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EDITORIAL

Advances in vehicle routing and logistics optimization: exact methods

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Given a fleet of vehicles and a set of customers (or tasks), vehicle routing problems (VRPs) ask for a minimum-cost set of routes to serve all customers (perform all tasks) exactly once, subject to side constraints. Since their introduction in the seminal paper by Dantzig and Ramser in 1959, VRPs have been among the most important and most widely studied problems in the Operations Research literature. Their huge success as a research topic can arguably be attributed to the fact that they are both theoretically challenging and of high relevance in transportation and logistics practice.

Motivated by the size and activity of the vehicle routing research community within EURO (Association of the European Operational Research Societies), the Working Group on Vehicle Routing and Logistics Optimization (VeRoLog) has been founded in 2011 to (i) foster the development and application of Operations Research models and methods to the field of vehicle routing and to (ii) encourage the exchange of information among practitioners, end-users, and researchers. This special issue follows the VeRoLog 2016 conference organized in Nantes (France) and the VeRoLog special track on vehicle routing and logistics optimization at EURO 2016 in Poznan (Poland). The call for papers was separated in two parts. The first part is dedicated to heuristics, and the second to exact methods. This second part of the special issue contains two strong papers that have been selected from the submissions following the high standards of the EURO Journal on Transportation and Logistics.

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The first paper, by Desaulniers, Pecin, and Contardo, introduces a new paradigm for branch-price-and-cut algorithms for VRPs called selective pricing. Selective pricing is applicable whenever working with a relaxed set of routes, e.g., *ng*-routes instead of elementary routes. The basic idea is that the pricing problem may disregard certain relaxed routes with minimum reduced cost as long as it guarantees to identify a negative reduced cost route if there exists one feasible (non-relaxed) route with negative cost. The authors illustrate the use of the new paradigm by developing a selective-pricing labeling algorithm for a branch-price-and-cut with *ng*-routes for the VRPTW. Computational results show that the approach can significantly reduce running times to reach a good lower bound on certain very-hard-to-solve VRPTW instances.

The second paper, by Medina, Hewitt, Lehuédé, and Péton, investigates an integrated service network design and vehicle routing problem. A route-based formulation, which is able to handle a multitude of operational constraints but suffers from the potentially large number of potential route, and an arc-based formulation with less modeling power but also less computational problems, are presented. Both formulations are solved with the dynamic discretization discovery algorithm of Boland, Hewitt, Marshall, and Savelsbergh, and the authors conduct extensive computational experiments to examine the benefits of the formulations.

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