference Equation with Properties A and B, Seminar of Ilia Vekua Institute of applied Mathematics, Vol. 42 (2016), 34-38.

ON THE SOLUTIONS OF FRACTIONAL CAUCHY PROBLEM FEATURING CONFORMABLE DERIVATIVE

Mehmet Yavuz¹ and Necati Özdemir²

¹Department of Mathematics-Computer Sciences, Necmettin Erbakan University, Konya,
Turkey

mehmetyavuz@konya.edu.tr,

²Department of Mathematics, Balikesir University, Balikesir, Turkey

nozdemir@balikesir.edu.tr,

Abstract

In this research, we have obtained analytical solutions of fractional Cauchy problem by using q-Homotopy Analysis Method (q-HAM) featuring conformable fractional derivative. We have considered different situations according to the homogeneity and linearity of the fractional Cauchy differential equation. A detailed analysis of the results obtained in the study has been reported. According to the results, we have found out that our obtained solutions converge very speedily to the exact solutions.

Keywords: q-homotopy analysis method; Fractional Cauchy problem, Conformable derivative.

REFERENCES

1. El-Tawil, M.A., Huseen, S.N., The q-homotopy analysis method (q-HAM), International Journal of Applied Mathematics and Mechanics, Vol:8, No:15, 51-75, 2012.
2. Iyiola, O.S., Ojo, G.O., On the analytical solution of Fornberg–Whitham equation with the new fractional derivative, Pramana, Vol:85, No:4, 567-575, 2015.
3. Baleanu, D., Agheli, B., Al Qurashi, M.M., Fractional advection differential equation within Caputo and Caputo–Fabrizio derivatives, Advances in Mechanical Engineering, Vol:8, No:12, 1-8, 2016.

POLYGONS FOR HEARING-IMPAIRED STUDENTS

Nejla Gürefe¹

¹ Department of Mathematics Education, University of Usak, Usak, Turkey

nejlacialik@gmail.com

Abstract

To detect what students think about mathematical concepts, how information they have, and what misconceptions are, is crucial to organize the learning environments as desired. Indeed, these students have been proven to have serious problems in learning mathematics which is an abstract course. This study also aims to reveal the knowledge that hearing-impaired students have about polygons and their properties which are edge, angle, corner, rotation, modal features, regions separated in the plane, and combination of different geometric shapes. It was determined that the students said that geometric objects such as cone, cylinder, cube and circles, angles which are non-polygonal are polygons. Also, it was detected that the students used some mathematical concepts with meanings in daily speech language while explaining these features. The students stated that triangle, rectangle, and square converted into a different polygon when they were rotated. In the light of findings, it is suggested that teachers should pay attention to the words and explanations they use in expressing mathematical concepts in the classroom environment and to show shapes and representations in different positions.

Keywords: polygons, non-polygons, hearing-impaired students.

REFERENCES

1. Kelly, R. R., Mousley, K., Solving word problems: more than reading issues for deaf students, *American Annals of the Deaf*, 146(3), 251-262, 2001.
2. Mousley, K., Kelly, R. R., Problem-solving strategies for teaching mathematics to deaf students. *American Annals of the Deaf*, 143(4), 325-336, 1998.
3. Nunes, T., Moreno, C., An intervention programme for promoting deaf pupils' achievement in mathematics. *Journal of Deaf Studies and Deaf Education*, 7(2), 120-133, 2002.

REGARDING THE NUMERICAL AND STABILITY ANALYSIS OF THE SHARMA-TOSSO-OLVER EQUATION

Tukur Abdulkadir Sulaiman¹, Asif Yokus¹, Nesrin Gulluoglu², Haci Mehmet Baskonus³

¹Firat University, Department of Mathematics, Elazig, Turkey,

²Harran University, Sanliurfa Technical Sciences Vocational School, Sanliurfa, Turkey,

³Munzur University, Department of Computer Engineering, Tunceli, Turkey
sulaiman.tukur@fud.edu.ng, asfyokus@yahoo.com, ngulluoglu@harran.edu.tr,
hmbaskonus@gmail.com

Abstract

With aid of the Wolfram Mathematica package, this study investigates the solutions of a nonlinear model with strong nonlinearity, namely; the Sharma-Tosso-Olver equation. We use the improved Bernoulli sub-equation function method in acquiring the analytical solution to this equation, we successfully obtain one-singular soliton solution with exponential function structure. Through the obtained analytical solution, the finite forward difference method is used in approximating the exact and numerical solutions to this equation. We check the stability of the finite forward difference method with this equation using the Fourier-Von Neumann stability analysis. We find the L_2 and L_∞ norm error to the numerical approximation. We present the interesting 3D and 2D figures of the obtained singular soliton solution. We also plot the graphics of the numerical error, exact and numerical approximations data obtained in this study by using the MATLAB package.

Keywords: Sharma-Tosso-Olver equation. Improved Bernoulli sub-equation function method, Finite forward difference method.

REFERENCES

- [1] X. Li, The Improved Riccati Equation Method and Exact Solutions to mZK Equation, International Journal of Differential Equations, 2012 (2012), 596762.
- [2] E.M.E. Zayed and K.A.E. Alurrf, The Homogeneous Balance Method and its Applications for Finding the Exact Solutions for Nonlinear Evolution Equations, Italian Journal of Pure and Applied Mathematics, 33 (2014), 307-318.
- [3] M. Wang, Y. Zhou and X. Li, Application of a Homogeneous Balance Method to Exact Solutions of Nonlinear Equations in Mathematical Physics, Physics Letters A, 216 (1996), 67-75.

Inverse problem for a Class of Dirac Operators with eigenvalue linearly dependent to boundary condition

Nilüfer TOPSAKAL¹ and Rauf AMIROV²

^{1,2} Cumhuriyet University Faculty of Sciences Department of Mathematics Sivas-TURKEY

¹ ntopsakal@cumhuriyet.edu.tr, ² emirov@cumhuriyet.edu.tr

ABSTRACT

We consider the boundary value problem L for the equation:

$$\ell[y(x)] := A(\sigma y)'(x) + C(x)y(x) = \lambda y(x), \quad x \in I = (0, \pi) \quad (1)$$

with the boundary conditions

$$\begin{aligned} (\sigma y_1)(0) \sin \alpha + (\sigma y_2)(0) \cos \alpha &= 0, \\ (a_1 \lambda + a_2)(\sigma y_1)(\pi) + (b_1 \lambda + b_2)(\sigma y_2)(\pi) &= 0 \end{aligned}$$

where $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$, $C(x) = \begin{pmatrix} p(x) & q(x) \\ q(x) & r(x) \end{pmatrix}$, $y(x) = \begin{pmatrix} y_1(x) \\ y_2(x) \end{pmatrix}$, $p(x), q(x), r(x), \sigma(x), \frac{1}{\sigma(x)}$, real

valued bounded function in $\sigma(x) > 0$, $\gamma(x) = \int_0^x \frac{dt}{\sigma(t)}$, $\alpha \in [0, \pi)$, a_1, a_2, b_1, b_2 are real numbers.

If $\sigma(x) \equiv 1$ the function $y(x) = \begin{pmatrix} y_1(x) \\ y_2(x) \end{pmatrix}$ is differentiable and also $\ell[y(x)] \in L_2(0, \pi)$.

However when $\sigma(x) \neq 1$, the function $(\sigma y)(x)$ must be differentiable and $\ell[y(x)] \in L_2(0, \pi)$. It is clear that in that case the function $y(x)$ may or may not be differentiable function. However the function $(\sigma y)(x)$ has to be differentiable. Therefore, in this study the solution set of given system consists of more general functions, which is different from the classic case. Hence, this problem has importance mathematical and also application sense.

In this study, we consider operator (1) in a finite interval. Properties of spectrum are investigated in the second part. The Prüfer's angle, the Weyl function for considering operator have been defined in the third part. In the fourth part, the inverse problem of the reconstruction of a boundary value problem L from the Prüfer's angle, the Weyl function and two different eigenvalues sequences are investigated. Then the uniqueness theorem of inverse problem according to these functions and two different eigenvalues sets has been proved.

Key words: Inverse problem; Dirac operator, Prüfer's angle

Acknowledgement : This work is supported by the Scientific Research Project Fund of Cumhuriyet University under the project number F-545.

References

1- N. Topsakal, Inverse Problem for Dirac Differential Operators with Eigenvalue Linearly Dependent to Condition, *Journal of Advanced Research in Applied Math.*, 4 no.4, 12-25 (2012).

Inverse problem for singular Sturm-Liouville operator which has discontinuous coefficient

Nilüfer TOPSAKAL¹ and Rauf AMİROV²

^{1,2} Cumhuriyet University Faculty of Sciences Department of Mathematics SİVAS

¹ ntopsakal@cumhuriyet.edu.tr, ² emirov@cumhuriyet.edu.tr

ABSTRACT

We consider the boundary value problem L for the equation:

$$ly := -y'' + \left[\frac{A}{x} + q(x) \right] y = \lambda \rho(x) y, \quad \lambda = k^2, \quad x \in I = (0, d) \cup (d, \pi)$$

with the boundary conditions

$$U(y): y(0) = 0, V(y): y(\pi) = 0$$

and with the jump conditions

$$\rho(x) = \begin{cases} 1, & 0 \leq x < d \\ \alpha^2, & d < x \leq \pi \end{cases}$$

where λ is spectral parameter; $A, \alpha \in \mathbb{R}, \alpha \neq 1, \alpha > 0$, $d \in \left(\frac{\pi}{2}, \pi \right)$, $q(x)$ -is a real valued bounded function and $q(x) \in L_2(0, \pi)$.

Boundary value problems with discontinuous coefficient often appear in applied mathematics, geophysics, mechanics, electromagnetics, elasticity and other branches of engineering and physics. The inverse problem of reconstructing the material properties of a medium from data collected outside of the medium is of central importance in disciplines ranging from engineering to the geosciences. [1-3]

In this study, uniqueness theorem for solution of inverse problem according to GLM type main integral equation has been proved.

References:

- [1] R. Kh. Amirov and N. Topsakal, On Sturm-Liouville operators with Coulomb potential which have discontinuity conditions inside an interval, *Integral Transforms Spec. Funct.* 19(12) (2008), 923-937.
- [2] N : A. Nabiev Adiloğlu and R. Kh. Amirov, On the boundary value problem for the Sturm-Liouville equation with the discontinuous coefficients, *Mathematical methods in the Applied Sciences*, 36, (2013), 1685- 1700.
- [3] A.M. Savchuk and A.A. Shkalikov, Sturm-Liouville operator with singular potentials, *Mathematical Notes*, 66(6), (1999), 741-753.

Key words: Inverse problem; Coulomb singularity; GLM type main integral equation.

AMS (2000) classif: 34A55, 34B24, 34L05

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Active Power Filter Based on PQ Current Detection For Compensation of Harmonics

N.DAOU¹ **H.FASSI FIHRI**² **N.ABABSSI**³

^{1,2,3} Laboratory of Mecanical Engineering Industrial Management and Innovation, University Hassan the first Faculty of Sciences and Technology BP : 577, Route de Casa -, Settat, Morocco
E-mail: daounora@gmail.com

Abstract

These last years, the spectacular progress and the increasing use of the semiconductor components in the electric systems conduct to the appearance of the problems connected to the harmonious disturbances. These problems can affect branches of industry (speed variators, electronic starters etc.) either tertiary (computing, lighting of desks, trades) or domesticate (household electrical appliances such as television sets). The harmonious currents are mainly generated by the non-linear loads(responsibilities) connected to the electricity network, this type of loads(responsibilities) absorb non-sinusoidal currents when the voltage is sinusoidal. These harmonious of current are going to generate in their turn harmonious tensions in the various points of connection to the network. For other electric equipments connected in these points, this harmonious pollution has unwanted effects. Among these effects, we can distinguish the deformation of the tension of the network in the connecting point, This pollution can also cause the heating(warm-up) of cables and electric equipments either still sudden stop of the rotating machines, or destruction of all these equipments. To minimize these disturbances we propose an active filter of power which allows to eliminate the harmonious and reduces the total of harmonious distortion (THD).

Keywords: Active Filter of Power APF; The Total of Harmonious Distortion THD, Harmonic Current HC

REFERENCES

- [1] H.J. Gu, and H.C. Gyu, "New active power filter with simple low cost structure without tuned filters", 29th Annual IEEE Power Electronics Specialists Conference, Vol.1, pp 217-222, 1998
- [2] F. Hideaki, Y. Takahiro, and A. Hirofumi , "A hybrid Active Filter for Damping of Harmonic Resonance in Industrial Power System", 29th Annual IEEE Power Electronics Specialists Conférence, pp209- 216 1998.
- [3] C. Collombet, J. Lupin, J. Schonek, (1999), Harmonic disturbances in networks, and their treatment, Schneider Electric's "Collection Technique", Cahier technique no.152.

A Fresh Look To Exact Solutions of Some Coupled Equations

Berat Karaagac¹, Nuri M. Yagmurlu², Alaattin Esen², Selcuk Kutluay²

¹ Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

² Department of Mathematics, University of Inonu, Malatya, Turkey

bkaraagac@adiyaman.edu.tr

Abstract

This manuscript is going to seek travelling wave solutions of some coupled partial differential equations with an expansion method known as Sine-Gordon expansion method. Primarily, we are going to employ a wave transformation to partial differential equation to reduce the equations into ordinary differential equations. Then, the solution form of the handled equations is constructed as polynomial of hyperbolic trig or trig functions. Finally, with the aid of symbolic computation, new exact solutions of the partial differentials equations will have been found.

Keywords: Sine-Gordon expansion method, variant Boussinesq equation; coupled Klein Gordon equation., exact solutions

REFERENCES

1. Gulnur Yel, Haci Mehmet Baskonus, Hasan Bulut, Novel archetypes of new coupled Konno–Oono equation by using sine–Gordon expansion method, Opt Quant Electron, 49:285,2017
2. D. Kumar, K. Hosseini, F. Samadani, The sine-Gordon expansion method to look for the traveling wave solutions of the Tzitzéica type equations in nonlinear optics, Optik 149, 439–446, 2017
3. Kamruzzaman Khan, M Ali Akbar, Study of analytical method to seek for exact solutions of variant Boussinesq equations, SpringerPlus, 3:324,2014
4. Kamruzzaman Khan, M Ali Akbar and S M Rayhanul Islam, Exact solutions for (1 + 1)-dimensional nonlinear dispersive modified Benjamin-Bona-Mahony equation and coupled Klein-Gordon equations, SpringerPlus, 3:724, 2014

A New Approach To Exact Solutions of Some Partial Differential Equations Based on Sine-Gordon Expansion Method

Berat Karaagac¹, Nuri M. Yagmurlu², Alaattin Esen², Selcuk Kutluay²

¹ Department of Mathematics Education, University of Adıyaman, Adıyaman, Turkey

² Department of Mathematics, University of Inonu, Malatya, Turkey

bkaraagac@adiyaman.edu.tr

Abstract

This manuscript is going to focus on to obtain exact solutions of (2+1) dimensional Dispersive Long Wave equation and (2+1)-dimensional Painlevé integrable Burgers (PIB) equation via sine-Gordon expansion method (SGEM). Firstly, the partial differential equations are converted into ordinary differential equations using the travelling wave transformation. Then, with the aid of symbolic computation, their hyperbolic function solutions are constructed. The newly obtained results show that the SGEM is a powerful and effective method in seeking exact solutions of nonlinear differential equations.

Keywords: Dispersive Long Wave equation; Painlevé integrable Burgers equation; sine-Gordon expansion method; exact solution.

REFERENCES

1. Gülnur Yel, Hacı Mehmet Baskonus, Hasan Bulut, Novel archetypes of new coupled Konno–Oono equation by using sine–Gordon expansion method, Opt Quant Electron 49:285, 2017.
2. D. Kumar, K. Hosseini, F. Samadani, The sine-Gordon expansion method to look for the traveling wave solutions of the Tzitzéica type equations in nonlinear optics, Optik 149 439–446, 2017
3. Emmanuel Yomba, The Extended Fan Sub-Equation Method and its Application to the
4. (2+1)-Dimensional Dispersive Long Wave and Whitham-Broer-Kaup Equations, Chinese Journal of Physics, 43:4, 2005.
5. Kamruzzaman Khan, M. AliAkbar, Ahmed H. Arnous, Exact traveling wave solutions for system of nonlinear evolution equations, SpringerPlus, 5:663, 2016

VEHICLE ROUTING PROBLEM APPLICATIONS IN FOOD INDUSTRY

Olcay Polat¹, Hande Mutlu Öztürk², Seda Gökçe Cömert¹

¹ Department of Industrial Engineering, Pamukkale University, Denizli, Turkey

² Gastronomy and Culinary Arts Department, Pamukkale University, Denizli, Turkey

opolat@pau.edu.tr

Abstract

Optimization of logistic management system is also vital for quality in food industry including collection and distribution of raw milk, fresh vegetables, fruits, catering meals, beverages, meat, fish and dairy products etc. Efficient logistics systems should therefore provide not only fresh and safe food products, but also it should be delivered on the time. Delivery time is the one of the most important concern for customers along with price and taste of the meal. The food industry companies needs to find the best route plan to deliver the foods within predetermined time limits. The distance from the food production center to serving areas will affect transportation time. It is very important to plan optimum delivery routes to minimize the cost and to keep the temperature of meals within the acceptable level. It is very important that the food companies set up their distribution networks in the most optimal way. Route optimization is one of the leading problems targeting the vehicle routing problem. In this study, a literature review of vehicle routing problem applications is examined from the recent published literature and a new case study from food industry is solved with variable neighborhood search metaheuristic.

This research is funded by the Scientific and Technological Research Council of Turkey (TUBITAK) with the grant number 217M578.

Keywords: Vehicle routing problem; Food industry; Logistics, Optimization.

REFERENCES

1. Paredes-Belmar, G., Lüer-Villagra, A., Marianov, V., Cortés, C. E., & Bronfman, A. (2017). The milk collection problem with blending and collection points. *Computers and Electronics in Agriculture*, 134, 109-123.
2. Hwang, H. S. A food distribution model for famine relief. *Computers & Industrial Engineering*, 37(1), 335-338, 1999.
3. Kahraman C, Cebeci U, Ruan D. Multi-attribute comparison of catering service companies using fuzzy AHP: The case of Turkey. *Int. J. Production Economics*, 87: 171–184, 2004.
4. Osvald, A., & Stirn, L. Z. A vehicle routing algorithm for the distribution of fresh vegetables and similar perishable food. *Journal of food engineering*, 85(2), 285-295, 2008.

REPRODUCING KERNEL METHOD FOR TIME FRACTIONAL ALLEN-CAHN EQUATION

Onur Saldır, Mehmet Gıyas Sakar, Fevzi Erdoğan

Department of Mathematics, Faculty of Science, Van Yuzuncu Yil University, Van, Turkey

onursaldir@gmail.com, giyassakar@hotmail.com, ferdogan@yyu.edu.tr

Abstract

In this study, we present an iterative reproducing kernel method for numerical solution of Allen-Cahn equation with time fractional Caputo derivative. Convergence analysis is constructed theoretically. Numerical experiments show that approximate solution uniformly converges to exact solution. The results show that the given method very efficient and convenient for time fractional Allen-Cahn equation.

Keywords: Iterative reproducing kernel method; Allen-Cahn equation; Caputo derivative.

REFERENCES

1. Mahmoud S. Rawashdeh, A reliable method for the space-time fractional Burgers and time fractional Cahn-Allen equations via the FRDTM, *Advances in Difference Equations*, Vol:99, 1–14, 2017.
2. Mehmet Gıyas Sakar, Iterative reproducing kernel Hilbert space method for Riccati differential equations, *Journal of Computational and Applied Mathematics*, 309, 163-174, 2017.
3. Alaattin Esen, Orkun Tasbozan, Numerical solution of time fractional Burgers equation. *Acta Univ. Sapientiae, Mathematica*, 7 (2), 167-185, 2015.
4. M. Cui, Y. Lin, *Nonlinear Numerical Analysis in the Reproducing Kernel Space*, Nova Science, NewYork, USA, 2009.

On the new wave behavior to the longitudinal wave equation in a magneto-electro-elastic circular rod

Onur Alp Ilhan¹, Hasan Bulut^{2,3}, Tukur Abdulkadir Sulaiman^{2,4} and Hacı Mehmet Baskonus⁵

¹Department of Mathematics, Erciyes University, Kayseri, Turkey

²Department of Mathematics, Firat University, Elazig, Turkey

³Department of Mathematics Education, Final International University, Kyrenia, Cyprus

⁴Department of Mathematics, Federal University Dutse, Jigawa, Nigeria

⁵Department of Computer Engineering, Munzur University, Tunceli, Turkey

oilhan@erciyes.edu.tr, hbulut@firat.edu.tr, sulaiman.tukur@fud.edu.ng,
hmbaskonus@gmail.com

Abstract

With the aid of the symbolic computations software; Wolfram Mathematica 9, the powerful sine-Gordon expansion method is used in examining the analytical solution of the longitudinal wave equation in a magneto-electro-elastic circular rod. Sine-Gordon expansion method is based on the well-known sine-Gordon equation and a wave transformation. The longitudinal wave equation is an equation that arises in mathematical physics with dispersion caused by the transverse Poisson's effect in a magneto-electro-elastic circular rod. We successfully get some solutions with the complex, trigonometric and hyperbolic function structure. We present the numerical simulations of all the obtained solutions by choosing appropriate values of the parameters. We give the physical meanings of some of the obtained analytical solutions which significantly explain some practical physical problems.

Keywords: The SGEM; longitudinal wave equation in a MEE circular rod; complex; hyperbolic; trigonometric function solutions.

REFERENCES

1. Z. Yan and H. Zhang, New Explicit and exact Travelling Wave Solutions for a System of Variant Boussinesq equations in Mathematical Physics, Physics Letters A, Vol:252, 291-296 1999
2. H.M. Baskonus, H. Bulut and A. Atangana, On the Complex and Hyperbolic Structures of Longitudinal Wave Equation in a Magneto-Electro-Elastic Circular Rod, Smart Materials and Structures, Vol:25, No:3, 035022 2016
3. H. Bulut, T.A. Sulaiman and H.M. Baskonus, New Solitary and Optical Wave Structures to the Korteweg-de Vries Equation with Dual-Power Law Nonlinearity, Opt Quant Electron, Vol:48, 564 2016

On a mixed problem for semilinear wave equations with nonlinear boundary conditions

Jokhadze O^{1,2}., Kharibegashvili S^{1,3}.

¹A. Razmadze Mathematical Institute, ²I. Javakhishvili Tbilisi State University, ³Georgian Technical University,

Tbilisi, Georgia

ojokhadze@yahoo.com; kharibegashvili@yahoo.com

Abstract

In the plane of independent variables x and t , in the domain $D_T : 0 < x < l, 0 < t < T$, consider a nonlinear mixed problem of finding a solution $u(x, t)$ for semilinear wave equation of the form

$$u_{tt} - u_{xx} + g(u) = f(x, t), \quad (x, t) \in D_T, \quad (1)$$

satisfying the following initial

$$u(x, 0) = \varphi(x), \quad u_t(x, 0) = \psi(x), \quad 0 \leq x \leq l, \quad (2)$$

and boundary value conditions

$$u_x(0, t) = F[u_t(0, t)], \quad u(l, t) = 0, \quad 0 \leq t \leq T, \quad (3)$$

where f, φ, ψ, g and F are given, while u is unknown real functions. Let the following conditions of smoothness

$$f \in C^1(\overline{D_T}), \quad g, F \in C^1(R), \quad \varphi \in C^2([0, l]), \quad \psi \in C^1([0, l]) \quad (4)$$

be fulfilled. We assume that at points $(0, 0)$ and $(l, 0)$ the following conditions of agreement

$$\begin{aligned} \varphi'(0) &= F[\psi(0)], \quad \psi'(0) = F'[\psi(0)][\varphi''(0) - g(0) + f(0, 0)], \\ \varphi(0) &= \varphi(l) = \psi(l) = 0, \quad g(0) - \varphi''(l) = f(l, 0), \end{aligned} \quad (5)$$

are also fulfilled. Let

$$\int_0^s g(s_1) ds_1 \geq -M_1 s^2 - M_2, \quad sF(s) \geq -M_3, \quad F'(s) \neq -1, \quad \forall s \in R, \quad (6)$$

Where $M_i := \text{const} \geq 0, 1 \leq i \leq 3$.

There are proved, if the conditions (4)-(6) are fulfilled, than the problem (1)-(3) has a unique classical solution.

Keywords: Semilinear wave equation, mixed problem, apriori estimate.

REFERENCES

1. A.N. Tikhonov, A. A. Samarski Equations of Mathematical Physics, 2011.

New Aspects of Fractional Optimal Control Problems with Applications

Ozlem Defterli¹

¹ Department of Mathematics, Çankaya University, Ankara, Turkey

defterli@cankaya.edu.tr

Abstract

In this talk, new trends in the formulation of fractional optimal control problems will be discussed under the consideration of some newly defined fractional derivatives with nonsingular kernel. The necessary optimality conditions will be presented both in the cases of fractional derivatives with singular kernel and nonsingular kernel. Some one dimensional and multi dimensional illustrative examples will be shown with their numerical solutions via appropriate explicit numerical schemes within a comparative study. Further improvements will be discussed for the performance of the numerical schemes.

Keywords: Fractional Calculus; Fractional Optimal Control; Numerical Analysis.

REFERENCES

1. Anatoly A. Kilbas, Hari M. Srivastava, Juan J. Trujillo, Theory and Applications of Fractional Differential Equations, Vol:204, Elsevier, Amsterdam, The Netherlands, 2006.
2. Ozlem Defterli, Computers and Mathematics with Applications, Vol:59, No:5, 1630-1636, 2010.
3. Dumitru Baleanu, Ozlem Defterli, Om P. Agrawal, Journal of Vibration and Control, Vol: 15, No: 4, 583-597, 2009.
4. Om P. Agrawal, Ozlem Defterli, Dumitru Baleanu, Journal of Vibration and Control Vol:16, No:13, 1967-1976, 2010.
5. Dumitru Baleanu, Amin Jajarmi, Mojtaba Hajipour, Journal of Optimization Theory and Applications, Vol:175 No:3, 718-737, 2017.
6. Abdon Atangana, Dumitru Baleanu, Thermal Science, Vol: 20, No: 2, 763-769, 2016.
7. Michele Caputo, Mauro Fabrizio, Progress in Fractional Differentiation and Applications, Vol:1, 73-85, 2015.

UNITS IN INTEGRAL GROUP RING $\mathbb{Z}[S_3 \times C_3]$

Ömer Küsmüş

Department of Mathematics, Yuzuncu Yil University, Van, Turkey

kusmuso@gmail.com

Abstract

In this article, we obtain a split extension form of unit group in integral group of the direct group $S_3 \times C_3 = \langle a, b, x : a^3 = b^2 = x^3 = 1, bab^{-1}, ax = xa, bx = xb \rangle$. In this characterization, we extend some group homomorphisms to ideals of integral group rings $\mathbb{Z}[S_3 \times C_3]$ linearly and show that the torsion free normal complement of the unit group in $\mathbb{Z}S_3$ is a direct summand (as a \mathbb{Z} -module) of this extension. Notations mostly follow [8].

Keywords: Unit Group; Integral Group Ring; Group Ring; Direct Product.

REFERENCES

1. P. J. Allen, C. Hobby, A Note on The Unit Group of $\mathbb{Z}S_3$. Proc. Amer. Math. Soc., 99: 9-14, 1987.
2. T. Bilgin, Ö. Küsmüş, R. M. Low, A Characterization of the Unit Group in $\mathbb{Z}[T \times C_2]$, Bull. Korean Math. Soc., 53: 1105-1112, 2016.
3. R. A. Ferraz, R. Marcuz, Units of $\mathbb{Z}(C_p \times C_2)$ and $\mathbb{Z}(C_p \times C_2 \times C_2)$, Commun. Algebra, 44: 851-872, 2016.
4. E. Jespers, M. M. Parmenter, Bicyclic Units in $\mathbb{Z}S_3$. Bull. Soc. Math. Belg. Sér., 44(2): 141-146, 1992.
5. I.G. Kelebek, T. Bilgin, Characterization of $U_1(\mathbb{Z}[C_n \times K_4])$, Eur. J. Pure Appl. Math. 7, No. 4, pp 462-471, 2014.
6. O. Kusmus, On the Units of Integral Group Ring of $C_n \times C_6$, Algebra Discrete Math., 20:1, 142-151, 2015.
7. R. M. Low, On The Units of The Integral Group Ring $\mathbb{Z}[G \times C_p]$. J. Algebra Appl. 7(3)393-403, 2008.
8. C. P. Milies, S. K. Sehgal, An Introduction to Group Rings, Kluwer Academic Publishers, 2002.

