A Multi-Objective Hybrid Genetic Algorithm Approach To The Intergraded Problem Of Assembly Planning And Line Balancing

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ABSTRACT

To face the variety of the market change, a flexible assembly system which can fabricate the products in small batches and meet specific orders is necessary to for quick response the customer ’ s need. Thus, the integration for assembly sequence planning and assembly line system actually play an important role in the assembly design of product. An assembly sequence planning is considered to be optimal when the sequence satisfies specific assembly constraint such as the assembly direction and tool change. On the other side, the problem of assembly line balancing involves the minimization of the idle time in the assembly line design. In this research, Equal Piles method based on the imbalance concept is suggested in ALB. This study proposes a multi-objective hybrid genetic algorithm (MOHGA) approach to integrate the viewpoint of ASP and ALB. The MOHGA combines with evolutionary multi-objective optimization algorithms, grouping genetic algorithms and priority-based genetic algorithms. MOHGA is aim to find Pareto-optimal solution set (all non-dominated solutions) based on the multi-objective optimal search method. In addition, a decision model which can find only one solution in terms of decision maker ’ s preference is proposed. Finally, several examples were offered to verify the feasibility of MOHGA. Experiment results indicate that the MOHGA can efficiently produce Pareto-optimal solution set and support the design of flexible assembly system.

Keywords : Assembly Planning ; Assembly Line Balancing ; Evolutionary Multi-Objective Optimization ; Grouping Genetic Algorithms ; Hybrid Genetic Algorithms ; Multi-Objective Optimization

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