A General Variable Neighborhood Search Algorithm to Minimize Makespan of the Distributed Permutation Flowshop Scheduling Problem

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Abstract : This paper addresses minimizing the makespan of the distributed permutation flow shop scheduling problem. In this problem, there are several parallel identical factories or flowshops each with series of similar machines. Each job should be allocated to one of the factories and all of the operations of the jobs should be performed in the allocated factory. This problem has recently gained attention and due to NP-Hard nature of the problem, metaheuristic algorithms have been proposed to tackle it. Majority of the proposed algorithms require large computational time which is the main drawback. In this study, a general variable neighborhood search algorithm (GVNS) is proposed where several time-saving schemes have been incorporated into it. Also, the GVNS uses the sophisticated method to change the shaking procedure or perturbation depending on the progress of the incumbent solution to prevent stagnation of the search. The performance of the proposed algorithm is compared to the state-of-the-art algorithms based on standard benchmark instances.