High Order Iterative Methods for Matrix Inversion and Regularized Solution to the Fredholm Integral Equation of the First Kind with Noisy Data

S.C. Buranay¹ and O.C. Iyikal¹

¹ Department of Mathematics, Faculty of Arts and Sciences, Eastern Mediterranean University, Famagusta North Cyprus, Via Mersin 10 Turkey

suzan.buranay@emu.edu.tr,

ovgu.cidar@emu.edu.tr

Abstract

The motivation of the present work is to propose high order iterative methods with a recurrence formula for approximate matrix inversion and provide regularized solution of Fredholm integral equation of first kind with noisy data by an algorithm using the proposed methods. For constructing the methods, the matrix multiplications and additions in the calculation of matrix polynomials are reduced through factorizations and nested loops of which the iterations are defined using a recurrence formula. Therefore, the computational cost is lower than the hyperpower method of same orders. Analysis of convergence shows that these high order methods possess $p = 4k + 3$ orders of convergence where, $k \geq 1$ is integer requiring $\kappa = k + 4$ matrix multiplications per step. From the given family of methods of orders $p = 7, 11, 15, 19$ are applied to solve problems of Fredholm integral equation of first kind of which includes the harmonic continuation problem. Numerical analysis for the regularized solution of the considered problems are given. From the literature, iterative methods of same orders are used to solve the considered problems and numerical comparisons are shown through tables and figures.

Keywords: Approximate inverse, Perturbation error analysis, Fredholm integral equation of the first kind, Harmonic continuation problem

REFERENCES

1. J.M. Varah, On the Numerical Solution of Ill-Conditioned Linear Systems with Applications to Ill-Posed Problems, SIAM, Vol. **10**, No. 2 (1973), 257-267.
2. S.C. Buranay, D. Subasi, O.C. Iyikal, On the Two Classes of High Order Convergent Methods of Approximate Inverse Preconditioners for Solving Linear Systems, *Numerical Linear Algebra Appl.* **24** (6), 1-28, (2017).

HOME HEALTH CARE ROUTING SCHEDULING PROBLEM WITH WORKLOAD CONSTRAINTS

Özcan Mutlu¹, Zehra Durak¹ Hasan Akyer¹

¹ Department of Industrial Engineering, Pamukkale University, Turkey

E-mails: mutlu@pau.edu.tr, ztasci@pau.edu.tr, hakyer@pau.edu.tr,

Abstract

Home health care (HHC) is a wide range of health care services given by healthcare professionals such as doctors, nurses and therapists in the patient's home for their illness or injury. Due to the ageing population, high hospitalization cost and new developments in medical technologies, HHC is a rapidly growing service industry especially in developed countries. In order to increase the efficiency of the HHC, several decisions problems such as assigning the healthcare personals to the patients, finding daily or weekly visit schedules and travel routes must be addressed. These problems are called HHC routing and scheduling problems.

In this study, we consider HHC routing and scheduling problem with workload constraints. Healthcare professionals perform tasks that are both physically and mentally demanding. Therefore, work related illnesses are very common among homecare personals. In order to reduce work related illnesses, total workload should be distributed among healthcare professionals. We develop a mathematical model formulation that considers workload constraints when assigning workers to the patients. The aim of the model is to find the patient and personal assignments in order to maximize the number of patients visited daily without exceeding workload limit.

Keywords: Home health care, scheduling, routing, workload constraints.

REFERENCES

1. Lanzarone, E.,Matta, A., Sahin, E. "Operations Management Applied to Home Care Services: The Problem of Assigning Human Resources to Patients" IEEE Transactions on Systems, Man and Cybernetics, Part A: Systems and Humans, Vol: 42, No:6, 2012.
2. Fikar, C. and Hirsch, P. "Home health care routing and scheduling: A review", Computers & Operations Research, Vol: 77, 86-95, 2017.

A Multi Choice Conic Goal Programming Approach for the Optimization of Cuscrore Control Chart Parameters for the ARMA (1,1) Time Series Data

Özgür Cem IŞIK¹

¹ Department of Industrial Engineering, University of Dumlupinar, Kutahya, Turkey

ozgurcem.isik@dpu.edu.tr,

Abstract

Cumulative Score (CuScore) control charts, which are generalized version of the Shewhart, CUSUM and EWMA control charts, were developed to detect specific signals such as spike, step, bump and rump earlier. In this study, a Cuscrore control chart was designed for a particular signal type (bump) for the ARMA (1,1) time series data. The simulation code of this chart has been in SAS environment. Then, Design of Experiment (DOE) and Response Surface Methodology (RSM) were used to find the optimum values of CuScore control chart parameters by the objectives of maximizing the detection rate and minimizing the probability of false signal. By using DOE and Response Surface Methodology, two different non-linear regression equations were obtained for detection rate and false alarm. These regression models were considered as the objectives that conflicting each other. Then, Multi-Choice Conic Goal Programming (MCCGP) was used to minimize unwanted deviation variables of goals which contains conflicting objectives namely detection rate and false alarm. The results of the MCCGP provide parameter setting of Cuscrore Control Chart for IMA (1,1) Time Series. Then, MCCGP has been proposed by Ustun based on Conic Scalarizing Function alternatively. This alternative formulation allows the decision maker to set multi-choice aspiration levels for each goal to obtain an efficient solution in the global region and guarentees to obtain a properly efficient (in the sense of Benson) point.

Keywords: Cuscrore Control Chart; Design of Experiment; Response Surface Methodology; Multi-Choice Conic Goal Programming

REFERENCES

1. Nembhard H.B., Valverde-Ventura R., CuScore Statistics to Monitor a Non-stationary System, Quality and Reliability Engineering International, 23, 303-325, 2007.
2. Üstün Ö., Multi-Choice Goal Programming Formulation Based on the Conic Scalarizing Function, Applied Mathematical Modelling, 36, 974-988, 2012.

DETERMINING OPTIMAL ROUTING SOLUTION OF A PATROL CAR

Özlem Akarçay¹

Esra Yaşar²

¹ Department of Statistics, University of Selçuk, Konya, Turkey

²Department of Logistic Management, University of KTO Karatay, Konya, Turkey

ozlemm.akarçay7@gmail.com

esrayasaarr@gmail.com

Abstract

Chinese Postman Problem which is dealt with in the context of the arc routing problem is one of the routing problem in 1962 in order to get the shortest turn by passing at least once on every arc on the chart. It can be used in many stations such as determining vehicle routing, tours of police patrols and determining the routes of snow removal vehicles. In this study, after explaining the basic concepts related to Chinese Postman Problem, the analysis is done through the model to find the best route over the routes that police patrol cars in a certain area have to travel.

Keywords: *Chinese Postman Problem, Optimization, Routing Problem*

REFERENCES

1. Emel, G. G., Taşkın, Ç., & Dinç, E. (2003). Yönsüz Çinli Postacı Problemi: Polis Devriye Araçları İçin Bir Uygulama.
2. Chaste, G., Ooms, A., & Walravens, R. (2014). Chinese postman problem.
3. Stewart, W. R. (2013). Chinese postman problem. In Encyclopedia of operations research and management science(pp. 161-164). Springer, Boston, MA.

ON PROPERTIES OF RP_1 -SETS, RPC_1 -SETS AND RC_1 -SETS

Erdal Ekici¹ and Özlem Elmalı²

¹ Corresponding Author: Department of Mathematics, Canakkale Onsekiz Mart University, Terzioglu Campus, 17020, Canakkale, TURKEY

eekici@comu.edu.tr (prof.dr.erdalekici@gmail.com)

² Department of Accounting and Taxation, Ezine Vocational School, Canakkale Onsekiz Mart University, Ezine, Canakkale, TURKEY

Abstract

Ekici and Elmalı introduced and studied the notions of RP_1 -sets, RPC_1 -sets and RC_1 -sets for some decompositions via generalized closedness in ideal spaces [On decompositions via generalized closedness in ideal spaces, Filomat, 29 (4) (2015), 879-886]. Also, properties of RP_1 -sets, RPC_1 -sets and RC_1 -sets were introduced. The aim of this paper is to study additional properties of RP_1 -sets, RPC_1 -sets and RC_1 -sets.

Keywords: RP_1 -set, RPC_1 -set, RC_1 -set.

REFERENCES

1. J. Dontchev, M. Ganster and T. Noiri, Unified operation approach of generalized closed sets via topological ideals, Math. Japonica, 49 (1999), 395-401.
2. E. Ekici, On an openness which is placed between topology and Levine's openness, Jordan Journal of Mathematics and Statistics, 9 (4) (2016), 303-313.
3. E. Ekici and Ö. Elmalı, On decompositions via generalized closedness in ideal spaces, Filomat, 29 (4) (2015), 879-886.
4. E. Ekici and S. Özen, Rough closedness, rough continuity and I_g -closed sets, Annales Univ. Sci. Budapest. Eötvös Sect. Math., 55 (2012), 47-55.
5. E. Ekici, On pre-I-open sets, semi-I-open sets and b-I-open sets in ideal topological spaces, Acta Universitatis Apulensis, 30 (2012), 293-303.
6. E. Ekici, On AC_1 -sets, BC_1 -sets, β_1^* -open sets and decompositions of continuity in ideal topological spaces, Creative Mathematics and Informatics, 20 (2011), No. 1, 47-54.
7. E. Ekici, On R-I-open sets and A_7^* -sets in ideal topological spaces, Annals of the University of Craiova, Mathematics and Computer Science Series, 38 (2) (2011), 26-31.
8. E. Ekici and T. Noiri, Properties of I-submaximal ideal topological spaces, Filomat, 24:4 (2010), 87-94.
9. E. Ekici and T. Noiri, Certain subsets in ideal topological spaces, Analele Universitatii Oradea, Fasc. Matematica, Tom XVII (2010), Issue No. 2, 125-132.
10. E. Ekici and T. Noiri, Connectedness in ideal topological spaces, Novi Sad Journal of Mathematics, Vol. 38, No. 2 (2008), 65-70.
11. K. Kuratowski, Topology, Vol. I, Academic Press, New York, 1966.
12. M. H. Stone, Applications of the theory of Boolean rings to general topology, TAMS, 41 (1937), 375-381.

EXAMPLE OF A KINETIC MATHEMATICAL MODELING IN FOOD ENGINEERING

Özlem Ertekin¹

¹ Department of Food Engineering, University of Munzur, Tunceli, Turkey

oertekin@munzur.edu.tr

Abstract

Mathematical modeling of biochemical, chemical reaction processes facilitates understanding. The kinetics of these reaction processes can be analyzed mathematically and kinetics are presented as systems of differential equations. Mathematical model of a reaction kinetic is studied in this study. Bernoulli-Sub equation function method is used in this study. This example can be new model for food engineering applications.

Keywords: Bernoulli-Sub equation function method, Kinetic of reaction, Mathematical modeling, Food engineering.

REFERENCES

1. Bulut, H., Yel, G., Baskonus, H.M. An Application of Improved Bernoulli Sub-Equation Function Method to The Nonlinear Time-Fractional Burgers Equation. Turk. J. Math. Comput. Sci., 5,1-7, 2016.
2. Cain, J.W. Chemical Reaction Kinetics: Mathematical Underpinnings. Molecular Life Sciences, Springer, New York, 2014. DOI 10.1007/978-1-4614-6436-5_564-1

CONSEQUENCES ON THE GLOBAL STABILITY OF THE DISCRETE-TIME POPULATION MODEL

Özlem Ak Gümüş^{1,*}, Figen Kangalgil²

^{1,*} Department of Mathematics, University of Adiyaman, Adiyaman, Turkey

² Department of Mathematics, University of Cumhuriyet, Sivas, Turkey

akgumus@adiyaman.edu.tr,

fkangalgil@cumhuriyet.edu.tr

Abstract

In this article, the global dynamic behavior of a discrete-time population model with and without Allee effect are investigated . The results for both situations were obtained.

Keywords: Global stability, Discrete-time model, Allee effect

REFERENCES

1. James Dickson Murray, Mathematical Biology, Springer-Verlag, New York, 1993.
2. Linda J.S. Allen, An Introduction to Mathematical Biology, Pearson, New Jersey, 2007.
3. Franck Courchamp, Ludek Berec and Joanna Gascoigne, Allee effects in ecology and conservation, Oxford University, Presss, New York, 2008.
4. Warder Clyde Allee, Animal Aggregations: A Study in General Sociology, University of Chicago Press, Chicago, 1931.
5. Huseyin Merdan, Ozlem Ak Gumus, Stability analysis of a general discrete-time population model involving delay and Allee effects, Applied Mathematics and Computations, vol:219, 1821-1832, 2012.
6. Ozlem Ak Gumus, Global and local stability analysis in a nonlinear discretetime population model, Advances in Difference Equations, vol:299, 1-9, 2014.
7. Eduardo Liz, International Journal of Qualitative Theory of Differential Equations and Applications, Global stability and bifurcations in a delayed discrete population model, vol:3, No. 1-2, pp. 66–80, 2009.

THE STABILITY OF DELAYED POPULATION MODELS AND THE EFFECT OF THE ALLEE FACTOR ON STABILITY

Özlem Ak Gümüş^{1,*}, Figen Kangalgil²

^{1,*} Department of Mathematics, University of Adiyaman, Adiyaman, Turkey

² Department of Mathematics, University of Cumhuriyet, Sivas, Turkey

akgumus@adiyaman.edu.tr,

fkangalgil@cumhuriyet.edu.tr

Abstract

In this paper, we studied on delay difference models under a competitive effect. Firstly, we obtained the stability conditions of the equilibrium points of some models; and then we investigated the stability of the equilibrium points of the models together with Allee effect. Thus, we observed the effect of Allee factor on different populations. The numerical simulations confirm the analytical results.

Keywords: Population dynamics, Allee effect, Stability, Equilibrium point

REFERENCES

1. Warder Clyde Allee, *Animal Aggregations: A Study in General Sociology*. University of Chicago Press, Chicago, 1931.
2. Saber Elaydi, *An Introduction to Difference Equations*. Springer, New York, 2006.
3. Canan Çelik, Hüseyin Merdan, Oktay Duman and Ömer Akın, Allee effects on population dynamics with delay, *Chaos, Solitons & Fractals*, vol: 37 (2008), 65-74.
4. Hüseyin Merdan and Ozlem Ak Gumus, Stability analysis of a general discrete-time population model involving delay and Allee effects, *App. Math. and Comp.*, vol:219, 1821-1832, 2012.
5. Ozlem Ak Gumus and Hasan Kose, On the stability of delay population dynamics related with Allee effects, *Math. and Comput. App.*, vol:17, 56-67, 2012.
6. Ozlem Ak Gumus and Hasan Kose, Allee effect on a new delay population model and stability analysis, *Journal of Pure and Applied Mathematics: Advances and Applications*, vol:7, 21-31, 2012.
7. Ozlem Ak Gumus, Figen Kangalgil, Allee Effect in a New Population Model and Stability Analysis, *Gen. Math. Notes*, vol:35, pp.54-64, 2016.

REPRESENTATION OF THE MATRIX FOR CONVERSION BETWEEN TRIANGULAR BEZIER PATCHES AND RECTANGULAR BEZIER PATCHES

Pembe Sabancıgil, Mustafa Kara¹

¹ Department of Mathematics, Eastern Mediterranean University, T.R.N.C.

pembe.sabancigil@emu.edu.tr, mustafa.kara@emu.edu.tr

Abstract

In this paper we studied Bezier surfaces that are very famous techniques and widely used in Computer Aided Geometric Design. Mainly there are two types of Bezier surfaces which are rectangular and triangular Bezier patches. They have different geometric properties so it is not easy to use both of them in the same CAD. Here we will give a different representation for the conversion matrix which converts one type to another.

Keywords: Bèzier curves; Bèzier rectangles; Bèzier triangles; Degree reduction; Degree elevation.

REFERENCES

1. Shi-Min Hu, Conversion between triangular and rectangular Bèzier patches, Computer Aided Geometric Design, 18 (2001) 667-671.

DEGENERATE POCHHAMMER SYMBOL AND DEGENERATE HYPERGEOMETRIC FUNCTION

Recep Şahin¹, İ. Onur Kıymaz², Ayşegül Çetinkaya²
, Oğuz Yağcı¹

¹ Department of Mathematics, University of Kırıkkale, Kırıkkale, Turkey

² Department of Mathematics, University of Ahi Evran, Kırşehir, Turkey

receptsahin@kku.edu.tr, iokiyamaz@ahievran.edu.tr, acetinkaya@ahievran.edu.tr,
receptsahin@kku.edu.tr, oguzyagci26@gmail.com

Abstract

Recently, T. Kim and D.S. Kim [2] have defined and introduced some properties of the degenerate gamma function. In this study, we constitute and investigate some properties of the degenerate Pochhammer symbol using degenerate gamma function. Then, using the degenerate Pochhammer symbol, we obtain the degenerate hypergeometric function ${}_pF_q$ with p numerator and q denominator parameters. Moreover, we define and present some properties of the degenerate Sumudu transform using the degenerate exponential function. Also, we give the certain integral representations.

Keywords: Gamma function, Degenerate Gamma function, Pochhammer symbol, Degenerate Pochhammer symbol, Degenerate Hypergeometric function, Degenerate Sumudu transform, Integral transforms.

REFERENCES

1. T. Kim, D. S.Kim, (2017). Degenerate Laplace transform and degenerate gamma function. Russian Journal of Mathematical Physics, 24(2), 241-248.
2. H.M. Srivastava.,A.Çetinkaya, İ. O.Kıymaz,(2014). A certain generalized Pochhammer symbol and its applications to hypergeometric functions. Applied Mathematics and Computation,226, 484-491.
3. H.M. Srivastava, H.L. Manocha, A Treatise on Generating Functions, Halsted Press (Ellis Horwood Limited, Chichester), John Wiley and Sons, New York,Chichester, Brisbane and Toronto, 1984.

DISCRETE FRACTIONAL SOLUTIONS OF A HERMITE EQUATION

Resat Yilmazer¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

rstyilmazer@gmail.com,

Abstract

In recent years, fractional differential equations have been of great interest. It is caused both by the intensive development of the theory of fractional calculus itself and by the applications of such constructions in various sciences such as physics, mechanics, chemistry and engineering.

In this work, we submit a method for solving the second-order linear ordinary differential equation. Unlike previous studies, we obtain some different new solutions of the equation. Therefore, we obtain new discrete fractional solutions of the homogeneous and non-homogeneous Hermite differential equation by using a discrete fractional Nabla calculus operator.

Keywords: Fractional Calculus; Discrete Fractional Calculus; Hermite Equation.

REFERENCES

1. F.M. Atici, P.W. Eloe, Initial value problems in discrete fractional calculus, Proc. American Math. Soc. 137 (3), 981-989, 2009.
2. F.M. Atici, P.W. Eloe, Discrete fractional calculus with the nabla operator, Electronic Journal of Qualitative Theory of Differential Equations, Spec. Ed I, 3 1-12, 2009.
3. I. Podlubny, Fractional differential equations, Academic Press, New York, London, Tokyo and Toronto, 1999.
4. R. Yilmazer, N-Fractional Calculus Operator N -method to a Modified Hydrogen Atom Equation, Math. Commun. 15, 489-501, 2010.

APPLICATIONS OF FRACTIONAL CALCULUS FOR SECOND ORDER DIFFERENTIAL EQUATIONS

Resat Yilmazer¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

rstyilmazer@gmail.com,

Abstract

Fractional calculus is a very useful and simple means in obtaining particular solutions to certain non-homogeneous linear differential equations. Fractional calculus techniques contribute to many fields of science and engineering such as applied mathematics, control theory, economy, nuclear magnetic resonance, optics, robot technology and so on [1-4].

Our aim in this work is to obtain fractional solutions of the second order non homogeneous differential equation with Nishimoto's operator.

Keywords: Fractional Calculus; Nishimoto's operator; Differential Equation.

REFERENCES

1. K.B. Oldham, J. Spanier, The Fractional Calculus, Academic Press, New York, USA, 1974.
2. K. Nishimoto, Fractional Calculus, vols. I, II, III, IV and V, Descartes Press, Koriyama, 1984, 1987, 1989, 1991 and 1996.
3. I., Podlubny, Fractional differential equations, Academic Press, New York, London, Tokyo and Toronto, 1999.
4. R. Yilmazer, N-Fractional Calculus Operator N -method to a Modified Hydrogen Atom Equation, Math. Commun. 15, 489-501, 2010.

EXPLICIT SOLUTIONS OF THE LAGUERRE EQUATION VIA FRACTIONAL CALCULUS OPERATOR

Resat Yilmazer¹, Serkan Karabulut²

^{1,2}Department of Mathematics, University of Firat, Elazig, Turkey

rstyilmazer@gmail.com, karabulutserkan2323@hotmail.com

Abstract

In this work, we submit a method for solving the second-order linear ordinary differential equation. Unlike previous works, we obtain some different new solutions of the equation. By means of fractional calculus techniques, we find explicit solutions of the Laguerre differential equations. We use the N -fractional calculus operator to obtain the solutions of these equations.

Keywords: Fractional Calculus; Nishimoto's operator; Laguerre Differential Equation.

REFERENCES

1. K. S. Miller and B. Ross, An Introduction to the Fractional Calculus and Fractional Differential Equations, John Wiley & Sons, New York, 1993.
2. K. Nishimoto, Fractional Calculus, vols. I, II, III, IV and V, Descartes Press, Koriyama, 1984, 1987, 1989, 1991 and 1996.
3. I. Podlubny, Fractional differential equations, Academic Press, New York, London, Tokyo and Toronto, 1999.
4. K. Nishimoto, Kummer's Twenty-Four Functions and N -Fractional Calculus, Nonlinear Analysis, Theory, Methods & Applications, 30 (2) (1997), 1271-1282.

ON SOME GENERALISATIONS OF STATISTICAL CONVERGENCE

Rifat Çolak¹ and Emine Kayan²

Department of Mathematics, Firat University, Elazig, Turkey

¹rftcolak@gmail.com, ²eminekayan86@gmail.com

Abstract

In this study using a modulus function we introduce and study some new concepts related to statistical convergence, statistical boundedness and strong Cesàro summability of sequences in a metric space with a new version of density for sets of positive integers. The sequence sets produced with the help of given concepts are closely related to each other. We will also reveal the relationships between the concepts we present and the concepts already have been given. Furthermore, we also investigate the relations on the sets which are derived as special cases.

Keywords: density, modulus function, statistical convergence, Cesàro summability.

REFERENCES

1. A. Aizpuru, M. C. Listán-García and F. Rambla-Barreno, Density by moduli and statistical convergence, *Questiones Mathematicae*, 2014: 1-6.
2. V.K. Bhardwaj, S. Dhawan, f - statistical convergence of order α and strong Cesàro summability of order α with respect to a modulus, *J. Inequal. Appl.* 332, (2015) 14 pp.
3. B. Bilalov, T. Nazarova, On Statistical Convergence in Metric Spaces, *Journal of Math Research* Vol. 7, No. 1 (2015) 37-43.
4. J. S. Connor, The Statistical and Strong p -Cesàro Convergence of Sequences, *Analysis* 8 (1988), 47-63.
5. H. Fast, Sur la convergence statistique, *Colloq. Math.* 2 (1951), 241-244.
6. E. Kayan, R. Çolak, $\lambda_{\{d\}}$ -Statistical Convergence, $\lambda_{\{d\}}$ -statistical Boundedness and Strong $(V, \lambda)_{\{d\}}$ -summability in Metric Spaces. *ICMC 2017. Communications in Computer and Information Science*, vol 655 (2017) pp: 391 - 403
7. E. Kayan, R. Çolak and Y. Altın, d - Statistical Convergence of order α and d - Statistical Boundedness of Order α in Metric Spaces, *U.P.B. Sci. Bull., Series A*, (To appear in 2018)
8. M. Küçükarslan and U. Değer, On Statistical Boundedness of Metric Valued Sequences, *Eur. J. Pure Appl. Math*, 5 (2012), 174-186
9. M. Küçükarslan, U. Değer and O. Dovgoshey, On Statistical Convergence of Metric-Valued Sequences, *Ukr. Math. J* 66(5) (2014) 796-805, doi:10.1007/s11253-014-0974-z

ON A NEW DIFFERENCE SEQUENCE SET

Rifat ÇOLAK¹ and Mikail Et²

Department of Mathematics, Firat University, Elazig, Turkey

rcolak@firat.edu.tr; mikailet68@gmail.com

Abstract

The idea of difference sequences and the related sets was introduced by Kızmaz [8] in 1981 and then this subject has been studied and generalized by various mathematicians. In this study, we have defined the difference sequence set $m(\varphi, p, \alpha)(\Delta_v^r x) = \{x = (x_k) : \Delta_v^r x \in m(\varphi, p)\}$ and showed that $m(\varphi, p, \alpha)(\Delta_v^r x)$ is a Banach space. Furthermore, we have noted some other topological properties and obtained some results with related to this set. The results obtained in this study generalize some known results.

Keywords: Difference sequence, Solid space, BK-space.

REFERENCES

1. Ç. A. Bektaş ; M. Et and R. Çolak, Generalized difference sequence spaces and their dual spaces, J. Math. Anal. Appl. 292(2) (2004), 423-432.
2. R. Çolak and M. Et, On some difference sequence sets and their topological properties, Bull. Malays. Math. Sci. Soc. (2) 28 (2) (2005), 125-130.
3. M. Et and R. Çolak, On generalized difference sequence spaces. Soochow Jour. Math. 21 (4) (1995), 377-386.
4. M. Et and A. Esi, On Köthe-Toeplitz duals of generalized difference sequence spaces. Bull. Malays. Math. Sci. Soc. (2) 23 (2000), 25-32.
5. M. Et, A. Alotaibi and S. A. Mohiuddine, On (Δ^m, I) -statistical convergence of order α , The Scientific World Journal, 2014, 535419 DOI: 10.1155/2014/535419.
6. M. Et, M. Mursaleen and M. Işık, On a class of fuzzy sets defined by Orlicz functions, Filomat 27(5) (2013), 789--796.
7. M. Et and V. Karakaya, A new difference sequence set of order α and its geometrical properties. Abstr. Appl. Anal. 2014, Art. ID 278907, 4 pp
8. H. Kızmaz, On certain Sequence spaces. Canad. Math. Bull. 24 (2) (1981), 169-176.

An Approximate Grid Solution of a Nonlocal Boundary Value Problem with Integral Boundary Condition for Laplace's Equation

Adiguzel A. Dosiye¹, Rifat Reis²

^{1,2}Department of Mathematics, Near East University, Nicosia,
TRNC, Mersin 10, Turkey

¹adiguzel.dosiye@emu.edu.tr

²rifat.reis@neu.edu.tr

Abstract

The new method for the solution of the multilevel nonlocal boundary value problem given [1]-[4] is generalized to the problem with integral boundary condition for Laplace's equation on a rectangular domain. The solution of the given problem is defined as a solution of the Dirichlet problem by constructing the approximate value of the unknown boundary function on the side of the rectangle where the integral boundary condition was given. Further, the five point approximation of the Laplace operator is used on the way of finding the uniform estimation of the error of the solution which is order of $O(h^2)$, where h is the mesh size. Numerical experiments are given to support the theoretical analysis made.

Keywords: rectangular domain; nonlocal boundary value problem; elliptic equation; difference scheme; solvability of boundary value problem; integral condition.

