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An Improved Water Flow-like Algorithm for Order Acceptance and Scheduling with Identical Parallel Machines

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Research Highlights

- An improved Water Flow-like Algorithm for order acceptance and scheduling with identical parallel machine problem.
- The characteristics consider due dates, order profits, tardiness penalties, sequence-dependent setup times.
- The splitting and moving procedures were modified, four neighborhoods were introduced, and two neighborhood search strategies were developed.

Abstract

Order acceptance and scheduling (OAS) problem denotes manufactures in a make-to-order environment have to determine which orders should be accepted and how to arrange the accepted orders in a processing sequence. If the order schedule is not well-arranged, that will lead to the tardiness penalties and the impact of other orders on the allocation of resources. Therefore, this study considered the due dates, order profits, tardiness penalties, sequence-dependent setup times and proposed the integrated model for the problem of order acceptance and identical parallel machine scheduling. The modified Water Flow-like Algorithm (WFA) was developed to solve the problem. The proposed water flow-like algorithms, WFA.I and WFA.II are compared, with a well-defined classic algorithm, particle swarm optimization embedded with variable neighborhood search, to find out their solution qualities in different sizes of problems. The computational results show that, in the large-sized problems, WFA.II is performing much better than WFA.I with a range of solution gaps, 0.45%~38.06%. WFA.II is also competitive as the well-defined classic algorithm, PSOVNS, in the large-sized problems, with an extremely short range of

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