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Ranking of Scheduling Rules Using Topsis Method for a Dynamic Job Shop with Sequence Dependent Setup Time

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Abstract:

The problem considered in the present research involves scheduling a dynamic job shop operating in a sequence dependent setup time environment with the consideration of multiple performance measures. A discrete event simulation model is developed to describe the operation of the job shop. Four scheduling rules from the literature and two scheduling rules proposed in the present study are used for scheduling jobs on machines. The performance measures considered are average flow time, average tardiness, percentage of tardy jobs, average setup time and average flow allowances. The statistical analysis of simulation results reveals that scheduling rules have a significant effect on the performance of the job shop. It is found that the best performing scheduling rule varies over the performance measures. Hence, TOPSIS, a multi-attribute decision making method is applied for ranking the six scheduling rules under the five performance measures. The proposed scheduling rule that combines due date, processing time, and setup time data emerges as the best scheduling rule when multiple objectives are considered.

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