REFERENCES

1. Volkov, E.A.: Approximate grid solution of a nonlocal boundary value problem for Laplace's equation on a rectangle. *Comput. Math. Math. Phys.* **53**(8), 1128-1138 (2013)
2. Volkov, E.A., Dosiye, A.A., Buranay, S.C.: On the solution of a nonlocal problem. *Comput. Math. Appl.* **66**, 330-338 (2013)
3. Volkov, E.A.: Solvability analysis of a nonlocal boundary value problem by applying the contraction mapping principle. *Comput Math. Math. Phys.* **53**(10), 1494-1498 (2013)
4. Volkov, E.A., Dosiye, A.A.: On the numerical solution of a multilevel nonlocal problem. *Mediterr. J. Math.* **13**, 3589-3604 (2016)

Water driven *CuO* nanoparticles enclosed in a partially heated trapezoidal cavity with heated obstacle via FEM

Rizwan ul Haq¹

¹Department of Engineering, Bahria university, Islamabad, Pakistan

Email: r.haq.qau@gmail.com

Abstract

This frame work is established to investigate the thermal management of free convection enclosed in trapezoidal cavity filled with the water based copper oxide (*CuO*) nanofluid. As nanoparticles volume fraction ($\phi\%$) play a significant role to handle the thermal conductivity of any working fluid, so we have addressed the complex nature real world model that widely used at the industrial level and many other mechanisms. An identical trapezoidal shape cavity is placed inside the big trapezoidal cavity that have three various constraints at the surface (cold, insulated and heated). Since bottom wall of the outer cavity is partially heated so various heated portion tests are applied to analyze the influence of heat transfer within the entire cavity. Aspect ratio that depends upon the size of the inner cavity is also determine. Complete and compatible mathematical model is constructed in the form of nonlinear coupled partial differential equation. These set of equations are characterized under the law of conservation of mass, momentum and energy equation along with the restricted domain of the cavity. Koo and Kleinstreuer-Li (KKL) model is used for effective thermal conductivity and viscosity of the nanofluid. A Galerkin based Finite Element method (FEM) is implemented to attain the suitable results in term of stream function and isotherms within the restricted domain of the cavity. Results are also obtained for velocity and temperature of the nanofluid at vertically mean position of the cavity. A Nusselt is also calculated to determine the heat transfer rate at the surface of the various heated portion of outer and inner cavity. The simulations are performed for nanoparticles volume fraction $0 \leq \phi \leq 0.2$ heated portion length $0 \leq L_T \leq 1$ aspect ratio $0.5 \leq AR \leq 3.0$, Rayleigh numbe $10^4 \leq Ra \leq 10^{5.7}$, and three heated conditions (cold, adiabatic and hot) for inner trapezium.

Keywords: Trapezoidal cavity; nanoparticles; inner heated obstacle; nanofluid; KKL model; Heat transfer.

References:

- [1] S. Ostrach, Natural convection in enclosures, ASME J. Heat Transfer 110, 1175-1189 (1988).
- [2] K. Khanfer, K. Vafai, M. Lightstone, Bouyancy-driven heat transfer enhancement in two-dimensional enclosure utilizing nanofluid, Int. J. Heat Mass Transfer 46 (2003) 3639–3653.
- [3] D.A.G. Buruggman, Berechnung verschiedener physikalischer konstanten von heterogenen substanzen, I. Dielektrizitatskontanten and Leitfähigkeiten der Mishkörper aus Isotropen Substanzen, Ann. Physik, Leipzig 24 (1935) 636–679.
- [4] J.C. Maxwell-Garnett, Colours in metal glasses and in metallic films, Philos. Trans. Roy. Soc. A 203 (1904) 385–420.
- [5] A.K. Santra, S. Sen, N. Chakraborty, Study of heat transfer characteristics of copper-water nanofluid in a differentially heated square cavity with different viscosity models, J. Enhancement Heat Transfer 15 (4) (2008) 273–287.
- [6] R. K. Tiwari, M. K. Das, Heat transfer augmentation in a two-sided lid-driven differentially heated square cavity utilizing nanofluids, Int. J. Heat Mass Transfer 50 (2007) 2002–2018.
- [7] K. S. Hwang, J.H Lee, S. P. Jang, Buoyancy-driven heat transfer of water-based Al_2O_3 nanofluids in a rectangular cavity, Int. J. Heat Mass Transfer 50 (2007) 4003–4010.
- [8] K. S. Hwang, S. P. Jang, Stephen U.S. Choi, Flow and convective heat transfer characteristics of water-based Al_2O_3 nanofluids in fully developed laminar flow regime, Int. J. Heat Mass Transfer 52 (2009) 193–199.
- [9] H.F. Oztop, E. Abu-Nada, Numerical study of natural convection in partially heated rectangular enclosure filled with nanofluid, Int. J. Heat Fluid Flow 29 (2008) 1326–1336.
- [10] Koo, Junemoo, and Clement Kleinstreuer. "A new thermal conductivity model for nanofluids." Journal of Nanoparticle Research 6, no. 6 (2004): 577-588.
- [11] Brinkman, H. C. "The viscosity of concentrated suspensions and solutions." The Journal of Chemical Physics 20, no. 4 (1952): 571-571.
- [12] Taylor, Cedric, and Paul Hood. "A numerical solution of the Navier-Stokes equations using the finite element technique." Computers & Fluids 1, no. 1 (1973): 73-100.

Implementation of the vehicular occupancy-emission relation using a cubic B-spline collocation method

S.Agoujil¹, A.Bouhamidi², S.Chergui¹ and Y.Qaraai¹

¹Department of Computer Science, University of Moulay Ismail, Faculty of Science and Technonogy Errachidia, Morroco

²Department of Mathematics, Laboratory LMPA, University Littoral Cote d'Opale France

agoujil@gmail.com, bouhamidi@lmpa.univ-littoral.fr, chergui.sofiya@gmail.com,
qaraai_youssef@yahoo.fr,

Abstract

The complexity and non-linearity of flow phenomena are explained by numerous criteria, including the interactions of the large number of vehicles occupying the road, which influence the road density. This density under certain conditions, leads to traffic congestion which has dangerous effects on the environment such as; resources consumption; noise and the effect caused by greenhouse gas emissions of the CO₂ and other pollutants. In this paper we consider working in an uniform, homogeneous road where the traffic is described by the Lighthill Whitham-Richard (LWR) model resolved using a cubic B-spline collocation scheme in space and an implicit Runge Kutta scheme in time. We also sheded light on the relation between vehicle occupancy and vehicle emissions. Inthisarticle,we obtains omenew complex analytical solutions to the nonlinear Kundu-Eckhaus equation which seems in the quantum field theory, weakly nonlinear dispersive water waves and nonlinear optics by using improved Bernoulli sub-equation function method.

Keywords: LWR model; Traffic congestion; Traffic pollution; Traffic vehicle emission, B-spline; Collocation method; Implicit Runge Kutta method.

REFERENCES

1. Adams, W.F., 1936: Road Traffic Considered as a Random Series. J. Inst. Civil Engineers, vol. 4, pp. 121-130.
2. Ardekani, S., Hauer, E., Jamei, B., 1996: Traffic impact models. In: Traffic Flow Theory. US Federal Highway Administration, Washington, DC, pp. 17.
3. Bektas, T., Laporte, G., 2011: The Pollution-Routing Problem. Transportation Research Part B.45 (2011) 12321250.
4. Bharti, G., Kukreja, V.K., 2012: Numerical approach for solving diffusion problems using cubic Bspline collocation method. Applied Mathematics and Computation, 219 (2012) 20872099.
5. Bressan, A., 2000: Hyperbolic Systems of Conservation Laws. The One Dimensional Cauchy Problem. Oxford University Press.
6. Catalin, D., 2013: Contributions la modlisation et la commande des rseaux de trafic routier.

A new family of k – Gaussian Fibonacci Numbers

Sait TAŞ*,

*Department of Mathematics, Faculty of Science, Atatürk University, Erzurum, Turkey.

saittas@atauni.edu.tr

Abstract

In this manuscript, we identified a new family of k – Gaussian Fibonacci numbers and found some relationships between this family and known Gaussian Fibonacci numbers. Also, we have obtained the generating functions of this family for $k = 2$. Horadam [2] in 1963 and Berzsenyi [1] in 1977 defined complex Fibonacci numbers. Horadam introduced the concept of the complex Fibonacci numbers as the Gaussian Fibonacci numbers. Moawwad El-Mikkawy and Tomohiro Sogabe [12] in 2015 defined a new family of k - Fibonacci numbers and they gave $F_n^{(k)}$ and establish some properties of the relation to the F_n . There are many studies on Fibonacci and Gaussian Fibonacci numbers. See, e.g. [3–11, 13–17].

Keywords: Fibonacci sequences. Fibonacci Numbers, Sequences, Gaussian Fibonacci numbers.

REFERENCES

- [1] Berzsenyi, G., Gaussian Fibonacci numbers, *The Fibonacci Quarterly*, 15 (1977) 223–236.
- [2] Horadam, A.F., Complex Fibonacci Numbers and Fibonacci Quaternions, *American Mathematics Monthly* 70 (1963) 289–291.
- [3] Karduman, E., On determinants of matrices with general Fibonacci numbers entries, *Appl. Math. Comput.* 167 (2005) 670–676.
- [4] Akbulak, M., Bozkurt, D., On the order- m generalized Fibonacci k -numbers, *Chaos Soliton Fract.* (2009), doi:10.1016/j.chaos.2009.03.019.
- [5] Dunlap, R.A., *The Golden Ratio and Fibonacci Numbers*, World Scientific Press, Singapore, 1997.
- [6] Falcon, S., Plaza, A., The k -Fibonacci sequence and the Pascal 2-triangle, *Chaos Soliton Fract.* 33 (2007) 38–49.
- [7] Grabowski, A., Wojtecki, P., Lucas numbers and generalized Fibonacci numbers, *Form. Math.* 12 (2004) 329–334.

SSLH TOPOLOGICAL SPACES

Samer Al Ghour¹

¹Department of Mathematics and Statistics, Jordan University of Science and Technology, Irbid, Jordan

algore@just.edu.jo,

Abstract

As a generalization of the concept strongly locally homogeneous topological space, we introduce and investigate the concept of slightly strongly locally homogeneous (SSLH) topological space. We give several implications regarding this concept. We show that a slightly homogeneous component of an SSLH topological space is clopen. We show that a clopen subspace of an SSLH topological space is SSLH. Also, we show that the disjoint sum of SSLH topological spaces is SSLH.

Keywords: Strongly locally homogeneous space; countable dense homogeneous space.

REFERENCES

1. L. R. Ford, Homeomorphism groups and coset spaces, *Tran. Amer. Math. Soc.* 77, 490—497, 1954.
2. R. Hernandez-Gutiérrez, M. Hrušák, Non-meager P-filters are countable dense homogeneous. *Colloq. Math.*, 130, 281-289, 2013.
3. K. Omiljanowski, An extension theorem for strongly locally homogeneous continua., *Topology Appl.*, 157, 2373–2375, 2010.
4. D. Repovš, L. Zdomsky, S. Zhang, Countable dense homogeneous filters and the Menger covering property, *Fund. Math.*, 224, 233—240, 2014.
5. A. R. Singal, R. C. Jain, Slightly continuous mappings, *J. Indian Math. Soc. (N.S.)*, 64, 195—203, 1997.

On Optimal Control of the Initial Status in a Hyperbolic System

Seda İĞRET ARAZ¹

¹ Siirt University, Faculty of Education, Department of Mathematics Education, Siirt, TURKEY

sedaaraz@siirt.edu.tr,

Abstract

In this paper, optimal control problem governed by hyperbolic system with Dirichlet conditions is considered. It is proved that the optimal solution is exist and unique and it is obtained an adjoint problem corresponding to hyperbolic problem. After Frechet derivative of the cost functional is calculated, necessary optimality conditions for hyperbolic problem with cost functional are derived.

Keywords: Optimal Control, Hyperbolic Equations, Frechet Differentiability.

REFERENCES

- [1] Subaşı M., Güngör H., Araz İ.S., (2017). On the Control of End Point Tensions in a Vibration Problem, International Journal of Modeling and Optimization, 7, 2, 74-77.
- [2] Tagiyev R. K., (2012). On Optimal Control of the Hyperbolic Equation Coefficients, Automation and Remote Control, 1145-1155.
- [3] Bahaa G. M., (2012). Boundary Control Problem of Infinite Order Distributed Hyperbolic Systems Involving Time Lags, Intelligent Control and Automation, 3, 211-221.
- [4] Kröner A., (2011). Adaptive Finite Element Methods for Optimal Control of Second Order Hyperbolic Equations, Computational Methods in Applied Mathematics, 214-240.
- [5] Yeloğlu T., Subaşı M., (2010). Simultaneous control of the source terms in a vibrational string problem, Iranian Journal of Science & Technology, Transaction A, Vol. 34, No. A1.
- [6] Hasanov A., (2009). Simultaneous determination of the source terms in a linear hyperbolic problem from the final over determination: weak solution approach, Journal of Applied Mathematics, p 1-19.
- [7] Cipolatti R. and Lopez I. F., (2005). Determination of coefficients for a dissipative wave equation via boundary measurements. Journal of Mathematical Analysis and Applications, 306, 317-329.
- [8] Ladyzhenskaya O. A., (1985). Boundary Value Problems in Mathematical Physics, Springer-Verlag, 322 p, New York.
- [9] Goebel, M., (1979). On Existence of Optimal Control. Math. Nachr., Vol 93, 67-73.
- [10] Yosida, K., (1980). Functional Analysis, Springer-Verlag, 624 p, New York.

APPROXIMATE SOLUTIONS OF TWO-DIMENSIONAL BURGERS' AND COUPLED BURGERS' EQUATIONS BY RESIDUAL POWER SERIES METHOD

Selahattin Gulsen¹, Mustafa Inc¹, Harivan R. Nabi²

¹ Department of Mathematics, Firat University, Elazig, Turkey

² Department of Road Construction, Duhok Polytechnic University, Duhok, Iraq

sgulsen2301@gmail.com, minc@firat.edu.tr, harivannabi@yahoo.com

Abstract

In this study, two-dimensional Burgers' and coupled Burgers' equations are examined by the residual power series method. This method provides the solutions in the form of rapidly convergent series with easily calculable components using Mathematica software package. When the solution is polynomial, the method gives the exact solution using Taylor series expansion. The results reveal that the method is more efficient applicable and accuracy and the graphical consequences clearly present the reliability of the method.

Keywords: Residual power series; Taylor expansion; Two-dimensional Burgers' and coupled Burgers' equations.

REFERENCES

1. P. C. Jain, D. N. Holla, Numerical solutions of coupled Burgers' equation, International Journal of Non-Linear Mechanics, , 13, 4, 213-222, 1978.
2. A. A. Soliman, On the solution of two-dimensional coupled Burgers' equations by variational iteration method, Chaos, Solitons and Fractals, 40, 3, 1146-1155, 2009.
3. M. Al-Smadi, Solving initial value problems by residual power series method, Theoretical Mathematics and Applications, 3, 1, 199-210, 2013.
4. M. Inc, Z. S. Korpınar, M. M. Al Qurashi, D. Baleanu, A new method for approximate aolutions of some nonlinear equations: Residual power series method, Advances in Mechanical Engineering, 8, 4, 1687814016644580, 2016.
5. F. Tchier, M. Inc, Z. S. Korpınar, D. Baleanu, Solutions of the time fractional reaction–diffusion equations with residual power series method, Advances in Mechanical Engineering, 8, 10, 1687814016670867, 2016.

A RISK ANALYSIS BASED MODEL FOR ENHANCING THE SUSTAINABILITY PERFORMANCE OF ENTERPRISES

Semih Coşkun, Olcay Polat, Esra Önder, Kubra Özen

Department of Industrial Engineering, University of Pamukkale, Denizli, Turkey

scoskun@pau.edu.tr

Abstract

The competition environment, influence of increasing customer awareness and technological evolution combine with many other external macro-effects make the future predictions of managers more difficult. The suppliers in the supply chains exist in the markets not only with the diversity and quality of products, but also with the environmental, social and economic influences as a whole. In the direction of these developments, sustainability has emerged as a field that needs systematical implementations beyond its conceptual view to businesses. Sustainability indices are used in the supply chains for evaluating and selecting suppliers nowadays. Standard makers in the area of management systems emphasizes that the risk and opportunity analysis are critical issues for sustainability. Risk analysis takes place in the requirements of the new management systems standards updates. There is not enough researches in the matter of adaptation of risk analysis to general sustainability pillars. In this study, quality that finds an important place under the framework of integrated management systems are evaluated. The criteria for quality management system sustainability and the analysis of the risks that may be faced have been evaluated in a textile company. The implementation of the model begins with the definition of the policies, objectives and goals of a textile company. After that, processes are defined and the risks and opportunities related with the objectives analyzed. According to the risk analysis results preventive actions planned. Actions are evaluated for the sustainability pillars; economic, social and environmental. At the end of the model sustainability scores are determined.

Keywords: Sustainability; Quality Management; Risk Analysis; Decision Making

REFERENCES

1. Seuring, S. ve Müller, M. From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production*, 16(15): 1699-1710, 2008.
2. Zink, K. J., Steimle, U. ve Fischer, K. Human factors, business excellence and corporate sustainability: differing perspectives, joint objectives. *Corporate Sustainability as a Challenge for Comprehensive Management*, 3-18, Physica-Verlag Heidelberg, 2008.
3. Gupta, S., Dangayach, G. S., Singh, A. K., & Rao, P. N. Analytic hierarchy process (AHP) model for evaluating sustainable manufacturing practices in Indian electrical panel industries. *Procedia-Social and Behavioral Sciences*, 189, 208-216, 2015.

What is the relationship between music and mathematics?

Serap YÜKRÜK

Department of Fine Art Education, Yüzüncü Yıl University, Van, Turkey

seryukruk@yahoo.com

In the historical development of music, it is thought that first rhythm then melody which is the second important element of music was discovered. Besides, there are three main components of music today. Rhythm, melody and harmony. The harmony that forms the basis of music has matured in the second half of the last millennium. For many years, music has been a prosperity door for some artists, troubles and struggles with misery for some artists; a research topic for some anthropologists, musicologists or a mysterious problem that has always made some curious physicists and mathematicians intrigued or led them to pursuit.

Interestingly enough, the historical development of music is parallel to the historical development of mathematics. Both first emerged with a concrete idea, then swung between abstract-concrete. For example, while the mathematical object started with counting, music became a rhythm played in religious rituals in primitive societies. Who knows, perhaps, the musicians of that time were first to discover counting numbers.

“The music is a hidden mathematical problem of the soul” said famous mathematician Leibniz. “We can express music as a collection of sentences formed by following a simple set of voices created according to certain rules.” Mathematics, because of the search for truth, has to be in every job that exists in life at certain rates. This bears a more important value for music. Because the rhythm, one of the three most important components of music, has to progress with certain order and accuracy. In this progress, the timing value and expression of each note are the points of question. Such as; a beat, two-beat, quadrature, octal note... Pythagoras is a Greek philosopher and mathematician who put out about 2600 years ago that music and mathematics are a great relationship.

Keywords:: music, mathematic, music and mathematic realitionship

REFERENCES

[1] <https://www.matematiksel.org/birbirinden-ayrilmaz-ikili-matematik-ve-muzik/> (Erişim tarihi 1 nisan,2018)

[2] <http://www.rizapektas.com/birbirinden-ayrilmaz-ikili-matematik-ve-muzik/> (Erişim tarihi 1 nisan, 2018)

Al-Khwarizmi's Contributions to Mathematics and Mathematics Education

Serbay Duran¹, Hüseyin Samancı¹

¹ Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

sduran@adiyaman.edu.tr,

Abstract

In this study, we are going to introduce Muḥammad ibn Mûsâ al-Khwarizmi ,who is an Iraqi Muslim mathematician, and his major contributions to mathematics and mathematics education. Muḥammad ibn Musa Al-Khwarizmi is the first Muslim mathematician who produced works in mathematics, astronomy, and geography and mapping of the earth. In Mathematics, The concept of Algorithm is found by Al-Khwarizmi and he was called as the 'father of algebra'. In particular, he improved a new systematic formula for solving linear and quadratic equations, introduced “balance” and “reduction” concepts. Muḥammad ibn Mûsâ al-Khwarizmi is one of the greatest mathematicians ever. His original works and contributions to mathematics changed understanding knowledge and science.

Keywords: History of mathematics; Algebra; Mathematics education.

REFERANSLAR

1. Tarek Kahlan, The Universal Effect for Arabic İslamic Civilization, İskenderiyye, 1.Printing, 1. skin, 120-121, 2009.
2. Salah Kasım Ahmed, Ulemâu'l-Muslimîn fi'l-Ulûm ve'l-Teknologiya, 3-4, 2010.

A Study on Finding Exact Solutions for the System of Shallow Water Wave equation using Extended Bernoulli Sub-Equation method

Serbay Duran¹, Doğan Kaya²

¹ Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

² Department of Mathematics, University of Istanbul Commerce, Istanbul, Turkey

sduran@adiyaman.edu.tr

Abstract

The aim of this study is to construct new exact solutions for the system of Shallow water wave equation which is an important equation in Mathematical physics. For this purpose, an extended Bernoulli Sub-equation method, which is an interesting candidate as an auxiliary equation for this type of approach, is applied to the equation. New and more general solutions including rational travelling wave solutions, rational solutions and rational triangular solutions of the considered equation are obtained using the method successfully. As a result, the extended Bernoulli Sub-equation method is an effective and efficient method for seeking the exact solutions of a wide range of partial differential equations.

Keywords: Extended Bernoulli Sub-equation method; the system of Shallow water wave equation; exact solutions.

REFERENCES

1. Baskonus, Haci Mehmet, and Hasan Bulut. "New wave behaviors of the system of equations for the ion sound and Langmuir Waves." *Waves in Random and Complex Media* 26.4, 613-625, 2016.
2. Bulut, Hasan, and Haci Mehmet Baskonus. "New complex hyperbolic function solutions for the (2+ 1)-dimensional dispersive long water-wave system." *Mathematical and Computational Applications* 21.2 6, 2016.
3. Hirota, Ryogo. "Exact N-soliton solutions of the wave equation of long waves in shallow-water and in nonlinear lattices." *Journal of Mathematical Physics* 14.7, 810-814, 1973.

NOVEL EXACT SOLUTIONS OF THE EXTENDED SHALLOW WATER WAVE AND THE FOKAS EQUATIONS

Serbay Duran¹, Berat Karaagac¹, Alaattin Esen²

¹ Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

² Department of Mathematics, University of Inonu, Malatya, Turkey

sduran@adiyaman.edu.tr,

Abstract

In this study, a Sine-Gordon expansion method for obtaining novel exact solutions of Extended Shallow wave equation and Fokas equation is presented. All of the equations which are under consideration consist of three or four variable. In this method, first of all, partial differential equations are reduced to ordinary differential equations by the help of variable change called as travelling wave transformation, then Sine Gordon expansion method allows us to obtain new exact solutions defined as in terms of hyperbolic trig functions of considered equations. The newly obtained results showed that the method is successful and applicable and can be extended to a wide class of nonlinear partial differential equations.

Keywords: Sine-Gordon expansion method Extended Shallow Water Wave equation; Fokas equation., exact solutions

REFERENCES

1. Marwan Alquran , Edamana V. Krishnan, Applications of sine-Gordon expansion method for a reliable treatment of some nonlinear wave equations, Nonlinear Studies, Vol. 23, No. 4, 639-649, 2016.
2. Haci M. Baskonus, Hasan Bulut, Tukur A. Sulaiman, Investigation of various travelling wave solutions to the extended $(2 + 1)$ -dimensional quantum ZK equation, Eur. Phys. J. Plus 132: 482, 2017.
3. Ahmet Bekir, Esin Aksoy, Exact solutions of extended shallow water wave equations by exp-function method, International Journal of Numerical Methods for Heat & Fluid Flow, Vol. 23 Issue: 2, 305-319, 2013.
4. Mohammed O. Al-Amr , Shoukry El-Ganaini, New exact traveling wave solutions of the $(4+1)$ -dimensional Fokas equation, Computers and Mathematics with Applications 74, 1274–1287, 2017.

New Wave Solutions for Nonlinear Differential Equations using an Extended Bernoulli Equation as a New Expansion Method

Serbay Duran¹, Doğan Kaya²

¹ Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

² Department of Mathematics, University of Istanbul Commerce, Istanbul, Turkey

sduran@adiyaman.edu.tr,

Abstract

In this paper, we presented a new expansion method constructed by taking inspiration for the Kudryashov method [1]. Bernoulli equation is chosen in the form of $F' = BF^n - AF$ and some expansions are made on the auxiliary Bernoulli equation which is used in this method. In this auxiliary Bernoulli equation some wave solutions are obtained from the shallow water wave equation system in the general form of “n-order”. As a result, obtained new results are simulated by graphically in 3D and 2D. To sum up, it is considered that this method can be applied to the several of nonlinear evolution equations in mathematics physics [2-4].

Keywords: A new expansion method; Kudryashov Method; Wave solution; System of the shallow water wave equation.

REFERENCES

1. N. Kudryashov, On Types of Nonlinear Nonintegrable Equations with Exact Solutions, Physics Letters A, 155, 269-275, 1991.
2. L. Debnath, Nonlinear Partial Differential Equations for Scientist and Engineers, Birkhauser, Boston, MA, 1997.
3. P. G. Drazin and R.S. Johnson, Solutions: An Introduction, Cambridge Univ. Press, Cambridge, 1989.
4. L. Debnath, A brief historical introduction to solitons and the inverse scattering transform- a vision of Scott Russell, Inter. J. Math. Edu. Sci. Technology, 38 : 1003, 2007.

RENEWABLE ENERGY ECONOMY- FREIBURG EXPERIENCE

Seren Özkaya¹

¹ Department of Economics, University of Istanbul , Istanbul, Turkey

serenozkaya@gmail.com

Abstract

The developing world and consumption growth have brought along the need for energy. Energy demand is generally derived from non-renewable sources which have lower costs and greater availability. The scarce resources and negative externalities especially on the environment, led people to renewable energy sources, an important element of the green economy. Although the use of renewable energy sources is costly in the short term but in long run it has many benefits of economy and environment. Energy conversion will eliminate the economic shortage of energy, sustainable development will be provided in this way. The use of renewable energy in green economy applications in the world is increasing day by day. The city of Freiburg in Germany is an area where renewable energy is effectively used. The city has acquired a different identity through renewable energy, the economy has been shaped accordingly and green economy practices have become a life style.

Keywords: Renewable Energy; Green Economy; Energy Economy, Freiburg.

REFERENCES

1. Apergis, N., Danuletiu, D., Renewable energy and economic growth: evidence from the sign of panel long-run causality. *Int. J. Energy Econ. Policy* 4 (4), 578–587, 2014.
2. Narayan, P., Smyth, R. (Multivariate Granger causality between electricity consumption, exports and GDP: Evidence from a panel of Middle Eastern countries, *Energy Policy*, 37, 229-236, 2009.
3. Aslan, A., Öcal, O, Shahbaz, M., Energy Consumption–Trade Openness – Economic Growth Nexus in G-8 Countries. *Kapadokya Akademik Bakış - Cappadocia Academic Review*, 1 (1), 71-97. Retrieved from <http://dergipark.gov.tr/car/issue/31636/347170>.

Mechanical properties of fiber and fly ash reinforced composite hollow pile

Serkan Karaca¹, Fatih Artuk²

¹Narman Vocational High School, Atatürk University, Erzurum, TURKEY

serkan.karaca@atauni.edu.tr

²Engineering Faculty, Civil Engineering Department, Ataturk University, Erzurum TURKEY

fatih.artuk@atauni.edu.tr

Abstract

Pile foundations is a deep foundation varieties used for many years. Deep foundations are affected by environmental conditions depending on production materials (concrete, wooden, etc). In present, glass reinforced plastics material as alternative material is desired to be used because it is economical and durable. Hollow piles are manufactured in hollow form with a certain wall thickness of circular produced piles together with the saving of material and are known in previous studies which resist to greater stresses.

In this study, fiber-reinforced polyester (FRP) piles are aimed to be produced. For this purpose, hollow piles with two different lengths (4 mm, 10 mm) and 4 different diameters (35 mm, 50 mm, 60 mm, 70 mm) have been manufactured by adding hemp, fly ash, rubber waste materials to polyester in different ratios . Nonconfined compression test, SEM (Scanning Electron Microscopy) experiments were carried out for these hollow piles manufactured in the effect reduced.

