

Solving dual flexible job-shop scheduling problem using a Bat Algorithm

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ABSTRACT

For the flexible job-shop scheduling problem with machine selection flexibility and process sequence flexibility in process design, types and characteristic of machine selection and process sequence flexibility are analyzed. The mathematical model of dual flexible job-shop scheduling problem is established, and an improved bat algorithm is proposed. For purpose of expressing the relationship effectively between the process and the bat population, a new method of encoding strategy based on dual flexibility degree is proposed. The crossover and mutation operation are designed to strengthen the searching ability of the algorithm. For purpose of overcoming the shortcomings of the fixed parameters in bat algorithm, the value of the inertia weight was adjusted, and a linear decreasing inertia weight strategy was proposed. We carried out experiments on actual examples, it can be seen from the experimental results that the robustness and optimization ability of the algorithm we proposed are better than Genetic Algorithm (GA) and Discrete Particle Swarm Optimization algorithm (DPSO). This shows that the proposed algorithm is more excellent in solving the flexible job-shop scheduling problem, and it is an efficient scheduling algorithm.

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