

# **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 shipyard manufacturing is generally conducted on a large scale, making workspace scheduling decisions is not a trivial mission. In particular, one needs to consider several factors (due date, resource limitation in the workspace, etc.) in order to efficiently schedule block processing in the workspace. A commonly used strategy is to input additional resources into a workspace to shorten the total production time. By implementing this strategy, one can curtail the total production time, which can later result in significant cost reductions in shipyard manufacturing. In this study, we tackle the workspace scheduling in shipyard manufacturing problem by taking the additional resource input strategy into account. This problem can be considered as a class of the parallel machine scheduling problem. We present 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 that considers the additional resources input method.

## **Keywords**

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

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## **Biographies**

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