Keywords: Pile foundation, FRP, fly ash, fiber, polymer, hollow pile, nonconfined compression test, sem.

REFERENCES

1. Guades, E., Aravinthan, T., Islam, M., Manalo, A., 2012. A Review On The Driving Performance Of FRP Composite Piles. *Composite Structures*, 94(6), 1932-1942.
2. Lin, H. J., & Liao, C. I. 2004. Compressive Strength Of Reinforced Concrete Column Confined By Composite Material. *Composite Structures*, 65(2), 239-250.
3. Pando, M., Filz, G., Ealy, C., Hoppe, E., 2003. Axial And Lateral Load Performance Of Two Composite Piles And One Prestressed Concrete Pile. *Transportation Research Record: Journal Of The Transportation Research Board*, (1849), 61-70.
4. Yue, Z., Li, J., Shao, W., & Li, L. 2016. Effect of crack opening and recovery on chloride penetration into reinforced concrete hollow piles. *Materials and Structures*, 49(8), 3217-3226.
5. Zyka, K., & Mohajerani, A. 2016. Composite piles: A review. *Construction and Building Materials*, 107, 394-410.

ON SOME PARANORMED LUCAS SEQUENCE SPACES

Serkan Demiriz¹ and Sezer Erdem²

¹ Department of Mathematics, Gaziosmanpasa University, Tokat, Turkey

serkandemiriz@gmail.com

² Battalgazi Farabi Anatolian Imam Hatip High School, Malatya, Turkey

sezererdem8344@gmail.com

Abstract

The sequence spaces $c_0(E)$, $c(E)$, $\ell_\infty(E)$ and $\ell_p(E)$ have been recently introduced and studied by Karakaş and Karabudak. The main purpose of the present paper is to extend the results of Karakaş and Karabudak to the paranormed case and is to work the spaces $c_0(\hat{L}, p)$, $c(\hat{L}, p)$, $\ell_\infty(\hat{L}, p)$ and $\ell_p(\hat{L}, p)$. Let μ denote any of the spaces c_0, c, ℓ_∞ and ℓ_p . We prove that $\mu(\hat{L}, p)$ is linearly paranorm isomorphic to $\mu(p)$ and determine the α -, β - and γ -duals of the $\mu(\hat{L}, p)$. Furthermore, the basis of $c_0(\hat{L}, p)$, $c(\hat{L}, p)$ and $\ell_p(\hat{L}, p)$ are constructed. Finally, we characterize the matrix transformations from the spaces $\mu(\hat{L}, p)$ to the spaces $c_0(q), c(q), \ell(q)$ and $\ell_\infty(q)$.

Keywords: *Paranormed sequence spaces, Lucas numbers, Matrix domain*

REFERENCES

1. F. Başar, Summability Theory and Its Applications, Bentham Science Publishers, İstanbul, Turkey, 2012.
2. M. Karakaş and H. Karabudak, An application on the Lucas numbers and infinite Toeplitz matrices, Cumhuriyet Sci. J., Vol. 38:3, 557-562, 2017.
3. I. J. Maddox, Paranormed sequence spaces generated by infinite matrices, Proc. Cambridge Philos. Soc., 64, 335-340, 1968.
4. I. J. Maddox, Spaces of strongly summable sequences, Quart. J. Math. Oxford, 18(2), 345-355, 1967.
5. K. -G. Grosse-Erdmann, Matrix transformations between the sequence spaces of Maddox, J. Math. Anal. Appl., 180, 223-238, 1993.

ELECTRICAL ANALOGUE OF ARTERIAL BLOOD PRESSURE SIGNALS

Sevcan Emek¹, Vedat Evren², Şebnem Bora¹

¹ Department of Computer Engineering, Ege University, Izmir, Turkey

² Faculty of Medicine, Department of Physiology, Ege University, Izmir, Turkey

sevcan.emek@ege.edu.tr, vedat.evren@ege.edu.tr, sebnem.bora@ege.edu.tr

Abstract

In this study, we describe an electrical circuit model that will be useful for understanding the mechanisms and dynamics of the human cardiovascular system, which is considered as a complex system in the field of physiology. The electrical circuit model, defined as the Windkessel model, plays an important role in the observation of the characteristic effect of the blood pressure on the arterial system. An electrical circuit model, which we have connected to the input terminals of the Windkessel model, ensures that the mean arterial blood pressure signals are observed within the expected range of values. The Windkessel circuit model that we have tried to develop in this study was constructed in a laboratory environment and the results were observed. It is thought that this study will contribute to the literature in terms of the development of the Windkessel model by increasing the number of parameters involved in heart and arterial system.

Keywords: Arterial system; Mean arterial blood pressure; Windkessel model.

REFERENCES

1. Guyton, A.C. and Hall J.E., Textbook of Medical Physiology. Elsevier Inc, 11th ed., 2006.
2. Bora, Ş., Evren, V., Emek, S. and Çakırlar, I., “Agent-based modeling and simulation of blood vessels in the cardiovascular system.” Simulation: Transactions of the Society for Modeling and Simulation International, p 1-16, 2017. Doi: 0037549717712602.
3. Olufsen, M. S., “A One-Dimensional Fluid Dynamic Model of the Systemic Arteries”, Computational Modeling in Biological Fluid Dynamics, p 167-187, Springer-Verlag New York, Inc. 2001.
4. Fazeli, N. and Hahn, J., “Estimation of cardiac output and peripheral resistance using square-wave-approximated aortic flow signal”, Frontiers in Physiology, Vol 3, 2012. Doi: 10.3389/fphys.2012.00298.

Statistical Process Control for the Furnace Cavity and Its Components

Özgür Cem IŞIK ¹

Ezgi AKTAR DEMİRTAŞ ²

¹ Department of Industrial Engineering, Dumlupınar University, Kutahya, Turkey

ozgurcem.isik@dpu.edu.tr,

² Department of Industrial Engineering, Eskisehir Osmangazi University, Eskisehir, Turkey

eaktar@ogu.edu.tr,

Abstract

Statistical Process Control (SPC) aims to produce a product in the most economical and useful way. Thus, SPC is a tool used to reduce the production of defective products, targeting compliance with standards that ensures conformity of production to predetermined quality specifications. The main purpose of this study is keeping the cavity process under control by removing the special causes. The application was performed for a white goods producer. For this purpose; by using statistical process control techniques such as pareto chart, control charts, process capability analysis etc. the specific reference points of furnace cavity and its components were examined and the results were discussed.

Keywords: Statistical Process Control; Furnace Cavity; Pareto; Control Charts, Process Capability Analysis

REFERENCES

1. Işığışok E., Toplam Kalite Yönetimi Bakış Açısıyla İstatistiksel Kalite Kontrol, Ezgi Kitabevi Yayınları, 2012.
2. Montgomery D.C., Statistical Quality Control A Modern Introduction, John Wiley & Sons, 2009.

A New Method for (4+1) Dimensional Fokas Equation

Seyma Tuluçe Demiray¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

seymatuluçe@gmail.com

Abstract

In this paper, modified $\exp(-\Omega(\xi))$ -expansion function method has been tackled for procuring exact solutions of (4+1) dimensional Fokas equation. Hyperbolic function solutions and dark soliton solutions of (4+1) dimensional Fokas equation have been found by means of this method. Moreover, by the help of Mathematica 9, some graphical simulations were given to clarify the behavior of these solutions.

Keywords: (4+1) dimensional Fokas equation; modified $\exp(-\Omega(\xi))$ -expansion function method; hyperbolic function solutions; dark soliton solutions.

REFERENCES

1. Z. Z. Yang, Z. Y. Yan, Symmetry groups and exact solutions of new (4+1)-dimensional Fokas equation, Commun. Theor. Phys. (Beijing), Vol:51, No:5, 876–880, 2009.
2. J. Lee, R. Sakthivel, L. Wazzan, Exact traveling wave solutions of a higher-dimensional nonlinear evolution equation, Modern Phys. Lett. B, Vol:24, No:10, 1011–1021, 2010.
3. H. Kim, R. Sakthivel, New exact traveling wave solutions of some nonlinear higher-dimensional physical models, Rep. Math. Phys., Vol:70, No:1, 39–50, 2012.
4. Y. He, Exact solutions for (4+1)-dimensional nonlinear Fokas equation using extended F-expansion method and its variant, Mathematical Problems in Engineering, Vol:2014, Article ID: 972519, 11 pages, 2014.
5. S. Zhang, C. Tian, W.Y. Qian, Bilinearization and new multisoliton solutions for the (4+1)-dimensional Fokas equation, Pramana J. Phys., Vol: 86, No:6, 1259–1267, 2016.
6. M. O. Al-Amr, S. El-Ganaini, New exact traveling wave solutions of the (4+1)-dimensional Fokas equation, Computers and Mathematics with Applications, Vol:74, 1274–1287, 2017.

Investigation of Dark and Bright Soliton Solutions of Some Nonlinear Evolution Equations

Seyma Tuluçe Demiray¹ and Hasan Bulut¹

¹ Department of Mathematics, University of Firat, Elazığ, Turkey

seymatuluçe@gmail.com, hbulut@firat.edu.tr,

Abstract

In this paper, generalized Kudryashov method (GKM) is used to find exact solutions of (1+1) dimensional nonlinear Ostrovsky equation and (4+1) dimensional Fokas equation. Firstly, we get dark and bright soliton solutions of these equations by using GKM. Then, for proper parameters, we plot 2D and 3D surfaces of some soliton solutions that we obtained by using this method. Numerical results together with the graphical demonstrations clearly present the reliability of this method.

Keywords: (1+1) dimensional nonlinear Ostrovsky equation; (4+1) dimensional Fokas equation; generalized Kudryashov method; dark soliton solution; bright soliton solution.

REFERENCES

1. H. Bulut, Y. Pandir and S. Tuluçe Demiray, Exact Solutions of Time-Fractional KdV Equations by Using Generalized Kudryashov Method, International Journal of Modeling and Optimization, Vol:4, No:4, 315–320, 2014.
2. C. Koroğlu, T. Öziş, A novel traveling wave solution for Ostrovsky equation using Exp-function method, Computers and Mathematics with Applications, Vol:58, 2142–2146, 2009.
3. S. Marzan, F. Farhana, Md. T. Ahmed, K.Khan, M. A. Akbar, Study of Nonlinear Evolution Equations in Mathematical Physics, Global Journal of Science Frontier Research (F), Vol:13, No:9, 45–53, 2013.
4. Z. Z. Yang, Z. Y. Yan, Symmetry groups and exact solutions of new (4+1)-dimensional Fokas equation, Commun. Theor. Phys. (Beijing), Vol:51, No:5, 876–880, 2009.
5. S. Zhang, C. Tian, W.Y. Qian, Bilinearization and new multisoliton solutions for the (4+1)-dimensional Fokas equation, Pramana J. Phys., Vol: 86, No:6, 1259–1267, 2016.

On the Travelling Wave Solutions of Ostrovsky Equation

Seyma Tuluce Demiray¹ and Hasan Bulut¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

seymatuluce@gmail.com, hbulut@firat.edu.tr,

Abstract

In this paper, extended trial equation method (ETEM) is applied to find exact solutions of (1+1) dimensional nonlinear Ostrovsky equation. We constitute some exact solutions such as soliton solutions, rational, Jacobi elliptic and hyperbolic function solutions of this equation via ETEM. Then, we submit results that we obtained by using this method.

Keywords: (1+1) dimensional nonlinear Ostrovsky equation; extended trial equation method; soliton solutions; rational; Jacobi elliptic; hyperbolic function solutions.

REFERENCES

1. H. Bulut, Y. Pandir and S. Tuluce Demiray, Exact Solutions of Nonlinear Schrödinger's Equation with Dual Power-Law Nonlinearity by Extended Trial Equation Method, *Waves in Random and Complex Media*, Vol:24, No:4, 439–451, 2014.
2. C. Koroğlu, T. Öziş, A novel traveling wave solution for Ostrovsky equation using Exp-function method, *Computers and Mathematics with Applications*, Vol:58, 2142–2146, 2009.
3. E. M. E. Zayed, S. Al-Joudi, The Traveling Wave Solutions for Nonlinear Partial Differential Equations Using the (G'/G)-expansion Method, *International Journal of Nonlinear Science*, Vol:8, No:4, 435–447, 2009.
4. J. Lee, R. Sakthivel, Exact traveling wave solutions for some nonlinear evolution equations, *Commun. Math. Sci.*, Vol:7, No:4, 1053–1062, 2009.
5. S. Marzan, F. Farhana, Md. T. Ahmed, K.Khan, M. A. Akbar, Study of Nonlinear Evolution Equations in Mathematical Physics, *Global Journal of Science Frontier Research (F)*, Vol:13, No:9, 45–53, 2013.

A NEW BLOCK SEQUENCE SPACE

Sezer Erdem¹ and Serkan Demiriz²

¹ Battalgazi Farabi Anatolian Imam Hatip High School, Malatya, Turkey

sezererdem8344@gmail.com,

² Department of Mathematics, Gaziosmanpasa University, Tokat, Turkey

serkandemiriz@gmail.com

Abstract

The purpose of the this study is to introduce the sequence space

$$\ell_p(E, B(r, s)) = \left\{ x = (x_n) \in \omega : \sum_{n=1}^{\infty} \left| \sum_{j \in E_n} rx_j + \sum_{j \in E_{n+1}} sx_j \right|^p < \infty \right\},$$

where $E = (E_n)$ is a partition of finite subsets of the positive integers, $r, s \in \mathbb{R} / \{0\}$ and $p \geq 1$. The topological and algebraical properties of this space are examined. Furthermore, some inclusion relations are given. Finally, we show that the operator A defined from ℓ_p into $\ell_p(E, B(r, s))$ is bounded and also we compute the norm of the operator A .

Keywords: Block sequence spaces, Capson matrix, Hilbert Matrix.

REFERENCES

1. D. Foroutannia, On the block sequence space $\ell_p(E)$ and related matrix transformations, Turk. J. Math. 39: 830-841, 2015.
2. S. Erfanmanesh and D. Foroutannia, Some new semi-normed sequence spaces of non-absolute type and matrix transformations, TWMS J. Pure Appl. Math., 4:2 96-108, 2015.
3. H. Roopaei and D. Foroutannia, The norm of certain matrix operators on the new difference sequence spaces I, Sahand Communications in Mathematical Analysis, 3:1 1-12, 2016.
4. F. Başar and B. Altay, On the space of sequences of p -bounded variation and related matrix mappings, Ukr. Math. J., 55:1 136-147, 2003.
5. F. Başar, Summability Theory and Its Applications, Bentham Science Publishers, İstanbul, Turkey, 2012.

Rate of convergence of Hermit-Feje'r polynomials for functions with derivatives of bounded variation

Abedallah Rababah and Shahnaz abogazleh

Department of Mathematics, Jordan University of Science and Technology, Irbid, Jordan

The Hermite-Feje'r interpolation problem is a classical subject that was widely studied last century. The Hermite-Feje'r interpolating polynomial, $H_n(f, x)$, to function $f(x)$ on the roots of the Chebyshev polynomials converges uniformly to $f(x)$ if $f(x)$ is a continuous function on $[-1, 1]$.

In 1982, Bojanic and Cheng, Estimate the rate for approximation of functions of bounded variation by Hermite-Fejer polynomials and Cheng proved that converges uniformly to $f(x)$ at points of continuity of $f(x)$. 1992, they also estimate the Rate of convergence of Hermite-Feje'r polynomials for functions with derivatives of bounded variation using the zeros of Chebyshev polynomial of the first kind.

In this talk, the behavior of Hermite-Fejér interpolation, $H_n(f, x)$, for function with derivatives of bounded variations on $[-1, 1]$ by taking the interpolation over the zeros of Chebyshev polynomial of the second kind, $U_n(x)$, is considered we give an estimate for the rate of convergence of, $H_n(f, x)$, using the zeros of Chebyshev polynomial, $U_n(x)$.

References:

[1] Al-Jarrah, R, and Rababah, A. (1990). On the rate of convergence of Hermite-Fejér polynomials to functions of bounded variation on the zeros of certain Jacobi polynomials. *Revista colombiana de matematicas*, 24(1-2), 51-64.

ON CHARACTERIZATIONS OF ALMOST p -REGULAR SPACES AND ALMOST REGULAR SPACES

Shamsiddin Ibragimov¹ and Erdal Ekici²

¹Canakkale Onsekiz Mart University, Graduate School of Natural and Applied Sciences, Department of Mathematics, Terzioğlu Campus, Canakkale, TURKEY

²Corresponding Author: Department of Mathematics, Canakkale Onsekiz Mart University, Terzioğlu Campus, 17020, Canakkale, TURKEY

eeekici@comu.edu.tr (prof.dr.erdalekici@gmail.com)

Abstract

In 1990, Malghan and Navalagi studied the concept of almost p -regular spaces [Almost p -regular, p -completely regular and almost p -completely regular spaces, Bull. Math. Soc. Sci. Math. R. S. Roumanie, 34 (82) (1990), 317-326]. In 1969, Singal and Arya studied the concept of almost regular spaces [On almost-regular spaces, Glasnik Mat., 4 (24) (1969), 89-99]. In this paper, some characterizations of the concept of almost p -regular spaces and the concept of almost regular spaces are studied.

Keywords: Almost regular, Almost p -regular, regular space.

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REFERENCES

1. E. Ekici, On weak structures due to Császár, Acta Mathematica Hungarica, 134 (4) (2012), 565-570.
2. E. Ekici, Generalized hyperconnectedness, Acta Mathematica Hungarica, 133 (1-2) (2011), 140-147
3. E. Ekici, A note on a -open sets and e^* -open sets, Filomat, 22:1 (2008), 89-96.
4. E. Ekici, On locally closedness and continuity, Chaos, Solitons and Fractals, 36 (2008), 1244-1255.
5. E. Ekici, On separated sets and connected spaces, Demonstratio Mathematica, Vol. XL No 1 (2007), 209-217.
6. E. Ekici, On an extension for functions, Demonstratio Mathematica, Vol. XXXIX (3) (2006), 657-670.
7. E. Ekici, On R spaces, International Journal of Pure and Applied Mathematics, Volume 25 No. 2 (2005), 163-172.
8. E. Ekici, On δ -semiopen sets and a generalization of functions, Boletim da Sociedade Paranaense de Matemática, (3s.) v. 23 (1-2) (2005), 73-84.
9. E. Ekici, On γ -US spaces, Indian Journal of Mathematics, Vol. 47, No. 2-3 (2005), 131-138.
10. S. R. Malghan and G. B. Navalagi, Alost p -regular, p -completely regular and almost p -completely regular spaces, Bull. Math. Soc. Sci. Math. R. S. Roumanie, 34 (82) (1990), 317-326.
11. M. K. Singal and S. P. Arya, On almost-regular spaces, Glasnik Mat., 4 (24) (1969), 89-99.

On Simultaneously Chebyshev Subspaces in Banach Spaces

Sh. Al-Sharif¹ and A. H. Hamdan²

*Department of Mathematics, Faculty of Science,
Yarmouk university, Irbid, Jordan.*

sharifa@yu.edu.jo

abdallahhamdan1988@gmail.com,

Abstract

In this paper we study the problem of simultaneously proximinal, simultaneously Chebyshev and simultaneously quasi-Chebyshev subspaces in general Banach spaces. Also we characterize points of simultaneous approximation in a Banach space X by the closed unit ball B_X . Further, some results concerning simultaneously proximinal subspaces in the quotient space are presented.

Keywords: simultaneous approximation Chebyshev approximation.

REFERENCES

1. E. Abu-Sirhan, Best simultaneous approximation in function and operator spaces, Turk. J. Math. 36 (2012), 101-112.
2. E. Abu-Sirhan, R. Khalil, Simultaneous approximation in operator and tensor product spaces, Journal of Applied Functional Analysis, Vol 4, Pages No. 1 (2009), 112-121.
3. J. B. Conway, A course in functional analysis, Second edition. Graduate Texts in Mathematics, 96. Springer-Verlag, New York, 1990.
4. J. Mach, Best simultaneous approximation of bounded functions with values in certain Banach spaces, Math. Ann, 240 (1979), 157-164.
5. P. D. Milman, On best simultaneous approximation in normed linear spaces, J. Approx. Theory, 20 (1977), 223-238.
6. H. Mohebi and E. Naraghirad, Closed convex sets and their best simultaneous approximation properties with applications, Journal of Numerical Functional Analysis and Optimization Letters, 1 (2006), 1-16.
7. M. Rawashdeh, Sh. Al-Sharif and W. B. Domi, On the Sum of Best Simultaneously Proximinal Subspaces, Hacet Journal of Math and Stat Vol 43 (4) (2014), 595 -- 602.
8. I. Singer, The theory of best approximation and functional analysis, Soc. Ind. App, Philadelphia, Pennsylvania 1974.

ON THE NOVEL NUMERICAL PROPERTIES OF A NONLINEAR MODEL ARISING IN MATHEMATICAL BIOLOGY

Asif Yokus¹, Tukur Abdulkadir Sulaiman¹, Haci Mehmet Baskonus², Sibel Pasali Atmaca³

¹ Firat University, Department of Mathematics, Elazig, Turkey,

² Munzur University, Department of Computer Engineering, Tunceli, Turkey,

³ Mugla Sıtkı Kocman University, Mugla, Turkey,

asfyokus@yahoo.com, sulaiman.tukur@fud.edu.ng, hmbaskonus@gmail.com, sibela@mu.edu.tr

Abstract

This study acquires the exact and numerical approximations of a reaction-convection-diffusion equation arising in mathematical biology namely; Murry equation through its analytical solutions obtained by using a mathematical approach; the modified $\exp(-\psi(\eta))$ -expansion function method. We successfully obtained the kink-type and singular soliton solutions with the hyperbolic function structure to this equation. We performed the numerical simulations (3D and 2D) of the obtained analytical solutions under suitable values of parameters. We obtained the approximate numerical and exact solutions to this equation by utilizing the finite forward difference scheme by taking one of the obtained analytical solutions into consideration. We investigate the stability of the finite forward difference method with the equation through the Fourier-Von Neu-mann analysis. We present the L_2 and L_∞ error norms of the approximations. The numerical and exact approximations are compared and the comparison is supported by a graphic plot. All the computations and the graphics plots in this study are carried out with help of the Matlab and Wolfram Mathematica softwares. Finally, we submit a comprehensive conclusion to this study.

Keywords: MEFM, FDM, Murry equation, kink-type and singular soliton solutions, hyperbolic function structure, exact and numerical solutions

REFERENCES

- [1] M. Matinfar, M. Eslami, S. Roshandel, The First Integral Method to Study the (2+1)-Dimensional Jaulent-Miodek Equations, *Pramana-J Phys*, 85(4) (2015), 593-603.
- [2] Z. Zhang, J. Zhong, S.S. Dou, J. Liu, D. Peng, T. Gao, First Integral Method and Exact Solutions to Nonlinear Partial Differential Equations Arising in Mathematical Physics, *Romanian Report in Physics*, 65(4) (2013), 1155-1169.
- [3] N. Taghizadeh, M. Mirzazadeh, A.S. Paghaleh, The First Integral Method to Nonlinear Partial Differential Equations, *Applications and Applied Mathematics*, 7(1) (2012), 117-132.

Properties of anti-Kähler-Codazzi Manifolds

Sibel Turanlı^{1*} and Aydın Gezer²

1 Erzurum Technical University, Faculty of Science, Department of Mathematics,
email: sibel.turanli@erzurum.edu.tr

2 Atatürk University, Faculty of Science, Department of Mathematics,
email: agezer@atauni.edu.tr

ABSTRACT

In this paper, we give some results on anti-Kähler-Codazzi manifolds.

Key Words: Anti-Kähler-Codazzi manifolds.

REFERENCES

- [1] Salimov, A. and Turanlı, S., Curvature properties of anti-Kähler-Codazzi manifolds. C.R. Math. Acad. Sci. Paris. 351 (5-6), 225-227, 2013.
- [2] Salimov, A., Akbulut, K. and Turanlı, S., On an isotropic property of anti-Kähler-Codazzi manifolds. C. R. Math. Acad. Sci. Paris 351, no. 21-22, 837- 839, 2013.
- [3] Shtarbeva, D.K., On Some Riemannian Product Manifolds. Plovdiv University “Paissii Hilendarski”, Bulgaria Scientific Works, Vol. 35, Book 3, 2007.

Optical solitons and other solutions to the (2+1)-dimensional cubic nonlinear Schrodinger equation with fractional temporal evolution

Sibel Sehiban Atas¹, Tukur Abdulkadir Sulaiman^{1,2} and Hasan Bulut^{1,3}

¹Department of Mathematics, Firat University, Elazig, Turkey

²Department of Mathematics, Federal University Dutse, Jigawa, Nigeria

³Department of Mathematics Education, Final International University, Kyrenia, Cyprus

sibel.s.atas@gmail.com, sulaiman.tukur@fud.edu.ng, hbulut@firat.edu.tr

Abstract

In this study, the (2+1)-dimensional cubic nonlinear Schrodinger equation with fractional temporal evolution is investigated. The idea of conformable fractional derivative is used in transforming the complex nonlinear partial differential equation to nonlinear ordinary differential equation. Dark, bright, combined dark-bright, singular, combined singular solitons and singular periodic wave solutions are successfully constructed. The parametric conditions for the existence of valid solitons are given. The 2D and 3D graphics to the obtained solutions are plotted.

Keywords: The sinh-Gordon equation; NLSE; optical soliton.

REFERENCES

1. X. Xian-Lin and T. Jia-Shi, Travelling Wave Solutions for Konopelchenko-Dubrovsky Equation Using an Extended sinh-Gordon Equation Expansion Method, Commun. Theor. Phys., Vol:50, 1047 2008.
2. H. Bulut, T.A. Sulaiman, H. Bulut and T. Yazgan, Novel Hyperbolic Behaviors to Some Important Models in Quantum Science, Optical and Quantum Electronics, Vol:49, 349 2017.
3. N. Taghizadeh and M. Mirzazadeh, The direct algebraic method to complex nonlinear partial differential equations, International Journal of Applied Mathematics and Computation, Vol85, No:3, 12-16 2013

SUPER HALF DERIVATIVE FORMULATION WITH SUPER GAMMA FUNCTION ON SUPER SPACE

Simge Şimşek¹ Cansel Yormaz²

¹ Department of Mathematics, University of Pamukkale, Denizli, Turkey

² Department of Mathematics, University of Pamukkale, Denizli, Turkey

simged@pau.edu.tr, c_aycan@pau.edu.tr

Abstract

Differentiation are usually regarded as discrete operations, in the sense that we differentiate a function once, twice, or any whole number of times. However, in some circumstances it's useful to evaluate a fractional derivative. On the other hand, super space is the coordinate space of theory having supersymmetry. There are also anticommuting ordinary space dimensions x, y, z, \dots and these coordinates are labeled in Grassmann numbers rather than real numbers. However, all elements on super space which are named supernumbers occur from body part and soul part or further characterized by even part and odd part. The aim of this paper is to improve the fractional derivative calculus on super space with Gamma function.

Keywords: Fractional derivative; Gamma function; Super structure.

REFERENCES

1. A. Rogers, Supermanifolds Theory and Applications, World Scientific Pub., 2007, USA.
2. Cartier, P., DeWitt-Morette, C., Ihl, M., Saemann, C., and Bell, M. E., "Supermanifolds -- Application To Supersymmetry", Cornell University Library., arXiv:math-ph/0202026v1, (2002).
3. G., Sardanashvily, "Lectures On Supergeometry", Cornell University Library., arXiv:0910.0092v1, (2009).
4. G. Sardanashvily, Super Metrics On Super Manifolds, International Journal of Geometric Methods in Modern Physics, Vol. 5, No. 2 (2008) 271--286
5. Matthew N. Moore, Fundamentals of Fractional Calculus, Seminar, April 4, 2013
6. Podlubny, Fractional Of Equations, Ac. Press, 1995, USA.
7. S. Ferrara, R. Fioresi, Supersymmetry In Mathematic and Physics, Springer Pub. 2010, USA.

