
The Periodic Vehicle Routing Problem with Driver Consistency

Inmaculada Rodríguez-Martín^{*1}, Juan José Salazar-González¹, and Hande Yaman²

¹Departamento de Matemáticas, Estadística e Investigación Operativa, Universidad de La Laguna (DMEIO, ULL) – Departamento de Matemáticas, Estadística e Investigación Operativa, Apartado de correos 456, Universidad de La Laguna, 38200 La Laguna, Spain, Spain

²Department of Industrial Engineering, Bilkent University – Ankara, Turkey

Abstract

The Periodic Vehicle Routing Problem is a generalization of the classical VRP in which routes are determined for a planning horizon of several days. Each customer has an associated set of allowable visit schedules, and the objective of the problem is to design a set of minimum cost routes that give service to all the customers respecting their visit requirements. In this paper we study a variant of this problem in which we impose that each customer should be served by the same vehicle/driver at all visits. We call this problem the Periodic Vehicle Routing Problem with Driver Consistency (PVRP-DC). We present different integer linear programming formulations for the problem and derive several families of valid inequalities. We solve it using an exact branch-and-cut algorithm, and show computational results on a wide range of randomly generated instances.

^{*}Speaker