

Two-stage Meta-Heuristic Algorithm for Parallel Machine Scheduling with Additional Resource Input in Shipyard Manufacturing

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Abstract

Development of an efficient workspace scheduling algorithm for shipyard manufacturing has become more crucial as the modern smart factory technologies burgeon. Because the shipyard manufacturing is greatly sizable, a decision making on workspace scheduling is not a trivial mission. In particular, there are several considerations to schedule the block processing on the workspaces such as due date or resource limitation in the workspaces. In a practical sense for workspace scheduling, it is commonly used strategy to input additional resources into a workspace to shorten the total production time because a little curtailment of the total production time can provide a huge revenue in shipyard manufacturing. In this study, we tackle the workspace scheduling in shipyard manufacturing considering the additional resource input strategy. This problem can be considered as a class of the parallel machine scheduling problem. We introduce a mixed integer programming model for the addressed problem, and develop an efficient meta-heuristic algorithm. The proposed algorithm is composed of two stages: (i) a genetic algorithm enhanced by an ordering-based heuristic scheduling and (ii) a tabu-search algorithm for local search with considering additional resources input. The comprehensive computational study shows the efficiency of our proposed algorithm.

Keywords

Parallel machine scheduling, Genetic algorithm, Tabu search, Shipyard manufacturing.

Biographies

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