
Mixed-Integer Programming Formulations and Valid Inequalities for the Electric Vehicle Routing Problem

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Abstract

In recent years, many companies start to use Electric Vehicles (EV) to encounter environmental issues. In the literature, Electric Vehicle Routing Problem (E-VRP) is introduced to handle the new challenges of using EVs. E-VRP aims to route a fleet of capacitated EVs to serve customers' demands while minimizing the total travel distance, considering battery restrictions. In this paper, four Mixed-Integer linear programming formulations of E-VRP and several valid inequalities are presented. The efficiencies of the models and valid inequalities are investigated based on the execution time, the number of nodes explored in the Branch-and-Bound, and LP-bounds over various-sized instances.

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