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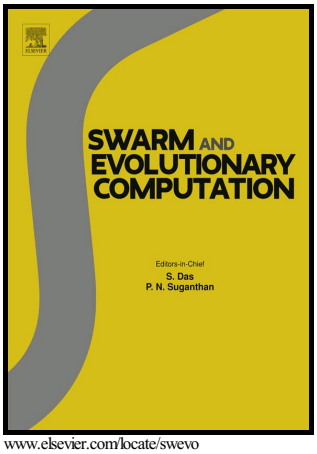

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ACCEPTED MANUSCRIPT

An effective invasive weed optimization algorithm for scheduling semiconductor final testing problem

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Abstract

In this paper, we address a semiconductor final testing problem from the semiconductor manufacturing process. We aim to determine both the assignment of machines and the sequence of operations on all the machines so as to minimize makespan. We present a cooperative co-evolutionary invasive weed optimization (CCIWO) algorithm which iterates with two coupled colonies, one of which addresses the machine assignment problem and the other deals with the operation sequence problem. To well balance the search capability of the two colonies, we adopt independent size setting for each colony. We design the reproduction and spatial dispersal methods for both the colonies by taking advantage of the information collected during the search process and problem-specific knowledge. Extensive experiments and comparison show that the proposed CCIWO algorithm performs much better than the state-of-the-art algorithms in the literature for solving the semiconductor final testing scheduling problem with makespan criteria.

Keywords: Invasive weed optimization; Cooperative co-evolutionary; Semiconductor final testing scheduling; Makepan;

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1. Introduction

Production scheduling plays a basic and key role in achieving advanced manufacturing and in improving the production efficiency [1]. This paper considers a real-world scheduling problem from a semiconductor manufacturing process, which is the semiconductor final testing scheduling (SFTS) problem. The semiconductor manufacturing process consists of two consecutive production stages: the wafer fabrication stage and final testing stage. The final testing stage tests and checks whether the integrated circuit products after the completion of package meet the requirements of standard

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