QUATERNIONS ON SUPER SPACE

Cansel Yormaz¹ Simge Şimşek²

¹ Department of Mathematics, University of Pamukkale, Denizli, Turkey

² Department of Mathematics, University of Pamukkale, Denizli, Turkey

c_aycan@pau.edu.tr, simged@pau.edu.tr

Abstract

In this article, the basic structure of the quaternions that can be thought of as points in a four dimensional system is discussed and süper quaternions are de.ned on super space which have a stronger place to solve the theoretical physics and mathematical problems.

Keywords: Superspace; Quaternions.

REFERENCES

1. Olmez, O, Genelleştirilmiş Kuarterniyonlar ve Uygulamaları, PhD Thesis, Ankara Univ., 2006.
2. Meral, M, Kuarterniyonlara Ait Matrisler İçinde De'Moivre ve Euler Formülleri, PhD Thesis, Ankara Univ., 2009.
3. Oflaz, S, Kuarterniyon Çeşitleri ve De Moivre Formülleri, PhD Thesis, Gazi Univ., 2015.
4. Hacısalıhođlu, H., H., Hareket Geometrisi ve Kuarterniyonlar Teorisi, Gazi Univ. Press., 1983.
5. Yormaz, C., Elmas, Ş., N., Simsek, S., Hamiltonian Mechanical System with Split Quaternions, Universal Journal of Applied Mathematics 6(1): 17-25, 2018
6. DeWitt, B., Supermanifolds, USA: Cambridge University Press., (1984).
7. Rogers, A., Supermanifolds, Theory And Applications, Singapore: World Scientific Pub., (2007).
8. Sardanashvily, G., "Lectures On Supergeometry", Cornell University Library., arXiv:0910.0092v1, (2009).
9. Cartier, P., DeWitt-Morette, C., Ihl, M., Saemann, C., and Bell, M. E., "Supermanifolds -- Application To Supersymmetry", Cornell University Library., arXiv:math-ph/0202026v1, (2002).

SOFT SIMPLICIAL RELATIONS FOR SOME SOFT SIMPLICIAL STRUCTURES IN DIGITAL IMAGES

Simge Öztunç¹

¹ Department of Mathematics, Manisa Celal Bayar University, Martyr Prof. Dr. İlhan Varank Campus, 45030, Manisa, Turkey

simge.oztunc@cbu.edu.tr,

Abstract

In this paper, we investigate some new properties of soft simplicial maps by using κ – adjacency relation for digital images. We focus on soft simplicial complexes and soft simplicial sets as soft simplicial structures in digital images and obtain some results dealing with face and degenerate maps for κ – adjacent soft simplicial structures.

Keywords: Digital Image; Soft Simplicial Maps; Soft Simplicial Set.

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REFERENCES

1. Laurence Boxer, Digitally Continuous Functions, Pattern Recognition Letters, Vol. 15, pp. 833–839, 1994.
2. Greg Freidman, An Elementary Illustrated Introduction to Simplicial Set, 2011.
3. Pradip K. Maji, Ranjit Biswas and Akhil Ranjan Roy, Soft Set Theory, Comput. Math. Appl., 45, 555-562, 2003.
4. J. Peter May, Simplicial Objects in Algebraic Topology, Van Nostrand, Math. Studies, 11, 1967.
5. Dmitri Anatol'evich Molodtsov, “Soft Set Theory-First Result,” Comput. Math, Appl., 37, pp. 19-31, 1999.
6. Simge Öztunç, Necdet Bildik, Ali Mutlu, The Construction of Simplicial Groups in Digital Images, Journal of Inequalities and Applications, 143, doi:10.1186/1029-242X-2013-143, 2013.
7. Simge Öztunç, Soft Simplicial Homotopy for Digital Images, International Conference on Mathematics and Engineering Abstract Book Pp. 388, 10-12 May, 2017.
8. Azrael Rosenfeld, ‘Continuous’ Functions on Digital Pictures, Pattern Recognition Letters, Vol. 4, pp. 177–184, 1986.

ON LACUNARY WEAK STATISTICAL CONVERGENCE OF ORDER α

Sinan Ercan¹, Yavuz Altın¹, Çiğdem A. Bektaş¹

¹ Department of Mathematics, University of Firat, Elazığ, Turkey

sinanercan45@gmail.com / yaltin23@yahoo.com / cbektas@firat.edu.tr

Abstract

In this paper, we introduce weakly lacunary statistical convergence of order α and weakly N_θ^α -convergence for $0 < \alpha \leq 1$. We give some properties of these modes of convergence and examine some inclusion relations.

Keywords: Lacunary sequence, weak convergence, statistical convergence.

REFERENCES

1. J. Fridy, On statistical convergence, *Analysis* 5 (1985), 301-313.
2. T. Šalát, On statistically convergent sequences of real numbers, *Math. Slovaca* 30 (1980), 139-150.
3. A. D. Gadjiev, C. Orhan, Some approximation theorems via statistical convergence, *Rock Mountain J. Math.* 32(1) (2002), 129-138.
4. R. Çolak, Statistical convergence of order α , In: *Modern Methods in Analysis and Its Applications*, M. Mursaleen (Ed.), pp. 121-129, Anamaya Pub. New Delhi, India, 2010.
5. J. A. Fridy, C. Orhan, Lacunary statistical convergence, *Pac. J. Math.* 160 (1993), 43-51.
6. F. Nuray, Lacunary weak statistical convergence, *Math. Bohem.* 136 (2011), no. 3, 259-268.
7. J. Connor, M. Ganichev, V. Kadets, A characterization of Banach spaces with separable duals via weak statistical convergence, *J. Math. Anal. Appl.* (2000) 244-251
8. V. K. Bhardwaj, I. Bala, On weak statistical convergence, *Int. J. Math. Math. Sci.* (2007) Art. ID 38530 9 pp.
9. Meenakshi, M. S. Saroa, V. Kumar, Weak statistical convergence defined by de la Vallée-Poussin mean, *Bull. Calcutta Math. Soc.* (2014), 106 no. 3, 215-224.

ON A NEW CONCEPT OF ALMOST CONVERGENCE

Sinan ERCAN¹

¹ Department of Mathematics, University of Firat, Elazig, Turkey

sinanercan45@gmail.com,

Abstract

The aim of present work is to introduce a new concept of almost convergence of sequences. New normed spaces are defined and some inclusion relations are examined concerning those spaces with examples. Further, the β - and γ -duals of the these new spaces are computed. Consequently, some matrix classes on these spaces are characterized.

Keywords: Almost convergence, matrix domain, β -, γ -duals, matrix transformations.

REFERENCES

1. P. Kórus, On λ^r -strong convergence of numerical sequences and Fourier series, J. Class. Anal., 9, no. 2, 89-98, 2016.
2. Qamaruddin, S. A. Mohuiddine, Almost convergence and some matrix transformations, Filomat, 21(2):261-266, 2007.
3. M. Mursaleen, A. K. Noman, On the spaces of λ -convergent sequences and bounded sequences, Thai J. Math, Volume 8, Number 2, 2010, 311-329.
4. A. Wilansky, Summability Through Functional Analysis, in: North-Holland Mathematics Studies, Elsevier Science Publishers, Amsterdam, New York, 1984.
5. G. G. Lorentz, A contribution to the theory of divergent sequences, Acta Math., 80, 167-190, 1948.
6. A. M. Jarrah, E. Malkowsky, BK spaces, bases and linear operators, Ren. Circ. Mat. Palermo II, 52, 177-191, 1990.
7. G. M. Petersen, Regular Matrix Transformations, McGraw-Hill, New York Toronto Sydney, 1970.
8. J. P. King, Almost summable sequences, Proc. Am. Math. Soc., 17 1219-1225, 1966.
9. F. Başar, Summability Theory and Its Applications, Bentham Science Publishers, Istanbul, 2012, e-books, Monographs.

English as the Language of Instruction for Mathematics

Suheyła Demirkol Orak

School of Foreign Languages, University of Firat, Elazig, Turkey

sudemirkol@gmail.com

In the last few decades, language of instruction nearly all over the world has been turned into English (in some part of the world 100 %, and in some part between 30-70 % of the mathematic lessons have been instructed in English) [1] to make transformation simple, bilingual high-stakes tests are being conducted as an accommodation scale, with the target of finally having English-only exams. . Especially in the immersion programmes together with the popularity of content based teaching method, mathematic lessons were gradually started to be taught in English. Talented lecturers have been expected teach mathematic lessons in English, rather than in Turkish (mother tongue), [2] particularly to harvest recipients who are intellectual, self-confident and proffers definitely to the existence of a dynamic community. There has been many discuss on the subject of teaching maths in English and [3]whether it is a common linguistic ability or a kind of mathematical ability. The aim of this study is to search for the difficulties lecturers are facing within the higher education institution in terms of teaching maths lessons in English rather than in mother tongue. It is also important to examine the local variables while conducting the study.

Keywords: Immersion Programmes, Content based teaching, high-stakes test

References

[1] May Tan & Lan Ong Saw (2011): Teaching mathematics and science in English in Malaysian Classrooms: The impact of teacher beliefs on classroom practices and student learning, Journal of English for Academic Purposes, Vol: 10, (2011) pp.5-18

[2] Noriza Majid, Saiful Hafizah Jaaman, Maslina Darus, Roslinda Mohd Nazar, Rokiah and Rozita Ahmad, Nora Muda, Nur Riza Mohd Suradi, Azmin Sham Rambely, Ummul Khair Salma Din, Wan Rosmanira Ismail, Nur Jumaadzan Zaleha Mamat, Abdul Ghafur Ahmad, Abdul Malek Zakaria, Zaidi Isa, Hamizun Ismail, Zainol Mustafa, Humaida Banu Shamsudin, Wan Zawiah Wan Zin, Marina Zahari, Faridatulazna Ahmad Shahabuddin, Zalina Mohd Ali, Norkisme Zainal Abidin, Nasruddin Hassan, Abul Razak Salleh & Najib Mahmood Rafee (2011): Transformation of teaching and learning mathematics in English: are the lecturers ready? , UKM Teaching and Learning Congress 2011, Procedia - Social and Behavioral Sciences, Vol: 59 (2012) pp, 650 – 656. Doi: 10.1016/j.sbspro.2012.09.326

[3] Pip Neville-Barton & Bill Barton (2005): The Relationship between English Language and Mathematics Learning for Non-native Speakers. Teaching and Learning Research Initiative, c/- NZCER, P O Box 3237, Wellington, New Zealand, TLRI (2005). pp.4.

A hybrid simulation for a system of singularly perturbed two-point reaction-diffusion equations

Süleyman Cengizci¹

¹ Department of Computer Programming, Antalya Bilim University, Antalya, Turkey

cengizci.suleyman@metu.edu.tr,

Abstract

This study is concerned with systems of singularly perturbed second order reaction-diffusion equations in ODE's. To handle this type of problems, a numerical-asymptotic hybrid method is employed. In this hybrid method, an efficient asymptotic method so-called Successive complementary expansion method (SCEM) is employed first and then, a numerical method based on finite differences is proposed to approximate to the solution of corresponding singularly perturbed reaction-diffusion systems. Numerical examples are provided to show the efficiency and easy-applicability of the present method with convergence properties.

Keywords: Asymptotic approximation, Boundary layer, Reaction-diffusion equations, SCEM, Singular perturbation problems.

REFERENCES

1. Lin, Runchang, and Martin Stynes. "A balanced finite element method for a system of singularly perturbed reaction-diffusion two-point boundary value problems." *Numerical Algorithms* 70.4 (2015): 691-707.
2. Linß, Torsten, and Niall Madden. "A finite element analysis of a coupled system of singularly perturbed reaction--diffusion equations." *Applied mathematics and computation* 148.3 (2004): 869-880.
3. Matthews, S., E. O'Riordan, and G. I. Shishkin. "A numerical method for a system of singularly perturbed reaction--diffusion equations." *Journal of Computational and Applied Mathematics* 145.1 (2002): 151-166.
4. Paramasivam, Mathiyazhagan, John JH Miller, and Sigamani Valarmathi. "Second order parameter-uniform numerical method for a partially singularly perturbed linear system of reaction-diusion type." *Mathematical Communications* 18.1 (2013): 271-295.

Some comparisons between MMAE and SCEM for solving singularly perturbed linear problems

Süleyman Cengizci¹

¹ Department of Computer Programming, Antalya Bilim University, Antalya, Turkey

cengizci.suleyman@metu.edu.tr,

Abstract

In this study, we propose an efficient method so-called Successive Complementary Expansion Method (SCEM) for approximating to the solutions of singularly perturbed two-point boundary value problems. In this efficient asymptotic method, in contrast to the well-known method the Method of Matched Asymptotic Expansions (MMAE), the matching process is not necessary to obtain uniformly valid approximations. The key point: A uniformly valid approximation is adopted first, and complementary functions are obtained imposing the corresponding boundary conditions. MMAE results are given in order to compare the numerical robustness of the methods. Numerical results and the comparisons demonstrate absolute superiority of SCEM to MMAE for linear problems.

Keywords: Singular perturbation, Successive complementary expansion method, Uniformly valid approximation.

REFERENCES

1. J. Mauss, J. Cousteix, Uniformly valid approximation for singular perturbation problems and matching principle, C. R. Mécanique 330 (10) (2002) 697--702.
2. J. Cousteix, J. Mauss, Asymptotic Analysis and Boundary Layers. Scientific Computation, vol. XVIII, Springer, Berlin, Heidelberg, 2007.
3. M. H. Holmes, Introduction to Perturbation Methods, Second Ed., Texts in Applied Mathematics, Springer, 2013.
4. Y.N. Reddy, P.P. Chakravarthy, An initial-value approach for solving singular perturbed two-point boundary value problems, Appl. Math. Comput. 155 (2004) 95--110.
5. M. Kumar, H.K. Mishra, P. Singh, A boundary value approach for a class of linear singularly perturbed boundary value problems, Adv. Eng. Softw. 40 (2009) 298--304.
6. Shampine, Lawrence F., Jacek Kierzenka, and Mark W. Reichelt. "Solving boundary value problems for ordinary differential equations in MATLAB with bvp4c." Tutorial notes 2000 (2000): 1-27.

SOLUTION OF AN OPTIMAL CONTROL PROBLEM WITH MEASURED DATA AT THE FINAL TIME FOR A VIBRATING BEAM

S. Şule Şener¹ and Yeşim Saraç²

^{1,2} Department of Mathematics, University of Ataturk, Erzurum, Turkey

senersule@atauni.edu.tr and ysarac@atauni.edu.tr

Abstract

In this article, we deal with solving an optimal control problem for a beam equation. We get the existence, uniqueness of the optimal solution of this problem. The gradient of the cost functional on the set of admissible controls is derived via the solution of the adjoint problem. We give an iteration algorithm for the numerical solution of the problem considered using the Gradient Method based on the gradient of the cost functional.

Keywords: Final overdetermination; Optimal control.

REFERENCES

1. Chun-Hung Lin, John C. Bruch Jr, James M. Sloss, Sarp Adalı and Ibrahim S. Sadek, Optimal multi-interval control of a cantilever beam by a recursive control algorithm, *Optimal Control applications and Methods*, Vol:30, 399-414, 2009.
2. Alemdar Hasanov and Alexandre Kawano, Identification of unknown spatial load distributions in a vibrating Euler–Bernoulli beam from limited measured data, *Inverse Problems*, Vol:32, 1-31, 2016.
3. Francisco J. Marin, Jesus Martinez-Frutos and Francisco Periago, Robust averaged control of vibrations for the Bernoulli-Euler beam equation, *J. Optim Theory Appl*, Vol:174, 428-454, 2017.
4. Q. Wang and C. M. Wang, A controllability index for optimal design of piezoelectric actuators in vibration control of beam structures, *Journal of Sound and Vibration*, Vol:242, No:3, 507-518, 2001.
5. A. Kawano, Uniqueness in the identification of asynchronous sources and damage in vibrating beams, *Inverse Problems*, Vol: 30, 1-16, 2014.

GALERKIN METHOD FOR THE NUMERICAL SOLUTION OF THE BEAM EQUATION

S. Şule Şener¹

¹ Department of Mathematics, University of Ataturk, Erzurum, Turkey

senersule@atauni.edu.tr,

Abstract

In this article, we give the numerical solution of the boundary value problem for the Euler-Bernoulli equation. The Galerkin method have been used to obtain this solution. We solve the numerical examples and show the errors of the approximation solutions in the tables.

Keywords: Euler-Bernoulli theory; Numerical method.

REFERENCES

1. Abubakr E. S. Musa, Galekin method for bending analysis of beams on non-homogeneous foundation, Journal of Applied Mathematics and Computational mechanics, Vol:16. No:3, 61-72, 2017.
2. O. A. Ladyzhenskaya, Boundary Value Problems in Mathematical Physics, Springer, New York, 1985.
3. Daniel Lesnic, Determination of the flexural rigidity of a beam from limited boundary measurements, J. Appl. Math. And Computing, Vol:20, No:1-2, 17-34, 2006.
4. Mahboub Baccouch, The local Discontinuous Galerkin method for the Fourth-order Euler-Bernoulli Partial Differential Equation in one Space Dimen –sion.Part I: Superconvergence error analysis, J. Sci Comput, Vol:59, 795-840, 2014.

*-Balanced Fuzzy Graphs

Talal Al-Hawary¹

¹ Department of Mathematics, Yarmouk University, Irbid, Jordan

talalhawary@yahoo.com,

Abstract

In this article, we introduce the relatively new concept of *-density of a fuzzy graph and *-balanced fuzzy graph. Several examples and results are also provided. In addition, many operations on fuzzy graphs that preserves *-balanced are explored.

Keywords: Fuzzy graph. *-density , *-balanced.

REFERENCES

- [1] T. Al-Hawary, Certain classes of fuzzy graphs, Eur. J. Pure Appl. Math. 10(3)(2017), 552-560.
- [2] T.AL-Hawary, Complete fuzzy graphs, International J. Math. Combin., 4(2011) 26-34.
- [3] T. Al-Hawary and Bayan Horani, ON INTUITIONISTIC PRODUCT FUZZY GRAPHS, Ital. J. Pure. Appl. Math. 38(2017), 113-126.
- [4] T. Al-Hawary and Bayan Horani, On product fuzzy graphs, Annals of fuzzy mathematics and Informatics 12(2)(2016), 279-294.
- [5] A.Nagoor Gani and J. Malarvizhi, Isomorphism on fuzzy graphs, Int. J. Comp. and Math. Sci. 2(4)(2008), 190-196.
- [6] A.Nagoor Gani and J. Malarvizhi, Isomorphism properties on strong fuzzy graphs, Int. J. Algorithms, Comp. and Math. 2(1)(2009), 39-47.
- [7] A.Nagoor Gani and K. Radha, On regular fuzzy graphs, J.physical Sciences 12(2008), 33-40.
- [8] A.Rosenfeld, Fuzzy graphs, in L.A zadeh K.S. Fu, K. Tabaka and M. Shirmura (Eds.), Fuzzy and their applications to congnitive and devision processes, Academic Press, New York, 1975, 77+95.
- [9] J. N. Mordeson and C. S. peng, Operations on fuzzy graphs, Information sciences 79(1994), 381-384.
- [10] K. R. Bhutani, On automorphism of fuzzy graphs, Pattern Recognition Letter 9(1989), 159-162.
- [11] L.A Zadeh, Fuzzy sets, Inform. Control. 8(1965),338-353.
- [12] M.S Sunitha and A. V. Kumar, Complements of fuzzy graphs, indian J. pure Appl. Math, 33(9)(2002), 1451-1464.

VARIATION FORMULAS OF SOLUTIONS FOR CONTROLLED DELAY DIFFERENTIAL EQUATIONS WITH THE CONTINUOUS AND DISCONTINUOUS INITIAL CONDITIONS

Tea Shavadze¹

¹Department of Mathematics & I. Vekua Institute of Applied Mathematics, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia

tea.shavadze@gmail.com,

Abstract

As is known, real controlled processes contain an information about their behavior in the past i.e., such processes contain effects with delayed action and are described by controlled differential equations with delays. Linear representation of the main part of the increment of a solution with respect to perturbations of the initial data is called the variation formula of solution (variation formula). The variation formula plays the basic role in proving the necessary conditions of optimality and sensitivity analysis of mathematical models. Moreover, the variation formula allows one to construct an approximate solution of the perturbed equation. The continuity (discontinuity) of the initial condition means that the values of the initial function and the trajectory always coincide (not coincide) at the initial moment.

In this article, for the nonlinear controlled differential equations with several constant delays the variation formulas of solutions are proved, in which the effects of the continuous and discontinuous initial conditions, perturbations of delays and the initial moment are detected. The variation formulas obtained here are proved by the scheme given in [1].

Keywords: Delay controlled differential equation, variation formula of solution, effects of the continuous and discontinuous initial conditions, effects of delays perturbations, effect of the initial moment perturbation.

REFERENCES

1. T. Tadumadze, Variation formulas of solutions for functional differential equations with several constant delays and their applications in optimal control problems, Mem. Differ. Equ. Math. Phys. 70, 7–97, 2017.

Investigation of the solution of nonlinear partial differential equations by MEFM

Tolga Akturk

¹Department of Mathematics, Ordu University, Ordu, Turkey

tolgaakturk@gmail.com

Abstract

In this article, The travelling wave solutions of the Modified Camassa-Holm (MCH) equation were obtained by using the Modified Expansion Function Method (MEFM). According to the obtained solutions, trigonometric functions with hyperbolic properties are obtained in the complex structure. For this reason, the graphics of the solutions are found to be real and imaginary by selecting the appropriate parameters. All the obtained solutions provide the MCH equation. In this work, all mathematical calculations are done with Wolfram Mathematica software.

Keywords: Modified Expansion Function method, Modified Camassa-Holm equation, The solitary wave solution

REFERENCES

1. Bulut H , Sulaiman T.A. , Erdogan F and Baskonus H.M., On the new hyperbolic and trigonometric structures to the simplified MCH and SRLW equations, Eur Phys J Plus.;132:350 2017
2. H. Bulut, T.A. Sulaiman and H.M. Baskonus., Eur. Phys. J. Plus , 132 459 2017
3. F. Xu, Phys. Lett. A 372, 252 2008
4. A. Irshad, M. Usman, S.T. Mohyud-Din, Int. J. Mod. Math. Sci. 4, 146 2012
5. H. Bulut, T.A. Sulaiman, H.M. Baskonus and T. Yazgan., *Opt. Quant. Electron.* 49 349 2017
6. H.M. Baskonus, T.A. Sulaiman and H. Bulut., *Indian J. Phys.* 135 327-336 2017
7. H.M. Baskonus, H. Bulut and A. Atangana., *Iop Publishing* 25(3) 035022 2016
8. T.A. Sulaiman, T. Akturk, H. Bulut and H.M. Baskonus., *Journal of Electro. Waves and Appl.*<https://doi.org/10.1080/09205071.2017.1417919> 1-13 2017
9. H. Bulut , T.A. Sulaiman, H.M. Baskonus and T. Akturk., *Opt. Quant. Electron.* 50:19 2018
10. T.A. Sulaiman, T. Akturk, H. Bulut , H.M. Baskonus., *Journal of Electro. Waves and Appl.*<https://doi.org/10.1080/09205071.2017.1417919> 2018
11. H. Bulut , T.A. Sulaiman, H.M. Baskonus and T. Akturk., *Opt. Quant. Electron.* 50:19 2018
12. T.A. Sulaiman, T. Akturk, H. Bulut , H.M. Baskonus., *Journal of Electro. Waves and Appl.*<https://doi.org/10.1080/09205071.2017.1417919> 2018

New Function Method for the Heat Equation

Tolga Akturk¹, Yusuf Gurefe², Yusuf Pandir³

¹ Department of Mathematics and Science Education, Faculty of Education, Ordu University, Turkey

² Department of Econometrics, Faculty of Economics and Administrative Sciences, Usak University, Turkey

³ Department of Mathematics, Faculty of Science and Arts, Bozok University, Turkey

tolgaakturk@gmail.com, ygurefe@gmail.com, yusufpandir@gmail.com

Abstract

In this study, the wave solutions of the heat equation with exponential nonlinearity have been constructed by using the new function method. Thus, trigonometric wave solutions are obtained via this approach. Also, some graphical interpretations are given with aid of the Mathematica package program.

Keywords: New function method; Heat equation; Wave solutions.

REFERENCES

1. V. F. Zaitsev, A. D. Polyanin, Handbook of partial differential equations: exact solutions [in Russian], Mezhdunarodnaya Programma Obrazovaniya, Moscow, 1996.
2. A. D. Polyanin, V. F. Zaitsev, Handbook of nonlinear partial differential equations, Chapman & Hall/CRC, Boca Raton, 2004.
3. G., Shen, Y., Sun, Y., Xiong, New travelling-wave solutions for Dodd-Bullough equation, Journal of Applied Mathematics, Vol:2013, 1–5, 2013.
4. T. Akturk, Y. Gurefe, Y. Pandir, An Application of the new function method to Zhiber-Shabat equation, An International Journal of Optimization and Control: Theories & Applications, Vol:7, No:3, 271–274, 2017.
5. T. Akturk., Y. Gurefe, H. Bulut, New function method to the (n+1)-dimensional nonlinear problems, An International Journal of Optimization and Control: Theories & Applications, Vol:7, No:3, 234–239, 2017.
6. H. Bulut., T. Akturk., Y. Gurefe, Traveling wave solutions of the (N+1)-dimensional sine-cosine-Gordon equation, AIP Conference Proceedings, Vol:1637, No:1, 145–149, 2014.

Complex Acoustic Gravity Wave Behaviors to a Mathematical Model Arising in Nonlinear Mathematical Physics

Tolga Akturk¹, Tukur Abdulkadir Sulaiman^{2,3}, Hasan Bulut^{2,4} and Hacı Mehmet Baskonus⁵

¹Department of Mathematics, Ordu University, Ordu, Turkey

²Department of Mathematics, Firat University, Elazig, Turkey

³Department of Mathematics, Federal University Dutse, Jigawa, Nigeria

⁴Department of Mathematics Education, Final International University, Kyrenia, Cyprus

⁵Department of Computer Engineering, Munzur University, Tunceli, Turkey

tolgaakturkk@gmail.com, sulaiman.tukr@fud.edu.ng, hbulut@firat.edu.tr,
hmbaskonus@gmail.com

Abstract

In this article, with the aid of the Wolfram Mathematica package, we utilize the powerful sine-Gordon expansion method in constructing some new solutions to the (2+1)-dimensional Boiti Leon-Pempinelli equation. We successfully obtain some new travelling solutions bearing some new structures such as trigonometric function, exponential function and hyperbolic function structures. We claim that some of our results are complex in structure. All the solutions obtained verified the (2+1)-dimensional Boiti-Leon-Pempinelli equation. To illustrate our results, present the numerical simulation of all the obtained solutions in this study by choosing suitable values of the parameters. Furthermore, we give the physical interpretation of all the graphics. We also give the physical meaning to some of the obtained results in this study.

Keywords: The SGEM; the (2+1)-dimensional BLP equation; trigonometric function; exponential function; hyperbolic function solution.

REFERENCES

1. Z. Yan and H. Zhang, New Explicit and exact Travelling Wave Solutions for a System of Variant Boussinesq equations in Mathematical Physics, Physics Letters A, Vol:252, 291-296 1999
2. H. Bulut, T.A. Sulaiman and H.M. Baskonus, New Solitary and Optical Wave Structures to the Korteweg-de Vries Equation with Dual-Power Law Nonlinearity, Opt Quant Electron, Vol:48, 564 2016
3. H.M. Baskonus and H. Bulut Exponential prototype structures for (2+1)-dimensional Boiti-Leon-Pempinelli systems in mathematical physics, Waves in Random and Complex Media, Vol:26, No:2, 201-208 2016

New numerical approximation of Atangana-Baleanu fractional derivative

Toufik Mekkaoui¹ and Abdon Atangana²

¹Department of Mathematics, Moulay Ismail University

² University of the Free-State, South Africa

* toufikmekkaoui65@gmail.com

Abstract

Recently a new concept of fractional differentiation with non-local and non-singular kernel was introduced in order to extend the limitations of the conventional Riemann-Liouville and Caputo fractional derivatives. A new numerical scheme has been developed, in this paper, for the newly established fractional differentiation. We present in general the error analysis. The new numerical scheme was applied to solve linear and non-linear fractional differential equations. We do not need a predictor-corrector to have an efficient algorithm, in this method. The comparison of approximate and exact solutions leaves no doubt believing that, the new numerical scheme is very efficient and converges toward exact solution very rapidly.

