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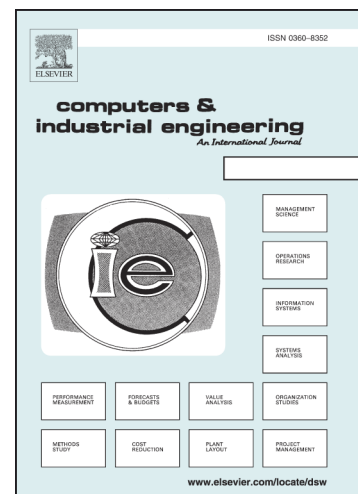
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Trade-off between the costs and the fairness for a collaborative production planning problem in make-to-order manufacturing

Trade-off between the costs and the fairness for a collaborative production planning problem in make-to-order manufacturing

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Abstract

The paper studies a generalized mixed-integer linear production planning problem with multi-period and multi-item specification in a make-to-order manufacturing system. In this system, a holding company assigns the customers' orders to its subsidiary companies in a way to minimize the total cost as well as minimizing the maximal production utilization which consequently leads to the fair allocations of production loads. Moreover, order splitting and assignment are allowed and production time windows and capacities are taken to account. Because of the complexity of the NP-hard problem, a ϵ -constraint method is firstly performed for small-sized problems and then three metaheuristic algorithms including NSGA-II, SPEA2, and MOPSO are applied for large-sized problems in order to find the set of Pareto optimization solutions. Numerous computational experiments illustrate that all algorithms evolve reasonably distributed fronts. The results prove the validity of the proposed model and also the efficiency of the proposed solution methods. Finally, the managerial insights are figured out and conclusions and future research directions are applied.

Keywords: production planning, order-splitting, make-to-order, time window, metaheuristic algorithms

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