WORKING PAPER

A comparison of priority rules for the job shop scheduling problem under different flow time- and tardiness-related objective functions

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Abstract

In this paper, a comparison and validation of various priority rules for the job shop scheduling problem under different objective functions is made.

In a first computational experiment, 30 priority rules from literature are used to schedule job shop problems under two flow time-related and three tardiness-related objectives. Based on this comparative study, the priority rules are extended to 13 combined scheduling rules in order to improve the performance of the currently best-known rules from literature. Moreover, the best performing priority rules on each of these five objective functions are combined into hybrid priority rules in order to be able to optimize various objectives at the same time.

In a second part of the computational experiment, the robustness on the relative ranking of the performance quality is checked for the various priority rules when applied on larger problem instances, on the extension of multiple machines possibilities per job as well as on the introduction of sequence-dependent setup times. Moreover, the influence of dynamic arrivals of jobs has also been investigated to check the robustness on the relative ranking of the performance quality between static and dynamic job arrivals. The results of the computational experiments are presented and critical remarks and future research avenues are suggested.