Keywords: Non-singular kernel; Predictor-corrector; Approximate solution; chaotic models.

REFERENCES

1. Toufik, M., & Atangana, A. (2017). New numerical approximation of fractional derivative with non-local and non-singular kernel: Application to chaotic models. *The European Physical Journal Plus*, 132(10), 444.
2. Atangana, A., & Koca, I. (2016). Chaos in a simple nonlinear system with Atangana-Baleanu derivatives with fractional order. *Chaos, Solitons & Fractals*, 89, 447-454.

NUMERICAL RESULTS OF REGIONAL BOUNDARY GRADIENT CONTROLLABILITY WITH OUTPUT CONSTRAINTS

Touria Karite¹ and Ali Boutoulout¹ and Fatima Zharae El Alaoui¹

¹ TSI Team, MACS Laboratory, Department of Mathematics & Computer Sciences, Faculty of Sciences, Moulay Ismail University, Meknes, Morocco

touria.karite@gmail.com, boutouloutali@yahoo.fr, fzelalaoui2011@yahoo.fr

Abstract

The aim of this paper is to study the boundary enlarged gradient controllability problem governed by parabolic evolution equations. The purpose is to find and compute the control u which steers the gradient state from an initial gradient one y_0 to a gradient vector supposed to be unknown between two defined bounds b_1 and b_2 , only on a subregion Γ of the boundary $\partial\Omega$ of the system evolution domain Ω . The obtained results have been proved via two approaches, The sub-differential and Lagrangian multiplier approach. A numerical approach is given with an example to validate the theoretical results.

Keywords: Distributed systems; Parabolic systems; Boundary; Regional controllability; Sub-differential; Gradient; Lagrangian multipliers; Semilinear systems; Minimum energy.

REFERENCES

1. M. Kurula, H. Zwart, The Duality Between the Gradient and Divergence Operators on Bounded Lipschitz Domains, Department of Applied Mathematics, University of Twente, October 2012.
2. T. Karite, A. Boutoulout, Regional constrained controllability for parabolic semilinear systems, International Journal of Pure and Applied Mathematics, Vol:113, No:1, 113-129, 2017.
3. J. P. Aubin, S. Wilson, Optima and Equilibria: An Introduction to Nonlinear Analysis, Springer-Verlag, Berlin Heidelberg, 2002.
4. M. Fortin, R. Glowinski, Augmented Lagrangian Methods: Applications to the numerical solution of boundary-value problems, North-Holland, Vol:15, 1983.
5. R. T. Rockafellar, Lagrange multipliers and optimality, SIAM Review, Vol:35, No:2, 183-238, 1993.

SOME SPECTRAL PROPERTIES OF P-LAPLACIAN DIFFUSION BOUNDARY VALUE PROBLEM ON TIME SCALES

Tuba Gulsen¹, Emrah Yilmaz², Meltem Kayali³

^{1,2,3} Department of Mathematics, University of Firat, Elazig, Turkey

tubagulsen87@hotmail.com, emrah231983@gmail.com, meltemkayali23.23@gmail.com

Abstract

In this study, we consider p -Laplacian type Diffusion boundary value problem on an arbitrary time scales. We generalize some spectral properties of p -Laplacian Diffusion problem to an arbitrary time scales.

Keywords: p -Laplacian Diffusion equation; Time Scales.

REFERENCES

1. M. G. Gasymov, G. Sh. Guseinov, Determination of a diffusion operator from spectral data, Doklady Akademii Nauk Azerb. SSR, 19-23, 1981.
2. S. Hilger, Masskettenkalkül mit Anwendung auf Zentrumsmannigfaltigkeiten [Ph.D. thesis], Universitat Wurzburg, 1988.
3. M. Bohner and A. Peterson, Dynamic equations on time scales: an introduction with applications, Boston (MA), Birkhauser, Boston Inc, 2001.
4. W. C. Wang, Y. H. Cheng, W. C. Lian, Inverse nodal problems for the p -Laplacian with eigenparameter dependent boundary conditions, Mathematical and Computer Modeling, 54, 11, 2718–2724, 2011.
5. T. Gulsen, and E. Yilmaz, Inverse nodal problem for p -Laplacian diffusion equation with polynomially dependent spectral parameter, Communications, Series A1; Mathematics and Statistics, 65, 2 23-36, 2016.
6. T. Gulsen, S. S. M. Sian, E. Yilmaz, H. Koyunbakan, Impulsive Diffusion Equation on Time Scales, International Journal of Analysis and Applications, 16, 1, 137-148, 2018.

P-LAPLACIAN DIRAC SYSTEM ON TIME SCALES

Tuba Gulsen¹, Emrah Yilmaz², Meltem Kayali³

^{1,2,3} Department of Mathematics, University of Firat, Elazig, Turkey

tubagulsen87@hotmail.com, emrah231983@gmail.com, meltemkayali23.23@gmail.com

Abstract

In this study, we consider p -Laplacian type Dirac boundary value problem on an arbitrary time scales. We examine some spectral properties of this problem.

Keywords: p -Laplacian Dirac system; Time Scales.

REFERENCES

1. S. Hilger, Masskettenkalkül mit Anwendung auf Zentrumsmannigfaltigkeiten [Ph.D. thesis], Universitat Wurzburg, 1988.
2. M. Bohner and A. Peterson, Dynamic equations on time scales: an introduction with applications, Boston (MA), Birkhauser, Boston Inc, 2001.
3. W. C. Wang, Y. H. Cheng, W. C. Lian, Inverse nodal problems for the p -Laplacian with eigenparameter dependent boundary conditions, Mathematical and Computer Modelling, 54, 11, 2718–2724, 2011.
4. C. F. Yang, V. N. Pivovarchik, Inverse nodal problem for Dirac system with spectral parameter in boundary conditions, Complex Analysis and Operator Theory, 7, 4, 1211-1230, 2013.
5. T. Gulsen and E. Yilmaz, Spectral theory of Dirac system on time scales, Applicable Analysis, 96, 2684-2694, 2017.
6. T. Gulsen, E. Yilmaz, and H. Koyunbakan, Inverse nodal problem for p -Laplacian Dirac system, Mathematical Methods in the Applied Sciences, 40, 7, 2329-2335, 2017.

Constant Angle Spacelike Surface in de Sitter 3-Space

Tuğba MERT

Department of Mathematics, University of Cumhuriyet, Sivas, Turkey

tmert@cumhuriyet.edu.tr,

Abstract

In this paper; using the angle between unit normal vector field of surfaces and a fixed spacelike axis in Minkowski 4-space. We develop two class of spacelike surface which are called constant timelike angle surfaces with timelike and spacelike axis in de Sitter 3-space. Moreover we give constant timelike angle tangent surfaces which are examples constant angle surfaces in de Sitter 3-space.

Keywords: Constant angle surfaces, de Sitter space, Helix.

REFERENCES

1. R. Lopez, M.I. Munteanu, Constant angle surfaces in Minkowski space, Bulletin of the Belgian Math. So. Simon Stevin, Vo.18 (2011) 2, (271-286).
2. S.Izumiya, K.Saji, M.Takahashi, Horospherical flat surfaces in Hyperbolic 3-space, J.Math.Soc.Japan, Vol.87 (2010), (789-849).
3. S.Izumiya, D.Pei, M.D.C.R. Fuster, The horospherical geometry of surfaces in hyperbolic 4-spaces, Israel Journal of Mathematics, Vol.154 (2006), (361-379).
4. C.Thas, A gauss map on hypersurfaces of submanifolds in Euclidean spaces, J.Korean Math.Soc., Vol.16 (1979) No.1.
5. S.Izumiya, D.Pei, T.Sano, Singularities of hyperbolic gauss map, London Math.Soc. Vol.3 (2003), (485-512).
6. M.I.Munteanu, A.I.Nistor, A new approach on constant angle surfaces in Euclidean 3-space, Turk T.Math.Vol.33 (2009), (169-178).
7. C.Takizawa, K.Tsukada, Horocyclic surfaces in hyperbolic 3-space, Kyushu J.Math. Vol.63 (2009), (269-284).
8. S.Izumiya, M.D.C.R. Fuster, The horospherical Gauss-Bonnet type theorem in hyperbolic space, J.Math.Soc.Japan, Vol.58 (2006), (965-984).
9. B. O'Neill, Semi-Riemannian Geometry with applications to relativity, Academic Press, NewYork, 1983.
10. J.G.Ratcliffe, Foundations of Hyperbolic Manifolds, Springer 1948.

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On the solitary wave solutions to the (2+1)-dimensional cubic Klein-Gordon and modified Zakharov-Kuznetsov equations

Tugba Yazgan² and Hasan Bulut¹

¹Department of Mathematics, Firat University, Elazig, Turkey

²Department of Mathematics, Ataturk University, Erzurum, Turkey

tubayzgn01@gmail.com, hbulut@firat.edu.tr

Abstract

In this paper, the extended sinh-Gordon equation expansion method is used in constructing various solitary wave solutions to the (2+1)-dimensional cubic Klein-Gordon and modified Zakharov-Kuznetsov equations such as the topological, non-topological, topological kink-type, non-topological kink-type and singular soliton solutions. All the reported solutions in this study verify their corresponding equation. We also plot the 2D and 3D graphics to the obtained solutions. We compare our results with some reported results in the literature. We finally present a comprehensive conclusion.

Keywords: The extended ShGEEM; cKG; mZK; topological.

REFERENCES

1. X. Xian-Lin and T. Jia-Shi, Travelling Wave Solutions for Konopelchenko-Dubrovsky Equation Using an Extended sinh-Gordon Equation Expansion Method, Commun. Theor. Phys., Vol:50, 1047 2008.
2. H. Bulut, T.A. Sulaiman, H. Bulut and T. Yazgan, Novel Hyperbolic Behaviors to Some Important Models in Quantum Science, Optical and Quantum Electronics, Vol:49, 349 2017.
3. M. Eslami, Trial solution technique to chiral nonlinear Schrodinger equation in (1+2)-dimensions, Nonlinear Dyn., Vol:85, No:2, 813-816 2016

DESIGN AND MANUFACTURE OF WEAR TEST MACHINE FOR MICRO MODULE GEARS

Tuğçe Tezel, Eyüp Sabri Topal, Volkan Kovan

Akdeniz University, Engineering Faculty, Mechanical Engineering Department, Antalya, Turkey
tugcetezel@akdeniz.edu.tr, eyupsabritopal@akdeniz.edu.tr, kovan@akdeniz.edu.tr

Abstract

Gears are the most widely used machine elements to transmit movement and mechanical power between the shafts. Gear tooth failures caused by wear, fatigue or fracture results in technical, critical and economical problems. For investigating wear failures, the FZG gear test systems have widespread used and accepted as the standard test in the world. However, there is no FZG test system or other standardized test device that can be used to examine the wear behaviour of gear tooth with the micro-module. The positional accuracy of the gear pair for micro devices and the rotational accuracy of the shafts have a great influence on wear performance compared to normal size gears. Therefore, it has great significance that the wear behaviour of gears tooth with micro-module can be identified precisely. In this study, a gear tooth wear test device was designed and manufactured which can represent different real service conditions for small gears with micro-module. Using this device, wear behaviours and load transfer performance of small gears with micro-module can be measured. The test system is driven by an AC servo motor and transmitted torque instantaneously measured with a dynamic torque sensor regulated by a computer-controlled brake mechanism. The gears used as specimen during the test can be mounted up in a real gearbox, different lubrication and service conditions can be tested.

Keywords: Micro module, gear, wear, failure.

REFERENCES

1. M. E. Niza, M. Komori, T. Nomura, I. Yamaji, N. Nishiyama, M. Ishida, Y. Shimizu, Test rig for micro gear and experimental analysis on the meshing condition and failure characteristics of steel micro involute gear and metallic glass one, *Mechanism and Machine Theory*, Vol:45, 1797–1812, 2010.
2. Bernd-Robert Höhn, Peter Oster, Christo Braykoff, Size and Material Influence on the Tooth Root, Pitting, Scuffing and Wear Load-Carrying Capacity of Fine-Module Gears, *Conference on Gears*, Technical University of Munich, 2001.
3. W. Li, A. Wood, B. Weidig, K. Mao, An investigation on the wear behaviour of dissimilar polymer gear engagements, *Wear*, Vol:271, 2176– 2183, 2011.
4. Takayoshi Itagaki, Hideo Takahashi, Hiroshi Iizuka, Mikio Takahashi, Ryoza Nemoto, Evaluating Fatigue Life of Injection Molded Plastic Gear added with Carbon Particle made from Rice Hull. *The 3rd International Conference on Design Engineering and Science*, 2014.
5. I.S. Al-Tubi, H. Long, J. Zhang, B. Shaw, Experimental and analytical study of gear micropitting initiation and propagation under varying loading conditions, *Wear*, Vol:8, No:16, 328-329, 2015.
6. Valentin Onishchenko, Investigation of tooth wears from scuffing of heavy duty machine spur gears, *Mechanism and Machine Theory*, Vol:83, 38–55, 2015.
7. Aljaz Pogacnik, Joze Tavcar, An accelerated multilevel test and design procedure for polymer gears, *Materials and Design*, Vol: 65, 961–973, 2015.
8. S. Sjöberg, M. Sosa, M. Andersson, U. Olofsson, U., Analysis of efficiency of spur ground gears and the influence of running-in, *Tribology International*, Vol:93,172-181, 2016.

ON A NEW KNOT TABLE

Tuççe Kunduracı¹, Tamer UĞUR², Ceren Sultan ELMALI³

¹Graduate School of Natural and Applied Science
Atatürk University, Erzurum-TURKEY

²Department of Mathematics, Faculty of Science,
Atatürk University, Erzurum-TURKEY

³Department of Mathematics, Faculty of Science,
Erzurum Technical University, Erzurum-TURKEY

tugkun@hotmail.com
tugur@atauni.edu.tr
ceren.elmali@erzurum.edu.tr

Abstract

A knot in R^3 (respectively in the 3-sphere, S^3), can be projected onto a plane R^2 (resp. a sphere S^2). This projection is almost always regular, meaning that it is injective everywhere, except at a finite number of crossing points. In this work, the knot graph is get from this regular diagram. After that we give direction to graph and get digraph which we called knot digraph. Bitopologies associated with these knot digraphs is finded by using knot digraph notation. We get new knot tables by classifying these bitopologies.

Keywords: Knot, knot graph, knot digraph, bitopology, quasi-pseudo metric

REFERENCES

1. Alexander, J.W., G.B., *On types of knotted curve*. Ann. Math., 28, 562-586, 1956.
2. Aumann, R. J., *Asphericity of alternating knots*. Ann. of Math., 64, 374-392, 1956.
3. Bankwitz, C., *Über die Torsionszahlen der alternierenden Knoten*. Math. Ann., 103, 145-161, 1930.
4. Bing, R.H. and Martin, J.M., *Cubes with knotted holes*, Trans. Amer. Math. Soc., 155, 217-231, 1971.
5. Girija B., Pilakkat R., *Bitopological spaces associated with digraphs*, South Asian Journal of Mathematics, Vol.3 (1):56-65, 2013.
6. Kelley J.C., *Bitopological Spaces*, Proc. London Math.(3), 13, 71-89, 1963.
7. Kinoshita, S., Terasaka, H., *On Unions of knots*. Osaka Math J., 9, 131-153, 1957.
8. Little, C. N., *Non-alternate f knots*. Trans. Roy. Sot. Edinburgh, XXXIX, Part III (No. 30). for the session 1898-89 (read July 3, 1899), 771-778

A STOCHASTIC MODEL FOR PARATHYROID TUMOURS

Tuğcem Partal¹ and Mustafa Bayram²

¹ Department of Mathematical Engineering, Yildiz Technical University, Istanbul, Turkey

² Department of Computer Engineering, Istanbul Gelisim University, Istanbul, Turkey

1tpartal@yildiz.edu.tr, 2mbayram@gelisim.edu.tr

Abstract

In this paper, we study on the behavior and growth of parathyroid cancer in the human body. The Gompertz model is considered for this. Firstly, we investigate the change of parathyroid cancer respect to time, which is obtained using the deterministic Gompertz model through 41 patients in the literature. Then we describe the nonlinear stochastic Gompertz model based on deterministic Gompertz's law and obtain the diffusion coefficient in our stochastic model, using the data taken from the patients. We construct stochastic growth model with its coefficients and compare the model with observed data for demonstrate the effectiveness of model. Finally, the model is solved also numerically and our aims are supported with graphs and error tables.

Keywords: Stochastic growth model; tumour growth; estimation of parameters.

REFERENCES

1. Parfitt, A. ve Fyhrrie, D. Gompertzian growth curves in parathyroid tumours: further evidence for the set-point hypothesis, Cell proliferation, 30(8-9), 341-349, 1997.
2. Kloeden, P.E. ve Platen, E., Numerical solution of stochastic differential equations, Applications of mathematics, Springer, Berlin, New York, 1999.
3. Parfitt, A., Willgoss, D., Jacobi, J. ve Lloyd, H., Cell kinetics in parathyroid adenomas: evidence for decline in rates of cell birth and tumour growth, assuming clonal origin, Clinical endocrinology, 35(2), 151-157, 1991.
4. Gompertz, B., On the nature of the function expressive of the law of human mortality, and on a new mode of determining the value of life contingencies, Phil. Trans. R. Soc. Lond., 115, 513-585, 1825.
5. Ferrante, L., Bompadre, S., Possati, L. ve Leone, L., Parameter estimation in a Gompertzian stochastic model for tumor growth, Biometrics, 56(4), 1076-1081, 2000.

Construction of various soliton solutions via the simplified extended sinh-Gordon equation expansion method

Hasan Bulut^{1,2}, Tukur Abdulkadir Sulaiman^{1,3} and Hacı Mehmet Baskonus⁴

¹Department of Mathematics, Firat University, Elazig, Turkey

²Department of Mathematics Education, Final International University, Kyrenia, Cyprus

³Department of Mathematics, Federal University Dutse, Jigawa, Nigeria

⁴Department of Computer Engineering, Munzur University, Tunceli, Turkey

hbulut@firat.edu.tr, sulaiman.tukr@fud.edu.ng, hmbaskonus@gmail.com

Abstract

In this paper, we present the simplified version of the extended sinh-Gordon equation expansion method. The newly proposed approach is based on the well-known sinh-Gordon equation and a travelling wave transformation. We successfully employed this approach to the (2+1)-dimensional nonlinear Chiral Schrodinger's and various solitary wave solutions to the studied nonlinear model are successfully constructed. The (2+1)-dimensional nonlinear Chiral Schrodinger's equation describes the edge states of the fractional quantum hall effect. The 2D and 3D surfaces of some of the obtained solutions are plotted.

Keywords: Simplified extended ShGEEM; Chiral NLSE; Soliton solutions.

REFERENCES

1. X. Xian-Lin and T. Jia-Shi, Travelling Wave Solutions for Konopelchenko-Dubrovsky Equation Using an Extended sinh-Gordon Equation Expansion Method, Commun. Theor. Phys., Vol:50, 1047 2008.
2. A.H. Khater, M.M. Hassan and D.K. Callebaut, Travelling wave solutions to some important equations of mathematical physics, Reports on Mathematical Physics, Vol:66, No:1, 1-19 2010.
3. M. Eslami, Trial solution technique to chiral nonlinear Schrodinger equation in (1+2)-dimensions, Nonlinear Dyn., Vol:85, No:2, 813-816 2016

DESIGN OF DIGITAL FIR FILTERS USING GRAY WOLF COLONY OPTIMIZATION

Turgay KAYA, Fatmanur SERBET

Department of Electrical-Electronics Engineering, University of Firat, Elazig, Turkey

tkaya@firat.edu.tr, fatmanur.serbet@hotmail.com

Abstract

In this paper aims to establish a solution methodology for the optimal design of digital finite impulse response (FIR) filter by integrating the features of gray wolf colony optimization (GWCO). GWCO is inspired by the hunting strategy of wolves. In this optimization method, when the searching artificial wolves in the searching space discover the quarry, the searching artificial wolves report the position of the quarry to other artificial wolves by howl and eventually result is obtained. The optimal design of alternative FIR filter is realized with the result obtained with GWCO

Keywords: Filter Design, FIR filter, wolf colony optimization, gray wolf colony optimization (GWCO).

REFERENCES

- [1] T.W. Parks and C.S. Burrus, Digital Filter Design. New, York:Wiley,1987
- [2] A. Kayom Md Khairuzzaman, S. Chaudhury, "Multilevel thresholding using grey wolf optimizer for image segmentation", Expert Systems with Applications, Vol. 86, pp. 64-76, 2017.
- [3] Q. Zhou, Y. Zhou, X. Chen, "A Wolf Colony Search Algorithm Based on the Complex Method for Uninhabited Combat Air Vehicle Path Planning", International Journal of Hybrid Information Technology, vol. 7, pp.183-200, 2014.
- [4] L. Changan, Y. Xiaohu, L. Chunyang and W. Hua, "The Wolf Colony Algorithm and Its Application", Chinese Journal of Electronics, vol. 20 pp. 212-216, 2011.
- [5] S. Gupta, K. Deep, A novel Random Walk Grey Wolf Optimizer, Swarm and Evolutionary Computation, 2018. doi.org/10.1016/j.swevo.2018.01.001.
- [6] F.Serbet, T. Kaya, M.T. Özdemir, "Design of Digital IIR Filter using Particle Swarm Optimization",
- [7] T. Kaya and M. C. Ince, The Obtaining of Window Function Having Useful Spectral Parameters by Helping of Genetic Algorithm, 2nd World Conference On Educational Technology Researches Near East University, Nicosia, North Cyprus, 27-30 June 2012.
- [8] T. Kaya and M. C. Ince, The FIR filter design by using window parameters calculated with GA, ICSCCW 2009-Fifth International Conference on Soft Computing, Computing with Words and Perceptions in System Analysis, Decision and Control, 1-4, 2009.
- [9] D. Mirković, M. Andrejević Stošović, P. Petković, V. Litovski, "IIR digital filters with critical monotonic pass-band amplitude characteristic", International Journal of Electronics and Communications (AEÜ), Vol. 69/ 10, pp. 1495–1505, 2015.
- [10] A.K. Dwivedi, S. Ghoshn , N.D. Londhe, Low power FIR filter design using modified multi-objective artificial bee colony algorithm, Engineering Applications of Artificial Intelligence Vol. 55, pp 58–69, 2016.
- [11] A. Aggarwal, T. K. Rawat, D.K. Upadhyay, Design of optimal digital FIR filters using evolutionary and swarm optimization techniques, International Journal of Electronics and Communications (AEÜ), Vol. 70/ 4, pp 373–385, 2016.

A NEW TYPE RSA ALGORITHM WITH FUZZY LOGIC FOR IMAGE ENCRYPTION

Turgut Hanoymak¹ Fatih Kutlu² Özkan Atan³

^{1,2} Department of Mathematics, Van Yuzuncu Yil University, Van, Turkey

³ Department of Electrical and Electronics Engineering, Van Yuzuncu Yil University, Van, Turkey

turguthanoymak@gmail.com , fatihkutlu@yyu.edu.tr, oatan@yyu.edu.tr

Abstract

In this study, by integrating fuzzy logic to RSA encryption scheme the augmentation of the security of sending the encrypted image is aimed. In this method first, the image is taken to the fuzzification process by the sender and then is encrypted using public key encryption. The encrypted image sent via an unsecure channel is first taken to the defuzzification process and then the original image is received after decryption. As a result, because of having uncertainty of fuzzy logic, a more secure communication mode is purposed. Another new idea of this study offers a more resistant encryption scheme to the several attacks by increasing the amount of possible public keys.

Keywords: Fuzzy Logic; Encryption Scheme; Public Key Encryption; Image Processing.

REFERENCES

1. L. A. Zadeh, Fuzzy sets, Inf. Control, Vol:8, No:3, pp.338-353, Jun. 1965.
2. T. J. Ross, Fuzzy Logic with Engineering Applications, 2004.
3. I. Bloch, Fuzzy sets for image processing and understanding, Fuzzy Sets Syst., Vol:281, pp.280-291, 2015.
4. M. Khan, T. Shah, A Literature Review on Image Encryption Techniques, 3D Res., Vol:5, No:4, p.29, 2014.
5. T. Chaira, A. K. Ray, A new measure using intuitionistic fuzzy set theory and its application to edge detection, Appl. Soft Comput., Vol:8, No:2, pp. 919-927, Mar. 2008.
6. R. C. Gonzales, R. E. Woods, Digital image processing, 2008.
7. T. J. Ross, Fuzzy logic with engineering applications, 2010.
8. W. Diffie, M. Hellman, New directions in cryptography, IEEE Transactions on Information Theory, 22(6): 644-654, 1976.
9. D. Boneh, Twenty years of attacks on the RSA cryptosystem, Notices of the American Mathematical Society, 46(2): 203-213, 1999.

MULTI-PARTY KEY EXCHANGE PROTOCOL OVER UNITS OF GROUP RINGS

Turgut Hanoymak¹ Ömer Küsmüş²

^{1,2} Department of Mathematics, Van Yuzuncu Yil University, Van, Turkey

turguthanoymak@gmail.com , omerkusmus@yyu.edu.tr

Abstract

In recent years, both symmetric and asymmetric encryption systems over various type of algebraic materials have become importance since they are based on some mathematically hard problems such as integer factorization, discrete logarithm, conjugacy search problem in group theory, finding the inverse of a given unit in group rings.

Key exchange protocol is a way of exchanging a secret key between two or more parties who want to communicate each other securely over an insecure channel. In this note, we first propose a Diffie-Helman type multi-party key exchange protocol using units in a given group ring and introduce a symmetric key encryption which is different from the encryption scheme in [1] by illustrating a concrete example.

Keywords: Key Exchange; Cryptosystem; Symmetric Key; Units; Group Rings.

REFERENCES

1. Turgut Hanoymak, Ömer Küsmüş, On Construction of Cryptographic Systems over Units of Group Rings, Int. Elec. J. Pure Appl. Math., Vol:9, No:1, 37-43, 2015.
2. Turgut Hanoymak, Ömer Küsmüş, A Possible Key Exchange Protocol over Group Rings, International Conference on Pure and Applied Mathematics, Van, Turkey, 2015.
3. Juha Partala, Algebraic Generalization of Diffie-Hellman Key Exchange, J. Math. Cryptol., 2017.
4. Eberhard Stickel, A New Public Key Cryptosystem in Non-Abelian Groups, <https://pdfs.semanticscholar.org/b6b9/caac3be0b565041cf05f14616f0cb1d76291.pdf>
5. D. Ezhilmaran, V. Muthukumaran, Key Exchange Protocol Using Decomposition Problem in Near-Ring, Gazi University Journal of Science, Vol:29, No:1, 123-127, 2016.
6. H. Daghigh, R. K. Gilan, F. S. Shahpar, Diffie-Hellman Type Exchange Protocols Based on Isogenies, Bull. Iranian Math. Soc., Vol:43, No:4, 77-88, 2017.
7. Ivana Ilic, The Discrete Logarithm Problems in Non-Abelian Groups, Ph.D. Thesis, 2010.
8. Cesaro Polcino Milies, Sudarshan K. Sehgal, An Introduction to Group Rings, Kluwer Academic Publisher, New York, 2002.

HIERARCHICAL CLUSTERING METHOD FOR TRAVELLING SALESMAN PROBLEM

Urfat Nuriyev¹, Fidan Nuriyeva^{2,3}, Gözde Kızılateş¹

¹Department of Mathematics, Ege University, Izmir, Turkey

²Department of Computer Science, Dokuz Eylul University, Izmir, Turkey

³Institute of Control Systems, ANAS, Baku, Azerbaijan

urfatnuriyev@gmail.com, nuriyevafidan@gmail.com, gozde.kizilates@gmail.com

Abstract

The Travelling Salesman Problem is the most famous optimization problem in the NP-hard class. Many problems having natural applications in computer science and engineering can be modelled using the TSP. This paper presents a new heuristic algorithm called hierarchical clustering based on the clustering of the vertices. Proposed algorithm works in a three stage. In the first stage, algorithm classifies vertices into sets based on a length between vertices. At the second stage, connection between all clusters is made. Entry vertices and exit vertices is determined for every cluster. At the third stage, the shortest path is found from entry vertex to exit vertex covering all vertices in every cluster. Many problem instances from TSPLIB (travelling salesman problem library) were solved with NN, Greedy and proposed method. The experimental results show that the proposed method is efficient.

