

An effective metaheuristic algorithm for solving multi-criteria job-shop scheduling problem with maintenance activities

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Abstract: *The majority of classical researches in connection with the job shop scheduling problem (JSSP) are concentrated in part on the assumption of single-criterion optimization (particularly the Makespan), and in the other part on the assumption of the resources permanent availability along the planning horizon. These assumptions cannot be justified, for multiple practical reasons. In spite of the research increase in the domain of JSSP, these assumptions still not much retained. With the aim of making the JSSP closer to industrial reality, this article proposes a multi-criteria optimization approach (MCJSSP) under various downtime constraints. The period of availability is considered flexible. Since the JSSP is considered as an NP-hard class, then the implementation of the algorithm like the " Non-dominated Sorting Genetic Algorithm second version " NSGA-II is more than necessary in order to obtain a better assignment of n tasks on m machines, as well as a calendar of optimal preventive maintenance, by minimizing simultaneously the Makespan, the production costs and the costs of maintenance. In order to validate the obtained results, an experimental case study was carried out for different benchmarks.*

Keywords: *Job-shop scheduling problem, Periodic maintenance, Genetic algorithm, Multi-objective optimization.*