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A Hybrid Pareto-Based Swarm Optimization Algorithm for the Multi-Objective Flexible Job Shop Scheduling Problems

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Abstract : In this paper, a new hybrid particle swarm optimization algorithm is proposed for the multi-objective flexible job shop scheduling problem that is very important and hard combinatorial problem. The Pareto approach is used for solving the multi-objective problem. Several new local search heuristics are integrated into an algorithm based on the critical block concept to enhance the performance of the algorithm. The algorithm is compared with the recently published multi-objective algorithms based on benchmarks selected from the literature. Several metrics are used for quantifying performance and comparison of the achieved solutions. The algorithms are also compared based on the Weighting summation of objectives approach. The proposed algorithm can find the Pareto solutions more efficiently than the compared algorithms in less computational time.

Keywords : swarm-based optimization, local search, Pareto optimality, flexible job shop scheduling, multi-objective optimization
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