

A hybrid grey cuckoo search algorithm for job-shop scheduling problems under fuzzy conditions

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ABSTRACT

This paper aims to acquire the precise makespan or delivery period in job-shop scheduling (JSP) under fuzzy conditions. To this end, the author designed a grey scheduling model and a hybrid grey cuckoo search (HGCS) algorithm in the following steps. Firstly, three- and four-parameter interval grey numbers were introduced to depict the fuzzy makespan and delivery period, respectively; then, the possibility measure and necessity measure were defined, and the tardiness credibility index was proposed to estimate the probability of job tardiness. After that, a grey mixed integer programming model was developed to minimize the mean tardiness credibility, and the HGCS was proposed to solve the model. Finally, simulations were conducted on the classical example of $6(3) \times 6$. The results show that the proposed algorithm outperformed the basic cuckoo search. The research findings shed new light on the JSP under fuzzy conditions.

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