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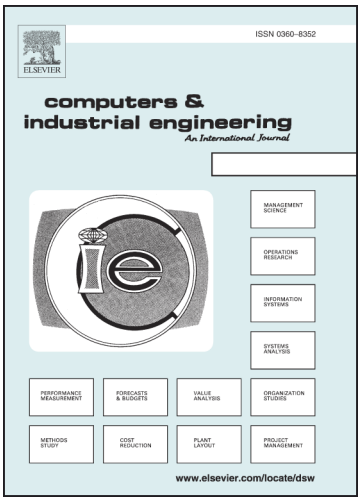

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Parallel Dedicated Machines Scheduling with Conflict Constraints

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Abstract

This paper investigates a variant of parallel-machine scheduling problems with conflict constraints. A set of identical parallel machines is available for processing a set of jobs subject to conflict constraints, which specify pairs of jobs that are mutually disjoint due to resource availability. Jobs conflicting to each other cannot be processed simultaneously. The scheduling problem is to construct a feasible schedule that optimizes the considered managerial performance measures. This paper discusses the specific two-machine setting where each machine has a designated set of jobs to process. We give NP-hardness proofs for the case with the presence of a fixed processing sequence on one of the machines. Polynomial-time dynamic programming algorithms are proposed to produce optimal schedules for the case where the processing sequences on both machines are known and fixed *a priori*.

Keywords: Parallel dedicated machines, conflict graph, fixed sequences, NP-hardness, dynamic programming.

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