

Conflict-free automated guided vehicles routing using multi-objective genetic algorithm

Abstract

The study presents an algorithm for conflict-free Automated Guided Vehicle (AGV) routing minimizing travel time and total job tardiness. The problem is represented using one sub-chromosome for dispatching represented with random keys and the remaining sub-chromosomes for routing represented with priority-based encoding. The algorithm used weight mapping crossover (WMX) and Insertion Mutation (IM) for priority-based representation and parameterized uniform crossover (PUX) for random-key based representation. Conflict is detected and avoided using the route occupation time of each segment. Numerical experiment was conducted on the developed algorithm.

Keyword: Automated Guided Vehicle (AGV); Dispatching; Multi-objective genetic algorithm; Metaheuristics; Optimization; Routing