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Modified job shop scheduling via Taguchi method and genetic algorithm

Abstract

To be in the competitive industrial world, industries required high quality, speed in completing the required work, and commitment to the delivery dates. One of the most important issues in the field of production management is the job shop scheduling problem (JSSP). In this paper, the researchers tried to solve JSSP of factory by presenting a method to improve the factory's production. Job shop scheduling (JSS) is a suitable method for solving these types of problems, which aims to improve the production flow through minimizing the whole operation time of the products. Moreover, considering the factory that depends on workers as same as machine, human factor should be considered while scheduling by using the workers' weightage, in order to improve the workers' working time flexibility in terms of their waiting time among their tasks by proposed model of JSS. In addition, the researchers proposed a new combination of weightage values by using Taguchi method, regarding to improve the workers' working time and using genetic algorithm (GA) to solve the proposed model of JSS. One of the factories which is located in Jordan, and it is considered as one of the important factories; nevertheless, it can cover the local demands hardly, and hence, it deserves to be as a study case for this research. The findings of the studies decreased the whole operation time of the products by saving 75 min for each production line and 90 min by using GA, and the proposed model improved the flexibility of the workers' working time in terms of their waiting times among their tasks.

Keywords

Genetic algorithm; Human factor; Job shop scheduling; Taguchi method