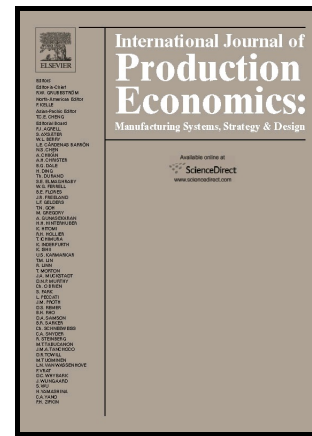


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An Effective Hybrid Genetic Algorithm and Tabu Search for Flexible Job Shop Scheduling Problem

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Abstract: Flexible job shop scheduling problem (FJSP) which is an extension of the classical job shop scheduling problem is a very important problem in the modern manufacturing system. It allows an operation to be processed by any machine from a given set. It has been proved to be a NP-hard problem. In this paper, an effective hybrid algorithm (HA) which hybridizes the genetic algorithm (GA) and tabu search (TS) has been proposed for the FJSP with the objective to minimize the makespan. The GA which has powerful global searching ability is utilized to perform exploration, and TS which has good local searching ability is applied to perform exploitation. Therefore, the proposed HA has very good searching ability and can balance the intensification and diversification very well. In order to solve the FJSP effectively, effective encoding method, genetic operators and neighborhood structure are used in this method. Six famous benchmark instances (including 201 open problems) of FJSP have been used to evaluate the performance of the proposed HA. Comparisons among proposed HA and other state-of-the-art reported algorithms are also provided to show the effectiveness and efficiency of proposed method. The computational time of proposed HA also has been compared with other algorithms. The experimental results demonstrate that the proposed HA has achieved significant improvement for solving FJSP regardless of the solution accuracy and the computational time. And, the proposed method obtains the new best solutions for several benchmark problems.

Keywords: *Flexible Job Shop Scheduling; Hybrid Algorithm; Makespan; Genetic Algorithm; Computational Time.*

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