Solution of Multi-Objective Optimization Model in FMS Design with Scalarization Methods

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Multi-objective optimization problems are more encountered in real life than single-objective optimization problems. Therefore, the solution of this multi-objective optimization problems has a critical importance due to its contribution to many areas. The objective function of operation allocation and material handling system selection in Flexible Manufacturing System (FMS) in the literature are created to minimize the costs related to the manufacturing operations, machines set up and material handling operations and to maximize the compatibility of the part types and the material handling equipment assigned to handle parts. The solutions of this problem can be achieved by multi-objective optimization solution techniques because of conflicting structure of the objective functions of this problem. Scalarization methods are used for solving multi-objective optimization problems. Scalarization is the transformation of multiple objective functions into a single function that can represent all of them. 6 scalarization techniques were applied on this model and result were compared within this study.

Keywords: Flexible Manufacturing System, Multi Objective Optimization, Scalarization Techniques