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A Hybrid ICA-GA Algorithm for Solving Multiobjective Optimization of Production Planning Problems

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Abstract : Production Planning or Master Production Schedule (MPS) is a key interface between marketing and manufacturing, since it links customer service directly to efficient use of production resources. Mismanagement of the MPS is considered as one of fundamental problems in operation and it can potentially lead to poor customer satisfaction. In this paper, a hybrid evolutionary algorithm (ICA-GA) is presented, which integrates the merits of both imperialist competitive algorithm (ICA) and genetic algorithm (GA) for solving multi-objective MPS problems. In the presented algorithm, the colonies in each empire has be represented a small population and communicate with each other using genetic operators. By testing on 5 production scenarios, the numerical results of ICA-GA algorithm show the efficiency and capabilities of the hybrid algorithm in finding the optimum solutions. The ICA-GA solutions yield the lower inventory level and keep customer satisfaction high and the required overtime is also lower, compared with results of GA and SA in all production scenarios.

Keywords : master production scheduling, genetic algorithm, imperialist competitive algorithm, hybrid algorithm
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