Keywords: Travelling salesman problem; Heuristic algorithms; Clustering.

REFERENCES

1. Applegate D. L., Bixby R. E., Chavatal V. and Cook, W. J., The Travelling Salesman Problem, A Computational Study, Princeton University Press, Princeton and Oxford, 593p, 2006.
2. Nuriyeva F., Heuristic Grid Algorithm for Travelling Salesman Problem, Transactions of National Academy of Sciences of Azerbaijan, Series of Physical-Technical and Mathematical Sciences, Informatics and Control Problems, Vol:36, No:3, 76 – 81, 2016.
3. Kızılateş G., Nuriyeva F., A Parametric Hybrid Method for the Traveling Salesman Problem, Mathematical and Computational Applications, Vol 18. No:3, 459-466, 2013.
4. Kızılateş G., Nuriyeva F., On the Nearest Neighbour Algorithms for the Traveling Salesman Problem”, The Third International Conference on Computational Engineering and Information Technology, 111-118, Konya, Turkey, June 07-09,2013.

A NEW CHARACTERIZATION ON INEXTENSIBLE FLOWS OF NORMAL SURFACES

Vedat Asil¹, Talat Körpınar², Mustafa Yeneroğlu³, Selçuk Baş⁴

^{1,3} Department of Mathematics, University of Firat, Elazığ, Turkey, ^{2,4} Department of Mathematics, University of Mus Alparslan, Mus, Turkey

vasil@firat.edu.tr, talatkorpınar@gmail.com, mustafayeneroglu@gmail.com,
s.bas@alparslan.edu.tr

Abstract

In this paper, we obtain a new characterization on inextensible flows of normal surfaces in Euclidean 3-space E^3 . Moreover, we obtain a new result for minimality for normal surfaces in Euclidean 3-space E^3 .

Keywords: Normal ruled surface, Euclidean 3-space, Inextensible flows.

REFERENCES

1. P. Alegre , K. Arslan, A. Carriazo , C. Murathan and G. Öztürk: Some Special Types of Developable Ruled Surface, Hacettepe Journal of Mathematics and Statistics, 39 (3) (2010), 319 -- 325.
2. M.P. Carmo: Differential Geometry of Curves and Surfaces, Pearson Education, 1976.
3. B. Y. Chen: Some open problems and conjectures on submanifolds of finite type, Soochow J. Math. 17 (1991), 169--188.
4. G. Y.Jiang: 2-harmonic isometric immersions between Riemannian manifolds, Chinese Ann. Math. Ser. A 7(2) (1986), 130--144.
5. J. J. Koenderink: Solid Shape, MIT Press, Cambridge, 1994.
6. T. Körpınar, V. Asil, S. Baş: Characterizing Inextensible Flows of Timelike Curves According to Bishop Frame in Minkowski Space, Journal of Vectorial Relativity Vol 5 (4) (2010), 18-25.

ON FUZZY 2-METRIC SPACES

Vildan Çetkin¹, Elif Güner² and Halis Aygün³

^{1,2,3}Department of Mathematics, University of Kocaeli, Kocaeli, Turkey

¹vildan.cetkin@kocaeli.edu.tr, ²elif.guner@kocaeli.edu.tr, ³halis@kocaeli.edu.tr

Abstract

In the present talk, we aim to investigate some fundamental properties of fuzzy 2-metric spaces. We first recall the definition of a fuzzy 2-metric space and define some elementary notions for fuzzy 2-metric spaces. Then we study completion of fuzzy 2-metric spaces. At the end, we prove the Baire's and Cantor's Theorems for fuzzy 2-metric spaces which are convenient tools for investigating fixed point results in fuzzy 2-metric spaces.

Keywords: Fuzzy 2-metric, convergence, completion.

REFERENCES

1. S. Gähler, 2-metriche Raume and ihre Topologische Strucktur, Mathematische Nachrichten, Vol:26, 115-148, 1963.
2. B. Singh, S.Jain, S.Jain, Generalized Theorems on Fuzzy Metric Spaces, Southeast Asian Bulletin of Mathematics, Vol:31, 963-978, 2007.
3. S. Sharma, On Fuzzy Metric Space, Southeast Asian Bulletin of Mathematics, Vol:26, 133–145, 2002.
4. K. Shrivastava, Common Fixed Point Theorems Satisfying Implicit Relation, International Journal of Advance Research in Science and Engineering, Vol:5, No:8, 206-215, 2016.

MAXIMAL ORDER BLOCK TRIGONOMETRICALLY FITTED SCHEME FOR THE INTEGRATION OF SECOND ORDER INITIAL VALUE PROBLEMS

Wale Okunuga

University of Lagos, Nigeria

waleokunuga@gmail.com

Abstract

A Maximal Order Block Trigonometrically Fitted Method (MBTFM) whose coefficients are functions of frequency and step size specially designed for the solution of second order Initial Value Problems (IVPs) with oscillatory solution is proposed in this paper. The MBTFM is obtained from one discrete formulae with two complementary formula which are provided by Continuous Trigonometrically Fitted Block Method (CTFBM). The convergence of the MBTFM is discussed and the performance of the method is demonstrated on some numerical examples to show accuracy and efficiency of the method.

Keywords: Second order Initial Value Problems; Continuous Trigonometrically Fitted Block Method

Comparison of Chebyshev Wavelet Collocation Method and Legendre Wavelet Collocation Method for Ginzburg-Landau Equation

Yasemin BAKIR, Aydın SECER

Yildiz Technical University, Faculty of Chemistry-Metallurgical, Department of Mathematical Engineering,
Davutpaşa Campus, 34210, İstanbul/TURKEY

ybakir@yildiz.edu.tr, asecer@yildiz.edu.tr

Abstract

The main aim of this paper is to demonstrate differences between Chebyshev wavelet collocation method and Legendre wavelet collocation method when applying in non-linear partial differential equation. For this purpose, we apply these both methods to the Ginzburg equation, which is best known among nonlinear equations. We show that these methods are how to use for numerical solution of the Ginzburg-Landau equation with boundary initial conditions. Firstly, we have obtained operational matrix for Chebyshev wavelets and Legendre wavelets, respectively. Then, Ginzburg-Landau equation is converted into an algebraic system for each method by using obtained operator matrix. Finally, this system has been solved using Maple computer algebra system. We demonstrate the validity and applicability of these techniques which have clarified by using an example. Exact solution is compared with obtained approximate solutions for each method. Finally, both Chebyshev wavelet collocation method and Legendre wavelet collocation method are found to be acceptable, efficient, accurate and computationally for the non-linear partial differential equation. Approximation of numerical solutions of both methods are excellent and difference of between their errors amount is found so little. Both of the methods are found almost the same numerical solutions as shown in tables and figures. Therefore, Both Chebyshev wavelet collocation method and Legendre wavelet collocation method are applicable for non-linear partial differential equation.

Keywords: Chebyshev wavelet collocation method, Legendre wavelet collocation method, Ginzburg-Landau Equation, Operational matrices of integration.

References

- [1] Daubechies I. Ten Lectures on Wavelets. SIAM: Philadelphia, PA,1992
- [2] Razzaghi M, Yousefi S. Legendre wavelets operational matrix of integration. International Journal of System Science 2001;32(4):495-502.

A BIASED ESTIMATION METHOD IN ZERO INFLATED COUNT MODELS

Yasin Asar¹ and Bahadır Yüzbaşı²

¹ Department of Mathematics-Computer Sciences, Necmettin Erbakan University, Konya, Turkey,

yasar@konya.edu.tr, yasinasar@hotmail.com

²Department of Econometrics, Inonu University, 44280 Malatya, Turkey,

b.yzb@hotmail.com

Abstract

Count variables may be often faced with in real life applications. It is the realization of a nonnegative integer-valued random variable. Zero-inflated count models can be used when there is an excess amount of zeros in the dependent variable. In this study, we introduce an improved biased estimation technique in the zero-inflated count models when there is multicollinearity problem in the data. We also compare our method to the maximum likelihood estimation in terms of mean squared error and squared bias. According to the results, new method is a better alternative to the maximum likelihood estimation in the presence of near linear dependencies in the design matrix.

Keywords: Zero-inflated count regression; Count data models; Ridge estimator; Ill-conditioned design matrix.

REFERENCES

1. Ahmed, S. Ejaz. Penalty, Shrinkage and Pretest Strategies: Variable Selection and Estimation. Springer, New York. 2014.
2. Cameron, A. Colin., Trivedi, Pravin. K, Regression Analysis of Count Data (Vol. 53). Cambridgeuniversity press. 2013
3. Lambert, Diane, Zero-inflated Poisson regression, with an application to defects in manufacturing. Technometrics, 34(1), 1-14, 1992.
4. Kibria, B. Golam., Mansson, Kristofer, Shukur, Ghazi, Some ridge regression estimators for the zero-inflated Poisson model. Journal of Applied Statistics, 40(4), 721-735, 2013.

λ – WIJSMAN STATISTICAL CONVERGENCE ON TIME SCALES

Tuba Gulsen, Emrah Yilmaz, Yavuz Altin, Hikmet Kemaloğlu

Department of Mathematics, University of Firat, Elazig, Turkey

tubagulsen87@hotmail.com, emrah231983@gmail.com, yaltin23@yahoo.com,

hkoyunbakan@gmail.com

Abstract

In this study, we define λ – Wijsman density, λ – Wijsman statistical convergence and λ – Wijsman strong p – Cesaro summability on time scales. Furthermore, some relations about the new obtained spaces are also examined.

Keywords: Time scales; Wijsman statistical convergence.

REFERENCES

1. Bhardwaj, V. K. Dhawan, S. and O. A. Dovgoshey, Density by moduli and Wijsman statistical convergence, Bulletin of the Belgian Mathematical Society-Simon Stevin, 24, 3, 393-415, 2017.
2. Bohner M. and Peterson A. Dynamic equations on time scales: an introduction with applications, Boston (MA), Birkhauser, Boston Inc, 2001.
3. Mursaleen, M. λ – statistical convergence, Mathematica Slovaca, 50, 1, 111-115, 2000.
4. Nuray, F. Rhoades, B. E. Statistical convergence of sequences of sets. Fasc. Math. No. 49, 87—99, 2012.
5. Stefan H., Masskettenkalkül mit Anwendung auf Zentrumsmannigfaltigkeiten [Ph.D. thesis], Universitat Wurzburg, 1988.
6. Turan, C. Duman O. Statistical convergence on time scales and its characterizations, Advances in Applied Mathematics and Approximation Theory, Springer, New York, NY, 57-71, 2013.
7. Yilmaz, E. Y. Altin, Y. Koyunbakan, H. λ - Statistical convergence on time scales, Dynamics of Continuous, Discrete and Impulsive Systems Series A: Mathematical Analysis, 23, 69-78, 2016.
8. Wijsman, R. A.. Convergence of sequences of convex sets, cones and functions, Bull. Amer. Math. Soc. 70, 186-188, 1964.

STATISTICAL BOUNDEDNESS ON TIME SCALES

Yavuz Altin, Büşra Nur Er , Emrah Yilmaz

Department of Mathematics, University of Firat, Elazig, Turkey

yaltin23@yahoo.com, nurb37332@gmail.com, emrah231983@gmail.com,

Abstract

In this study, we examine the concept of statistical boundedness on time scales.

We introduce λ -statistical boundness of function on time scale. Moreover, some relations about these concepts are obtained.

Keywords: Time scales; Statistical convergence.

REFERENCES

1. R. Agarwal, M. Bohner, D. O'Regan, and A. Peterson, Dynamic equations on time scales: a survey, *Journal of Computational and Applied Mathematics*, 141(1--2) (2002), 1-26.
2. V.K. Bhardwaj, S. Gupta, On some generalizations of statistical boundedness, *Journal of Inequalities and Applications*, (2014), 12, 11 pp.
3. R. Çolak, On statistical convergence. Conference on Summability and Applications. May 12-13, (2011), İstanbul-Turkey.
4. Mursaleen, M. λ – statistical convergence, *Mathematica Slovaca*, 50, 1, 111-115, 2000.
5. F. Moricz, Statistical limits of measurable functions, *Analysis (Munich)*, 24), 207-219, 2004.
6. Stefan H., *Masskettenkalkül mit Anwendung auf Zentrumsmannigfaltigkeiten* [Ph.D. thesis], Universität Würzburg, 1988.
7. Turan, C. Duman O. Statistical convergence on time scales and its characterizations, *Advances in Applied Mathematics and Approximation Theory*, Springer, New York, NY, 57-71, 2013.
8. Yilmaz, E Y. Altin, Y. Koyunbakan, H. λ -Statistical convergence on time scales, *Dynamics of Continuous, Discrete and Impulsive Systems Series A: Mathematical Analysis*, 23, , (2016), 69-78.

ON A NECESSARY CONDITION FOR AN OPTIMAL CONTROL PROBLEM IN A BEAM EQUATION

Yeşim Saraç¹

¹ Department of Mathematics, University of Ataturk, Erzurum, Turkey

ysarac@atauni.edu.tr,

Abstract

In this work, an optimal control problem is investigated for a beam equation with homogeneous boundary conditions. Such problems have been examined in the studies [1-4]. Well-posedness of the problem considered is proved. We give a necessary condition for the optimal solution by obtaining differentiable of the cost function.

Keywords: Beam Equation; Optimization.

REFERENCES

1. Daniel Lesnic, Determination of the flexural rigidity of a beam from limited boundary measurements, J. Appl. Math. And Computing, Vol:20, No:1-2, 17-34, 2006.
2. Daniel Lesnic and Alemdar Hasanov, Determination of the leading coefficient in fourth-order Sturm-Liouville operator from boundary measurements, Inverse Problems in Science Engineering, Vol: 16, No:4, 413-424, 2008.
3. Tchavdar T. Marinov and Rossitza Marinova, Coefficient identification in Euler-Bernoulli equation from over-posed data, Journal of Computational and Applied Mathematics, Vol:235, 450-459, 2008.
4. Tchavdar T. Marinov and Aghalaya S. Vatsala, Inverse problem for coefficient identification in the Euler-Bernoulli equation, An International Journal Computers and Mathematics with Applications, Vol:56, 400-410, 2008.

SIMULATION OF THE FAKE COLOR SCANNED – THE REGRESSED MODEL ON MARBLE QUALITY DETERMINATION

Yıldırım İsmail Tosun¹ Deniz Tosun²

¹ Department of Engineering, University of Şırnak, Şırnak, Turkey

²Department of Computer Engineering, Girne American University, Girne, KKTC

yildirimtosun@sirnak.edu.tr,

Abstract

Beneficiate from that processing marble surface and surface color and control during processing can efficiently be made. However, scanning of surface color by HP scanner was carried out over 100 plates at A4 size as paper scanning. In order to avoid this disturbing reflectance manner of that polished raw material, cream, red and black colored marble tiles were used in scanning evaluation. The simulated reflectance on tiles and porous structure and shining acts from surface or roughness could be developed reflektance separation. In the study, used.Adobe CS4, dirt and color conversion regressed by hue may also be evaluated. The quality in pricing of marble tiles with cream and red color or marble material without polished material in industrial sectors. The quality analysis of colored material such as rubber, paper, vegetable, egg and even waste food quality determination and analysis could be succeeded by this simulation at lower cost. The reliability at reflectance of color may be 40%,60% and 80% with roughness, fakeness, scratch red diagram simulation and scanned forms were used in analysis and calibrated models at A4 sized tiles. The simulated color simulation were provided a 28% polishing time and price reduction in packed tiles.

In this article, we obtain some regressive analytical solutions and the exponential binomial equation which seems in the regressed theory, weakly dispersive color change and exponential simulated color using gaussian Mat-lab function method.

Keywords: gaussian function, regressed method; color simulation; exponential regression

REFERENCES

1. Pan Wang, Bo Tian, Kun Sun, Feng-Hua Qi, The title of Paper, Applied Mathematics and Computation, Vol:2, No:1, 233–242, 2015.

SIMULATION OF GAS SORPTION KINETICS ON ACTIVE CARBON - REGRESSED MODEL FOR CONTROL TOXIC EMISSIONS OF FLUE GAS

Yıldırım İsmail Tosun¹ Deniz Tosun²

¹ Department of Engineering, University of Şırnak, Şırnak, Turkey

²Department of Computer Engineering, Girne American University, Girne, KKTC

yildirimosun@sirnak.edu.tr,

Abstract

Beneficiate from that finer char waste in toxic gas emission control during combustion can efficiently be made. However, fluidized combustion are carried out over 100 microns solid fuel combustion. In order to avoid this disturbing flow manner of that waste material, clay pellets were used in combustion chamber. The simulated sorption on solid carbon porous structure and capturing for toxic emissions active carbon or char can develop mechanical separation used. Temperature, active carbon and activated by microwave may also be evaluated as lime raw material without calcining for filling material in industrial sectors such as rubber, paper, animal food production. 40%, 60% and 80% active carbon, temperature infrared diagram simulation and activated forms were used in our combustion experiments at 1-2mm sized pellets. The pellets size-sorption simulation were provided a 78% sulfur dioxide emission and also 45% soot emission reduction in fluidized bed combustion.

In this article, we obtain some new complex analytical solutions to the exponential binomial equation which seems in the fault tree theory, weakly dispersive temperature waves and exponential simulated color using gaussian Mat-lab function method.

Keywords: gaussian function, fault tree method; temperature simulation; exponential regression

REFERENCES

1. Pan Wang, Bo Tian, Kun Sun, Feng-Hua Qi, The title of Paper, Applied Mathematics and Computation, Vol:2, No:1, 233–242, 2015.

A NEW MULTI-STEP APPROACH BASED ON TOP ORDER METHODS (TOMS) FOR THE NUMERICAL INTEGRATION OF STIFF ORDINARY DIFFERENTIAL EQUATIONS

Awari, Yohanna Sani

Department of Mathematical Sciences, Taraba State University, Jalingo Nigeria

Kumleng, Geoffrey Micah

Department of Mathematics, University of Jos, Nigeria

E-mail: awari1245@gmail.com

Abstract

This paper presents an entirely new approach to obtaining self-starting Top Order Methods (TOMs) which we shall call Extended Top Order Methods (ETOMs). ETOMs were obtained through hermite polynomial used as basis function. Stability analysis of the new approach shows a uniform order six method for $k = 3$, they also possess very good absolute stability regions which made them highly suitable for the numerical integration of stiff ordinary differential equations. Implementation of the method in block form eliminates the need for starters and hence, generating simultaneously approximate solutions $y_i, i = 1, 2, \dots, 6$ on the go. To further observe the effect of the new approach, it was implemented on four numerical initial value problems of stiff ordinary differential equations occurring in real life and was shown to compete favorably with the work of existing scientists.

Keywords: Trapezoidal Method; Hermite Polynomial; Top Order Methods; Stiff Equation; Block Method; Stiff ODEs

Reference

- [1] Ajie, I. J., Ikhile, M.N.O., Onumanyi, P., A Family of Block Methods Derived from TOM and BDF Pairs for Stiff Ordinary Differential Equations, *American Journal of Mathematics and Statistics*, 4(2): 121-130, 2014.
- [2] Areo, E.A. and Adeniyi, R.B. Block Implicit One Step Method for the Numerical Integration of Initial Value Problems in Ordinary Differential Equations, *International Journal of Mathematics and Statistics Studies*, 2(3): 4-13, 2014.
- [3] Brugnano, L. and Trigiante, D. Solving Differential Problems by Multistep Initial and Boundary Value Methods. Gordon Breach Publishers, Amsterdam. 418p, 1998.

Image Distortion of LSB

Yücel İnan^a

^aNear East University, yucel.inan@neu.edu.tr, Nicosia, TRNC, Mersin 10 Turkey

Abstract

Several methods developed and applied for protecting the information. One of these is the steganography. Steganographic techniques are used to transmit the information in the image to the receiver in a secure manner. There are two main principles in the steganographic process. The first one is to hide the message in the image and the second one is to reduce the distortion on the image caused by information hiding. By making changes on digital images, a lot of information can be placed in the image. Nevertheless, changes in the image should not be noticed. In this paper, “image distortion of LSB” method is studied. The PSNR, SNR and MSE were used to assess the distortion rates of the images. Histograms were drawn to visualize the differences between original and encoded, “stego-images”.

References

- [1] L. Y. POR , B. Delina, Information Hiding: A New Approach in Text Steganography, 7th Wseas Int. Conf. On Applied Computer & Applied Computational Science (Acacos '08), Hangzhou, China, April 6-8, 2008.
- [2] Domenico Bloisi, Luca Iocchi , *Image Based Steganography and Cryptography*, Sapienza University of Rome, Italy.
- [3] D.Seetha, Dr.P.Eswaran, *A Study on Steganography to Hide Secret Message inside an image*, International Journal of P2P Network Trends and Technology(IJPTT)-Volume3 Issue5-June 2013.
- [4] Nasser Hamad, *Hiding Text Information in a Digital Image Based on Entropy Function*, The International Arab Journal of Information Technology, Vol. 7,No. 2, April 2010.
- [5] Monika Agarwal , *Text Steganographic Approaches: A Comparison*, International Journal of Network Security & Its Application(IJNSA), Vol.5, No.1.January 2013.
- [6] Salony Pandey, Prof. Amit .M. Lathigara, *Hiding Text Behinde Image for Secure Communication*, Salony Pandey, Prof.Amit .M. Lathigara / *International Journal of Engineering Reserach and Applications(IJERA) ISSN:2248-9622 Vol.3,Issue3, May-Jun 2013, pp.1295-1297.*
- [7] Neha Rani, Jyoti Chaudhary, *Text Steganography Techniques: A Review*, International Journal of Engineering Trends and Technology(IJETT)- Volume 4 Issue 7-july 2013.
- [8] L. Y. POR , B. Delina, Information Hiding: A New Approach in Text Steganography, 7th Wseas Int. Conf. On Applied Computer & Applied Computational Science (Acacos '08), Hangzhou, China, April 6-8, 2008.
- [9] Marwa M. Emam, Abdelmgeid A. Aly, Fatma A. Omara, *An Improved Image Steganography Method Based on LSB Technique with Random. Pixel Selection*, (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 7, No. 3, 2016.
- [10] Ali K.Hmood, B.B. Zaidan, A.A. Zaidan and Hamid A. Jalab, *An Overview on Hiding Information Technique in Images*, Journal of Applied Sciences,10: 2094-2100.
- [11] M.Naseem, Ibrahim M. Hussein, M.Kamran Khan, Aisha Ajmal, *An Optimum Modified Bit Plane Splicing LSB Algorithm for Secret Data Hiding*, International Journal of Computer Applications(0975-8887) Volume 29-No.12,September 2011.
- [12] Hassan K. Albahadily, V.Yu. Tsviatkou, V.K. Kanapelka, *Grayscale Image Compression using Bit Plane Slicing and Development RLE Algorithm*, International Journal of Advanced Research in Computer and Communication Engineering, Vol.6,Issue 2,February 2017.
- [13] Khan Muhammed, Jamal Ahmad, Haleem Farman and Muhammed Zubair, *A novel Image Steganographic Approach for Hiding Text in Color Images HSI Color Model*. Middle-East Journal of Scientific Research 22(5):647-654,2014.
- [14] Rengarajan Amirtharajan and John Bosco Balaguru Rayappan,*Pixel Authorized by Pixel to Trace with SFC on Image to Sabotage Data Muger: A Comparative Study on PI Stego*. Research Journal of Information Technology, 4: 124-139,June 27,2012.

Analysis of k -out-of- n Systems Using Inter-arrival Failure Times

Mehmet GÜRÇAN¹, Yunus GÜRAL¹ and Gökhan GÖKDERE¹

¹ Department of Statistics, University of Firat, Elazig, Turkey

mehmetgurcan2000@yahoo.com, ygural@firat.edu.tr, g.g.gokdere@gmail.com,

Abstract

An important application area of the reliability theory is the examination of the k -out-of- n systems which have an important place in the systems. In the literature, the reliability of technical system generally is based on the distribution of the lifetimes of the components in the system. The situation after the repair of the failed system has never been examined. However, it is not necessary to repair all failed components in order to work a repairable k -out-of- n system. It is enough to repair the components as much as needed to work the system. In this study, the time between failures are considered when examining the reliability of k -out-of- n systems. Furthermore, after the first failure, the system is examined considering other failure times.

Keywords: k -out-of- n system; Semi Markov process; Inter-arrival failure time.

REFERENCES

1. Alves, F. S. Q., Yehia, H. C., Pedrosa, L. A. C., Cruz, F. R. B., & Kerbache, L., Upper bounds on performance measures of heterogeneous M/M/c queues. *Mathematical Problems in Engineering*, Article ID 702834, 2011.
2. Atkinson, J. B., Two new heuristics for the GI/G/n/0 queueing loss system with examples based on the two-phase Coxian distribution. *Journal of the Operational Research Society*, 60(6), 818-830, 2009.
3. Brumelle, S. L., A generalization of Erlang's loss system to state dependent arrival and service rates. *Mathematics of Operations Research*, 3(1), 10-16, 1978.
4. Çinlar, E., Markov renewal theory. *Advances in Applied Probability*, 1(2), 123-187, 1969.
5. Halfin, S., Distribution of the interoverflow time for the GI/G/1 loss system. *Mathematics of Operations Research*, 6(4), 563-570, 1981.

Evaluation of Car Performances Using Data Envelopment Analysis

Yunus Güral¹, Ayşe Turan Buğatekin¹

¹ Department of Statistics, University of Firat, Elazig, Turkey

ygural@firat.edu.tr, aturan@firat.edu.tr

Abstract

Data Envelopment Analysis (DEA) is a nonparametric method used to examine the relative efficiencies of Decision Making Units (DMUs) on conditions where there are multiple inputs and multiple outputs. It was first introduced in 1957 by Farrell in the literature and in the following years different researchers tried to be developed. In 1978 Charnes, Cooper and Rhodes studied it in detail. As in all sectors, it is very important for the automotive sector to operate effectively. Therefore, it is also important to measure the efficiency and find the source of the inefficiency.

In this study, the performances of the DMU of the automobiles will examine using Data Envelopment Analysis. In this direction, it is aimed to assist consumers in purchasing to consumers by calculating the relative efficiencies of automobile models according to the wishes of the consumers by determining effective and ineffective DMUs. Sales price and fuel consumption are determined as input variables; maximum speed, cylinder volume, horsepower, maximum torque, luggage volume, acceleration time from 0 to 100 km are determined as output variables.

Keywords: Data Envelopment Analysis; Efficiency; Super-Efficiency; Automotive Industry.

REFERENCES

1. Aktaş , H., An Application of Data Envelopment Analysis with financial ratios assess the performance of banks , *Yönetim ve Ekonomi*, Celal Bayar Üniversitesi, İ.İ.B.F. Dergisi, 5, 27-40, 1999.
2. Charnes, A., Cooper, W.W., Rhodes, E., Measuring the efficiency of decision making units. *European Journal of Operational Research* 2, 429–444, 1978.
3. Erpolat, S., Veri Zarflama Analizi (Ağırlık Kısıtlamasız, Ağırlık Kısıtlı, Şans Kısıtlı, Bulanık) Türkiye'deki Özel Bütçeli Diğer İdarelerin Etkinlik Analizi, Evrim Yayınevi, İstanbul, 2011.
4. Kutlar, A. ve Babacan, A., Türkiye' deki Kamu Üniversitelerinde CCR Etkinliği-Ölçek Etkinliği Analizi: DEA Tekniği Uygulaması, *Kocaeli Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 15(1), 148-172, 2008.

