

## A Constrained Neural Network Based Variable Neighborhood Search for the Multi-Objective Dynamic Flexible Job Shop Scheduling Problems

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**Abstract :** In this paper, a new neural network based variable neighborhood search is proposed for the multi-objective dynamic, flexible job shop scheduling problems. The neural network controls the problems' constraints to prevent infeasible solutions, while the Variable Neighborhood Search (VNS) applies moves, based on the critical block concept to improve the solutions. Two approaches are used for managing the constraints, in the first approach, infeasible solutions are modified according to the constraints, after the moves application, while in the second one, infeasible moves are prevented. Several neighborhood structures from the literature with some modifications, also new structures are used in the VNS. The suggested neighborhoods are more systematically defined and easy to implement. Comparison is done based on a multi-objective flexible job shop scheduling problem that is dynamic because of the jobs different release time and machines breakdowns. The results show that the presented method has better performance than the compared VNSs selected from the literature.

**Keywords :** constrained optimization, neural network, variable neighborhood search, flexible job shop scheduling, dynamic multi-objective optimization

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