

MOGWO Metaheuristic Method Used to Solve by Identical Parallel Machine Scheduling Problem With Different Objectives Compared With GA and VNS

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Abstract

This paper tackles scheduling of identical parallel machine with an objective to minimize the makespan, tardiness, and number of tardy jobs. This has been considered for the effective utilization of resources and also to satisfy the customer requirements. For scheduling the identical parallel machines with multiple parameters (makespan, tardiness, and number of tardy jobs), assign weights to each parameter and the combined objective function is to be formulated by weighted sum of makespan, tardiness, and number of tardy jobs. In order to obtain the above objective, Multiobjective Grey Wolf Optimizer (MOGWO), swarm-based metaheuristics has been proposed. The effectiveness of the proposed algorithm has been tested by various test problems taken from the literature, and the computational results are also compared with Genetic Algorithm (GA) and Variable neighborhood search (VNS). The computational results show that MOGWO outperforms the GA and VNS.

Keywords: Identical parallel machine, Makespan, Tardiness, Number of tardy jobs, Multiobjective, Grey Wolf Optimizer.

1. Introduction

Scheduling is the effective means of allocation of resources to tasks over given periods of time and its goal is optimizing multiple objectives. The resources may be machines in a plant, runways in an airport, and squads at a construction site, processing units in a figuring environment, and so on. Each task may have a certain priority level, an earliest possible starting time and a due date and the objectives can also take many different forms [1]. The Chien-Hung Lin et al, a scheduling problem that assigns 'n' available and independent jobs to 'm' identical parallel machines. Each job can be processed on any of the identical parallel machines, and the machine can process only one job at a time. The importance of the multiple criteria consideration in the multiple machine-scheduling problem is widely appreciated. Serifoglu et al [3], the due dates of the jobs are distinct, which complicates the problem. The parallel machine-scheduling problem is an important and difficult problem. Traditionally, the problem has consisted of scheduling of a set of independent jobs on