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Abstract
In this study, we consider the multi-compartments vehicle routing problem. In addition to the classical capacity and time-window constraints, this problem also has compartment, compatibility, and assignment constraints. It is not only an NP-hard problem in strong sense, but also has multiple constraints. For such a problem, heuristic algorithms can be used in deriving bounding functions for a branch and bound algorithm, solving practical problems, and generating the initial population and designing genetic operators for a genetic algorithm. In this study, We propose a cluster-first route-second heuristic to solve the problem, based on Prim’s minimal spanning tree algorithm at first. Since the problem is NP-hard in strong sense, the solution obtained using a classical heuristic usually can be improved further. Therefore, it is necessary to design an efficient mechanism to improve such solutions. Based on the proposed classical heuristic, we then consider the problem how to improve solutions obtained using a genetic search. Because the parameter setting is important in a genetic algorithm, we also show how to set the parameters using the response surface methodology in the field of experiment design.
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