A Genetic Algorithm Approach for Unrelated Parallel-Machine Scheduling Problems with Constrained Resources

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Abstract

The previous studies on unrelated parallel-machine scheduling problems usually assume that the necessary resources for processes are unconstrained. However, it does not conform to condition that the resources in scheduling problems are usually limited in practice. It is well known that most of the unrelated parallel-machine scheduling problems are NP-hard. It costs much time and a large number of resources to solve this kind of problems. Therefore, this research attempts to solve unrelated parallel-machine scheduling problems with sequence-dependent setup-time and constrained resources. The objective considered in this research is minimizing the total weighted completion time.

This research proposes a heuristic approach developed based on genetic algorithm for the problem. A numerical experiment with data collected from IC testing industry is conducted. Examples of different sizes are constructed to test the performance of the proposed algorithm. The results show that this algorithm solves the problem efficiently and effectively.

Keywords: genetic algorithm unrelated parallel-machine constrained resources