Galerkin Finite Element Method For Coupled Klein Gordon Equation In Two Component Systems

Yusuf Ucar¹, Berat Karaagac², Nuri M. Yagmurlu¹, Alaattin Esen¹,

¹Department of Mathematics, University of Inonu, Malatya, Turkey

²Department of Mathematics Education, University of Adiyaman, Adiyaman, Turkey

yusuf.ucar@inonu.edu.tr

Abstract

In this study, an accurate numerical scheme is proposed for the Coupled Klein Gordon equation modelling one dimensional nonlinear wave process in two component media such as long longitudinal waves in elastic bi-layers. The newly obtained numerical scheme is based on Galerkin finite element method, a powerful technique to obtain numerical solutions of partial differential equations (PDEs), and cubic B-spline basis functions. The newly obtained numerical results are compared with exact solutions using the error norms L_2 and L_∞ . The error norms show that the convergence of the results obtained by the Galerkin Finite Element method is reasonable enough.

Keywords: Finite element method, Galerkin, Coupled Klein Gordon equation, cubic B-spline basis.

REFERENCES

1. Abdel Maksoud A. Soliman, A Galerkin Solution for Burgers' Equation Using Cubic B-Spline Finite Elements, Abstract and Applied Analysis, volume 2012, doi:10.1155/2012/527467.
2. Eid .H. Doha, A. H. Bhrawy, Dimitru. Baleanu, M.A. Abdelkawy, Numerical treatment of Coupled Nonlinear Hyperbolic Klein-Gordon Equations, Romanian Journal of Physics 59(3), 2014.
3. Paddy M. Prenter , Splines and Variational Methods, 1975.

A New Perspective for The Numerical Solution for Fractional Klein Gordon Equation

Berat Karaagac¹, Yusuf Ucar², Nuri M. Yagmurlu², Alaattin Esen²

bkaraagac@adiyaman.edu.tr

¹Department of Mathematics Education, University of Adiyaman, Turkey.

²Department of Mathematics, University of Inonu, Turkey

bkaraagac@adiyaman.edu.tr

Abstract

In the present manuscript, a new numerical scheme is going to be presented for solving the time fractional nonlinear Klein-Gordon equation. The approximate solutions of the fractional equation are based on cubic B-spline collocation finite element method and L2 algorithm. The fractional derivative in the given equation is handled in terms of Caputo sense. Using the above mentioned methods, first of all, fractional differential equation is converted into algebraic equation system that are appropriate for computer coding. Then, two model problems are taken into consideration, their error norms are calculated to demonstrate the reliability and efficiency of the proposed method. The newly calculated error norms show that numerical results are in a good agreement with the exact solutions.

Keywords: Finite element method, collocation, Fractional Klein Gordon equation, Caputo derivative

REFERENCES

1. Abdelhameed Mohamed Nagy, Numerical solution of time fractional nonlinear Klein-Gordon equation using Sinc-Chebyshev collocation method, Applied Mathematics and Computation, 310, 139-148, 2017.
2. Santos Bravo Yuste, Weighted average finite difference methods for fractional diffusion equations, Journal of Computational Physics, 216(1), 264-274 ,2006.
3. Rubayyi T. Alqahtani , Approximate Solution of Non-Linear Fractional Klein-Gordon Equation Using Spectral Collocation Method, Applied Mathematics, 6, 2175-2181, 2015.
4. Akbar Mohebbi , Mostafa Abbaszadeh and Mehdi Dehghan, High-Order Difference Scheme for the Solution of Linear Time Fractional Klein-Gordon Equations, 30 (4), 1234-1253, 2014.
5. Pin Lyu, Seakweng Vong, A linearized second-order scheme for nonlinear time fractional Klein-Gordon type equations, Numerical Algorithms, 2017,1 27.<http://dx.doi.org/10.1007/s11075-017-0385-y>.
6. Paddy M. Prenter , Splines and Variational Methods, 1975.

COMPUTATIONAL INVESTIGATION OF NEW COMPOUNDS BASED ON (EDOT) AND (BT) FOR DYE SENSITIZED SOLAR CELLS

Z. El Malki^{1*}, M. Bouachrine¹, L. Bejjit², M. Haddad³
F. Serein-Spirau⁴

¹Moulay Ismaïl University, MEM, High School of Technology (ESTM), B.P 3103
Toulal, 50040 Meknes, Morocco.

zelmalki@yahoo.fr, mbouach@hotmail.com

²Moulay Ismaïl University, LASMAR, High School of Technology (ESTM), B.P. 3103
Toulal, 50040 Meknes, Morocco.

bejjitl@yahoo.fr

³Moulay Ismaïl University, LASMAR, Faculty of Sciences, B.P. 11201
Zitoune Meknes, Morocco.

mhaddad@fs-umi.ac.ma

⁴Molecular and Macromolecular Heterochimie, UMR, CNRS 5076, Higher National
School of Chemistry, Montpellier, France.

francoise.spirau@enscm.fr

Abstract

Dye-sensitized solar cells (DSSCs) have increasingly attracted research interest for their abilities to convert solar light to electricity at a low cost since the breakthrough in conversion efficiency that Grätzel and co-workers made with Ru-based photosensitizers [1, 2]. The electron-donating and accepting strengths have been proven to be major control variables for increasing the energy conversion efficiency [3]. In the present study, a series of novel metal-free organic dyes for DSSCs were designed and investigated. These molecules were designed with the D1-BT-EDOT-BT-D2-A structure bearing the central donor unit (3,4-Ethylenedioxythiophene) (EDOT), the same Benzothiadiazole (BT) as π -acceptor and a different donor unit constituted of Thiophene, Phenylene, Carbazole, Fluorene and Anthracene. The optimized structures and optoelectronic properties of these dyes have been investigated by using the Density Functional Theory DFT/B3LYP/6-31G(d,p) method and Time Dependant Density Functional Theory (TD/DFT) calculations. In order to predict the band gaps for guiding the synthesis of novel materials with low band gaps, we applied quantum-chemical techniques to calculate the band gaps in several oligomers. The calculated HOMO-LUMO (E_{gap}) gaps and the wavelength of absorption spectrum (λ_{max}) were compared with the experimental data. The calculated results of these dyes demonstrate that these compounds can be used as potential sensitizers for TiO₂ nanocrystalline solar cells.

Keywords: Donor-Acceptor; Benzothiadiazole; Thiophene; TD/DFT calculations; solar cells.

REFERENCES

1. M. Gratzel, Nature 414, 338-344 (2001).
2. M. Gratzel, J. Photochem. Photobiol. C 4, 145-153 (2003).
3. K. Tanaka, K. Takimiya, T. Otsubo, K. Kawabuchi, S. Kajihara, Y. Harima. Chem Lett. 35, 592-3 (2006).

EIGENVALUE PROBLEMS FOR $p(x)$ -KIRCHHOFF-TYPE EQUATIONS WITH NEUMANN BOUNDARY CONDITIONS

Zakaria El Allali¹, Said Taarabti and Khalil Ben Haddouch

¹ Department of Mathematics and Computer Sciences, University of Mohamed First, Oujda
Morocco

z.elallali@ump.ma,

Abstract

This work is concerned with the existence of nontrivial weak solutions for a $p(x)$ -Kirchhoff-type equation with Neumann boundary conditions. By using the Mountain Pass Theorem of Ambrosetti and Rabinowitz, Ekelands variational principle and the theory of the variable exponent Sobolev spaces, we establish the conditions for the existence of weak solutions.

Keywords: $p(x)$ -Kirchhoff type equation, variational method, Mountain Pass Theorem, Neumann boundary conditions.

REFERENCES

1. K. Ben Haddouch, Z.El Allali , A.Ayoujil and N.Tsouli, Continuous spectrum of a fourth order eigenvalue problem with variable exponent under Neumann boundary conditions, Annals of the University of Craiova, Mathematics and Computer Science Series Volume, 42(1), 2015, Pages 42-55.
2. K. Ben Haddouch, Z.El Allali , A.Ayoujil, N.Tsouli, S. El Habib and F. Kissi Existence of solutions for a fourth order eigenvalue problem with variable exponent under Neumann boundary conditions, Bol. soc. Parana. Mat, v. 34 1 (2016): 253–272.
3. S.Taarabti , Z. El Allali and K. Ben Haddouch Eigenvalues of the $p(x)$ -biharmonic operator with inde nite weight under Neumann boundary conditions, , Bol. soc. Parana. Mat, v. 36 1 (2018): 195–213.
4. Ghasem A. Afrouzi, Maryam Mirzapour Problems for $p(x)$ -kirchhoff type equations. Electronic Journal of differential equations , Vol. 2013 (2013), No. 253, pp. 110.
5. Kong, L.: On a fourth order elliptic problem with a $p(x)$ -biharmonic operator. Appl. Math. Lett. 27, 21–25 (2014).

ON A NOVEL NUMERICAL METHOD FOR SOLVING FRACTIONAL-ORDER CAUCHY PROBLEMS

Zakia Hammouch^{1*} and Toufik Mekkaoui¹

¹Department of Mathematics, Moulay Ismail University

* hammouch.zakia@gmail.com

Abstract

Using the exponential series, a new numerical method is suggested in this paper. In this method, a given Cauchy problem for linear or nonlinear ordinary differential equation with classical differentiation is solve in multistep. To check the efficiency of the new method, four examples including chaotic problems are solved and numerical simulations are presented. The numerical simulations let no doubt to believe that, the new method is highly accurate.

Keywords: Exponential series; ordinary differential equations; chaotic models.

REFERENCES

1. A Atangana, D Baleanu (2016), Caputo-Fabrizio derivative applied to groundwater flow within confined aquifer *Journal of Engineering Mechanics* 143 (5).
2. M. Caputo, M. Fabrizio (2015). A new definition of fractional derivative without singular kernel. *Progr. Fract. Differ. Appl.*, 1, pp. 73-85.
3. J. Losada, J.J. Nieto (2015). Properties of the new fractional derivative without singular kernel. *Progr. Fract. Differ. Appl.*, 1, pp. 87-92.

On The Exact Solutions of Two-Mode Equations

Zehra Pinar¹, Huseyin Kocak²

¹Namık Kemal University, Faculty of Arts and Science, Department of Mathematics, 59030
Merkez-Tekirdağ, Turkey

²Quantitative Methods Department, Pamukkale University, 20160 Denizli, Turkey

zpinar@nku.edu.tr, hkocak@pau.edu.tr

Abstract

The two-mode Korteweg-de Vries (TKdV) equation, which describes the one dimensional propagation of shallow water waves with two modes in a weakly nonlinear and dispersive fluid system, and one of the Burgers hierarchies in (1+1)-dimensions, which is known as the two-mode Sharma-Tasso-Olver (TSTO) equation, are considered. Analytical solutions of proposed equations are obtained by using the well-known Bernoulli equation method through the symbolic computation.

Keywords: Two mode equations; Analytical solutions; Bernoulli equation method.

REFERENCES

1. A.M. Wazwaz, A two-mode modified KdV equation with multiple soliton Solutions, Applied Mathematics Letters, 70, 1–6, 2017.
2. A.-M. Wazwaz, Two-mode Sharma-Tasso-Olver equation and two-mode fourth-order Burgers equation: Multiple kink solutions, Alexandria Eng. J., <http://dx.doi.org/10.1016/j.aej.2017.04.003>, 2017
3. Zehra Pinar, Huseyin Kocak, Exact solutions for the third-order dispersive-Fisher equations, Nonlinear Dyn, 2017. <https://doi.org/10.1007/s11071-017-3878-2>
4. Zehra Pinar, Turgut Ozis, A remark on a variable-coefficient Bernoulli equation based on auxiliary equation method for nonlinear physical systems, arXiv:1511.02154 [math.AP],(2015)

Timelike Curve Flows and Integrable systems in Lorentzian Symmetric Space

Zuhal Kucukarslan Yuzbasi¹, Stephen C. Anco² and Mehmet Bektas³

^{1,3}Department of Mathematics, University of Firat, Elazig, Turkey

²Department of Mathematics, Brock University, Canada

zuhal2387@yahoo.com.tr, sanco@brocku.ca and mbektas@firat.edu.tr

Abstract

The main goal of this study is to give how to derive group-invariant soliton equations and their integrability structure from studying non-stretching flows of timelike curves in Lorentzian symmetric spaces $G/H = SO(n, 1) / SO(n-1, 1)$ by using the Cartan structure equations.

Keywords: Timelike curve, Flow, Integrable system

REFERENCES

1. S. C. Anco, 2006. Hamiltonian Flows of Curves in $G/SO(N)$ and Vector Soliton Equations of mKdV and Sine-Gordon Type, Symmetry, Integrability and Geometry: Methods and Applications, 2, Paper 044, 18.
2. Z. Kucukarslan Yuzbasi, 2014. Geometric Null Curve Flows and Integrable Systems in Lorentz Space PhD Thesis, Firat University.

On Hypersurface Family with a Common Asymptotic Curve in the 4D Galilean Space G_4

Zuhal Kucukarslan Yuzbasi¹ and Dae Won Yoon²

¹ Department of Mathematics, University of Firat, Elazig, Turkey

²Department of Mathematics, Gyeongsang National University, Republic of Korea

zuhal2387@yahoo.com.tr and dwyoon@gnu.ac.kr

Abstract

In the present study, we derive the problem of constructing a hypersurface family from a given isoasymptotic curve in the 4D Galilean space G_4 . We obtain the hypersurface as a linear combination of the Frenet frame in G_4 and examine the necessary and sufficient conditions for the curve as an asymptotic curve. Finally, some examples related to our method are given for the sake of clarity.

Keywords: Galilean space, Hypersurface, Asymptotic.

REFERENCES

1. R. A. Al-Ghefaria and A. B. Rashad A., An approach for designing a developable surface with a common asymptotic curve, Int. J. Contemp. Math. Sci. 8(18) (2013), 875-891.
2. E. Bayram and E. Kasap, Hypersurface family with a common isoasymptotic, Geometry, Article ID 623408, (2014), 6 pages.
3. Z. K. Yuzbasi, On a family of surfaces with common asymptotic curve in the Galilean space G_3 ; J. Nonlinear Sci. App. 9 (2016), 518-523.

Integrated Intelligent paradigm for nonlinear singular system of Lane-Emden Equation arising in Astrophysics

Zulqurnain Sabir¹, Fevzi Erdoğan², Muhammad Asif Zahoor Raja³

¹Department of Mathematics, Capital University of Science and Technology, Islamabad Pakistan

Email: dmt143017@cust.pk, zulqurnainsabir@gmail.com

²Department of Statistics, Faculty of Sciences, Yuzuncu Yil University, 65080 Van, Turkey

Email: ferdogan@yyu.edu.tr

³Department of Electrical Engineering, COMSATS Institute of Information Technology, Attock, Pakistan

Emails: Muhhammad.asif@ciit-attock.edu.pk, rasifzahoor@yahoo.com

In the present study, a novel application of computational intelligence technique is presented for solving nonlinear Lane-Emden [1-3] system arising in astrophysics models by exploiting the competency of radial base neural networks models (RNNMs) optimized with evolutionary computing approach of genetic algorithms supported with local search technique of sequential quadratic programming. The RNNMs is to provide convenient and reliable procedure for constructing a useful model based on error function to solve the equations. The applicability and reliability of the proposed scheme have been monitored thoroughly for various boundary value problems through numerical experimentation to validate its accuracy, convergence, and robustness. Statistical analysis has been performed to authenticate the accuracy in terms of different performance measuring gages based on variance account for (VAF), mean absolute error (MAE) and root mean square error (RMSE).

Keywords: Neural Networks; Genetic Algorithms; Astrophysics; Lane-Emden Systems; Sequential Quadratic; Hybrid Computing.

References

- [1] Richardson, O.W., 1921. *The emission of electricity from hot bodies*. Longmans, Green and Company.
- [2] Davis, H.T., 1962. *Introduction to nonlinear differential and integral equations*. Courier Corporation.
- [3] Chandrasekhar, S. and Chandrasekhar, S., 1957. *An introduction to the study of stellar structure (Vol. 2)*. Courier Corporation.

A NOTE ON THE STABILITY ANALYSIS OF THE TIME FRACTIONAL VARIABLE ORDER KLEIN-GORDON EQUATION

Necdet Bildik¹

¹ Department of Mathematics, Manisa Celal Bayar University, Manisa, Turkey

necdet.bildik@cbu.edu.tr

Abstract

In this study, the Klein- Gordon equation is generalized using the concept of the variational order derivative. We construct the Crank-Nicholson scheme for numerical solutions of the modified Klein- Gordon equation. Stability analysis of the Crank-Nicholson scheme is examined to show the proposed method is stable for solving the time-fractional variable order Klein-Gordon equation.

Keywords: Klein-Gordon equation, fractional variable order derivative, Crank-Nicholson scheme, stability.

REFERENCES

1. Podlubny I (1999) Fractional differential equations. Academic Press, New York
2. Golmankhaneh, Alireza K., Ali K. Golmankhaneh, and Dumitru Baleanu. "On nonlinear fractional Klein-Gordon equation." Signal Processing 91.3 (2011): 446-451.
3. S.G. Samko, A.A. Kilbas, O.I. Marichev, Fractional Integrals and Derivatives Theory and Applications, Gordon and Breach, New York, 1993.
4. Atangana, Abdon. "On the new fractional derivative and application to nonlinear Fisher's reaction-diffusion equation." Applied Mathematics and Computation 273 (2016): 948-956.
5. Arikoglu, Aytac, and Ibrahim Ozkol. "Solution of fractional differential equations by using differential transform method." Chaos, Solitons & Fractals 34.5 (2007): 1473-1481.
6. Atangana, Abdon, and Joseph Francois Botha. "A generalized groundwater flow equation using the concept of variable-order derivative." Boundary Value Problems 2013.1 (2013): 53.

λ - ALMOST CONVERGENCE AND SOME SEQUENCE SPACES

Ekrem SAVAS

Uşak University, Uşak, Turkey

ekrem.savas@usak.edu.tr

Abstract

In this article, we study some new sequence spaces which naturally emerge from the concept of λ -almost convergence. Just as almost, absolutely almost and strongly almost summability, it is expected that λ -almost convergence must give rise to λ -almost, absolutely λ -almost and strongly λ -almost summability. The goal of this paper is to introduce the spaces of strongly λ -almost summability sequences. Some topological results has been discussed.

Keywords: almost convergence, λ -almost convergence; topological properties, paranormed spaces.

REFERENCES

1. I.J. Maddox, Spaces of strongly summable sequences, Quart. J. Math. Oxford Se. (2), 18,345-355.
2. S. Nanda, Some sequence spaces and almost convergence, J. Austral. Math. Soc. 22 (Series A) (1976), 446-455.

MODELLING OF DENTAL DRILLS AND RESTORATION PROCESSES BY FINITE ELEMENT METHOD

Sinan SEZEK¹ and Bünyamin AKSAKAL²

¹Atatürk Üniöersity, Engineering Faculty, Dept. of Mater and Metall Eng.Erzurum, Turkey

²Yıldız Technical Üniöersity, Chemical and Metallurgy Faculty, Dept. Of Mater and Metallurgy Eng. , Istanbul, Turkey; baksakal@yildiz.edu.tr

Abstract

It is essential not to deform living tissues during dental surgeries involving teeth and dentine cutting operations. Our study has been conducted to determine temperature degrees generated during the operation due to use of dental drills in dental surgeries. Changes in temperature occurring at drill contact areas during dental operations carried out at a pressure of 1.5 and 2.2 bars have been identified and respective differences have been shown accordingly. In this study, comparisons with lab results and FEM model have been made to determine temperature distribution patterns. It has been observed that temperatures reached according to the type of dental drill used have remained within the boundaries of necrotic temperature area but approached the upper limit of necrotic area in cases where the pressure of aerator was high.

Keywords: *Dental Frez, Temperature Distribution, Dental Process, Dental Necrosis*

REFERENCES

1. Alam, K., M. Khan, and V.V. Silberschmidt, (2014). 3D finite-element modelling of drilling cortical bone: Temperature analysis. *Journal of Medical and Biological Engineering*,. 34(6): p. 618-623.
2. Alam, K., I.M. Bahadur, and N. Ahmed, Cortical bone drilling: An experimental and numerical study (2015). *Technology and Health Care*. 23(2): p. 223-231.
3. Gok, K., et al., (2015). Development of a new driller system to prevent the osteonecrosis in orthopedic surgery applications. *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, 37(2): p. 549-558.
4. Karaca, F. (2011). Diş Hekimliği Uygulamalarında Optimum Diş Kesme ve Delme Analizleri. *NEWSA*, 6(4).
6. Sezek, S., B. Aksakal, and F. Karaca, (2012). Influence of drill parameters on bone temperature and necrosis: A FEM modelling and in vitro experiments. *Computational Materials Science*, 60: p. 13-18.

INVESTIGATION OF TEMPERATURE DISTRIBUTION IN COLD ROLLING PROCESSES

Sinan SEZEK¹ and Bünyamin AKSAKAL²

¹Atatürk University, Engineering Faculty, Dept. of Mater and Metall Eng. Erzurum, Turkey

²Yıldız Technical University, Chemical and Metallurgy Faculty, Dept. Of Mater and Metallurgy Eng. , Istanbul, Turkey; baksakal@yildiz.edu.tr

Abstract

In cold forming processes of metals where subjected to plastic deformation, heat is generated in metals under the influence of deformation forces applied to deform material. Such forces triggers dislocations in the sample and also friction and thus cause temperature rise substantially by depend upon the number of passes in rolling process. The temperature change in cold rolling was examined by an experimental method and it was determined that the temperature increased by 39°C in each passes.

Keywords: Plastic Deformation; Cold Rolling; Number of Passes; Temperature distribution,

REFERENCES

1. E.N. Dvorkin, M.B. Goldschmit, M.A. Cavaliere, P.M. Amenta, O. Marini, W. Stroppiana, 2D finite element parametric studies of the flat-rolling process, J. Mater. Process. Tech. 68(1) (1997) 99-107.
2. S. Serajzadeh, Prediction of microstructural changes during hot rod rolling, Int. J. Mach. Tools Manufac. 43(14) (2003) 1487-1495.
3. A.F.M. Arif, O. Khan, A.K. Sheikh, Roll deformation and stress distribution under thermomechanical loading in cold rolling, J. Mater. Process. Tech. 147(2) (2004) 255-267.
4. J.G. Lenard, The effect of roll roughness on the rolling parameters during cold rolling of an aluminum alloy, J. Mater. Process. Tech. 152(2) (2004) 144-153.

COMPATIBILITY OF ANFIS TO MODEL REFERENCE EVAPOTRANSPIRATION IN TWO DIFFERENT COUNTRIES

Gozen Elkiran¹, Vahid Nourani², Jazuli Abdullahi¹, Sani Isah Abba¹

¹ Department of Civil Engineering, Near East University, Nicosia, North Cyprus

² Department of Water Resources Engineering, University of Tabriz, Tabriz, Iran
gozenelkiran@gmail.com, vnourani@yahoo.com, jazulibinabdallah@gmail.com,
Saniisaabba86@gmail.com

Abstract

The aim of this study is to model Reference Evapotranspiration (ET_0) in Nigeria and Cyprus with Maiduguri and Larnaca as a case study regions. Adaptive Neuro Fuzzy Inference System (ANFIS) which utilized 3 membership functions owing to its fine mapping capability was employed for the modeling purpose. Multiple Linear Regression (MLR) model was also developed. The results were compared to Penman-Monteith (FAO-56-PM) model. Monthly average of long-term climate data including minimum temperature, maximum temperature, relative humidity, and wind speed were used as inputs to the models. The performance of the models was evaluated by two global statistics of Root Mean Square Error (RMSE), and Determination Coefficient (DC). The results indicated that ANFIS had better performance than MLR models. The results also showed ANFIS is capable of modeling ET_0 in the study regions efficiently, but had better performance in Maiduguri than in Larnaca region.

Keywords: Climate data, Cyprus, Fuzzy Inference System, Global statistics, Penman-Monteith.

REFERENCES

- [1] Jahanbani and A.H. El-Shafie, Application of Artificial Neural Network in Estimating Monthly Time Series Reference Evapotranspiration with Minimum and Maximum Temperatures, Paddy and Water Environment 9(2), 207, 2011.
- [2] H. Citakoglu, M. Cobaner, T. Haktanir, and O. Kisi, Estimation of Monthly Mean Reference Evapotranspiration in Turkey, Water Resources Management., 28(1), 99-113, 2014.
- [3] Jang, ANFIS: Adaptive-Network-based Fuzzy Inference System, IEEE Transactions on systems, man, and cybernetics, 23(3), 665-685, 1993.

COMPUTING EIGENVALUE BOUNDS TO BOUNDARY VALUE PROBLEM

Hüseyin DEMİR^{1,*}, Yücel BALTÜRK²

¹ Ondokuzmayıs University, Arts and Science Faculty, Department of Mathematics, Samsun TURKEY,
hdemir@omu.edu.tr

² Gumushane University, Institute of Science, Department of Mathematics, Gumushane, TURKEY,
yucelbalturk@gmail.com

Abstract

A numerical procedure is considered for the computation of bounds to the Eigen Boundary Value Problem. Then, the eigen BVP has been converted to eigenvalue equation with the appropriate boundary conditions. To show this the associated Euler-Lagrange equation is taken with the self-adjoint positive operator $H = -\frac{d}{dx^2}$. Hence, the eigenvalue bound of the boundary value problem has been determined. Also, all eigenvalues are calculated by using Newton-Raphson method. Hence, the smallest real value among eigenvalues are found.

Keywords: Boundary value problem, eigenvalue, numerical solution, eigenvalue bounds.

REFERENCES

1. SYNGE, J. L. 1938. Hydrodynamical Stability, Semicentenn Publication, Ame. Math Soc., 2, 227-269
2. PAI, S. I., 1954, On a generalisation of Syngé's criterion for sufficient stability of plane parallel flows. , Quart. Appl. Math., 12, 203-206
3. GOULD, S. H. 1957. Variational Methods for Eigenvalue Problems, University of Toronto Press.
4. JOSEPH, D., D., 1968. Eigenvalue bounds for the Orr-Sommerfeld equation, J. Fluid Mech., 33, 617-621.

Δ_i^m -Lacunary Statistical Convergence of Order α and Lacunary Strongly (Δ_i^m, p) -Summable Sequences of Order α

¹Mikail Et ; ²Hacer Şengül and ³Muhammed Çınar

¹Department of Mathematics, Fırat University, Elazığ-TURKEY

²Faculty of Education, Harran University, Osmanbey Campus, Sanliurfa-TURKEY

³Department of Mathematic Education, Mus Alparslan University, Mus-TURKEY

E-mail: ¹mikailet68@gmail.com ; ²hacer.sengul@hotmail.com ;
³muhammedcinar23@gmail.com

Abstract

In the paper [1] Altinok et al. introduce the concepts of Δ_i^m -lacunary statistical convergence of order α and lacunary strongly (Δ_i^m, p) -summable sequences of order α and give some inclusion relations between these concepts. In this paper we continue to examine others relations between the concepts of Δ_i^m - lacunary statistical convergence of order α and lacunary strongly (Δ_i^m, p) -summable sequences of order α .

Keywords: Difference sequence, Statistical convergence, Lacunary sequence..

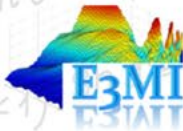
REFERENCES

- [1] Altinok ; Et, M. and Işık, M. Δ_i^m -lacunary statistical convergence of order α , AIP Conference Proceedings 1926, 020004 (2018); <https://doi.org/10.1063/1.5020453>.
- [2] Çolak, R. Statistical convergence of order α , Modern Methods in Analysis and Its Applications, New Delhi, India : Anamaya Pub, 2010 : 121--129.
- [3] Et, M. and Colak, R. On generalized difference sequence spaces, Soochow J. Math. 21(4) (1995), 377-386.
- [4] Et, M. and Şengül, H. Some Cesaro-type summability spaces of order α and lacunary statistical convergence of order α , Filomat 28(8) (2014), 1593--1602.
- [5] Şengül, H. and Et, M. On lacunary statistical convergence of order σ , Acta Math. Sci. Ser. B Engl. Ed. 34(2) (2014), 473--482.
- [6] B .C. Tripathy, A. Esi and B. K. Tripathy, On a new type of generalized difference Cesaro Sequence spaces, Soochow J. Math. 31:3 (2005), 333-340.

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