

A Memetic Algorithm for an Energy-Costs-Aware Flexible Job-Shop Scheduling Problem

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Abstract : In this article, the flexible job-shop scheduling problem is extended by consideration of energy costs which arise owing to the power peak, and further decision variables such as work in process and throughput time are incorporated into the objective function. This enables a production plan to be simultaneously optimized in respect of the real arising energy and logistics costs. The energy-costs-aware flexible job-shop scheduling problem (EFJSP) which arises is described mathematically, and a memetic algorithm (MA) is presented as a solution. In the MA, the evolutionary process is supplemented with a local search. Furthermore, repair procedures are used in order to rectify any infeasible solutions that have arisen in the evolutionary process. The potential for lowering the real arising costs of a production plan through consideration of energy consumption levels is highlighted.

Keywords : energy costs, flexible job-shop scheduling, memetic algorithm, power peak

Conference Title : ICPME 2017 : International Conference on Production and Manufacturing Engineering

Conference Location : Barcelona, Spain

Conference Dates : May 26-27, 2017