

A Genetic Algorithm Approach to Solve a Weaving Job Scheduling Problem, Aiming Tardiness Minimization

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Abstract : This study uses genetic algorithms to solve a job scheduling problem in a weaving factory. The underline problem regards an NP-Hard problem concerning unrelated parallel machines, with sequence-dependent setup times. This research uses real data regarding a weaving industry located in the North of Portugal, with a capacity of 96 looms and a production, on average, of 440000 meters of fabric per month. Besides, this study includes a high level of complexity once most of the real production constraints are applied, and several real data instances are tested. Topics such as data analyses and algorithm performance are addressed and tested, to offer a solution that can generate reliable and due date results. All the approaches will be tested in the operational environment, and the KPIs monitored, to understand the solution's impact on the production, with a particular focus on the total number of weeks of late deliveries to clients. Thus, the main goal of this research is to develop a solution that allows for the production of automatically optimized production plans, aiming to the tardiness minimizing.

Keywords : genetic algorithms, textile industry, job scheduling, optimization

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