

An exact approach for the consistent vehicle routing problem (ConVRP)

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ABSTRACT

This paper proposes a mathematical model for the Consistent Vehicle Routing Problem (ConVRP). The ConVRP is an extension of the VRP, considering customer satisfaction through consistent service. The consistency may be based on time or on the vehicle that offers the service. This paper proposes a novel mathematical model that allows solving the ConVRP for several companies for which visits to the customers need to be from the same service provider (namely, the same vehicle and driver). The efficiency of the model is tested on structured instances by changing customer distribution (uniform or clustered), depot location, and arrival time to the customer and removing certain constraints to see if they affect the performance of the objective function. The mathematical model is flexible and could be adapted to any characteristic of instances. The model was developed in the AMPL programming language and solved with the solvers CPLEX and Gurobi. The results are promising based on the efficiency of the proposed method at solving the problem.

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ARTICLE INFO

Keywords:

Vehicle routing problem (VRP);
Consistent vehicle routing (ConVRP);
Mathematical model;
Mixed integer linear programming model;
Optimization;
Exact algorithms;
Modelling;
CPLEX;
Gurobi

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Article history:

Received 24 March 2020

Revised 10 October 2020

Accepted 13 October 2020

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