A Modified NSGA-II Algorithm for Solving Multi-Objective Flexible Job Shop Scheduling Problem

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Abstract : NSGA-II is one of the most well-known and most widely used evolutionary algorithms. In addition to its new versions, such as NSGA-III, there are several modified types of this algorithm in the literature. In this paper, a hybrid NSGA-II algorithm has been suggested for solving the multi-objective flexible job shop scheduling problem. For a better search, new neighborhood-based crossover and mutation operators are defined. To create new generations, the neighbors of the selected individuals by the tournament selection are constructed. Also, at the end of each iteration, before sorting, neighbors of a certain number of good solutions are derived, except for solutions protected by elitism. The neighbors are generated using a constraint-based neural network that uses various constructs. The non-dominated sorting and crowding distance operators are same as the classic NSGA-II. A comparison based on some multi-objective benchmarks from the literature shows the efficiency of the algorithm.

Keywords : flexible job shop scheduling problem, multi-objective optimization, NSGA-II algorithm, neighborhood structures
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