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European Journal of Operational Research

Volume 72, Issue 1, 6 January 1994, Pages 102-114

Theory and Methodology

Comparative performance analysis of priority rules in a constrained flow shop with multiple processors environment

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[https://doi.org/10.1016/0377-2217\(94\)90333-6](https://doi.org/10.1016/0377-2217(94)90333-6)

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Abstract

Scheduling in a flow shop with multiple processors (FSMP) involves the sequencing of n jobs in a flow shop, where two or more identical processors are allowable at a machine stage. The *constrained flow shop with multiple processors problem* (CFSMP) considered in this study is a special case of the FSMP problem, in which the total number of jobs that can concurrently exist in the system is bounded by a prespecified number. A simulation experiment was performed to investigate the performance of six priority rules in the CFSMP environment for three performance measures namely makespan, mean flow time, and maximum flow time. A dynamic simulation model of the constrained flow shop with multiple processors environment was developed in which the queuing priorities at each machine stage were established dynamically. The results of the

simulation study indicated that the shortest processing time first dispatching procedure (SPT) yielded superior performance for the makespan and mean flow time criteria. However, for the maximum flow time criterion, clear superiority of a particular dispatching procedure was not established.



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Keywords

Flow shop; Multiple processors; Simulation

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