



Séminaire du CIRRELT

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A TWO-PHASE PARETO LOCAL SEARCH HEURISTIC FOR THE BI-OBJECTIVE POLLUTION-ROUTING PROBLEM

Abstract:

The Pollution-Routing Problem is a "green variant" of the Vehicle Routing Problem that aims at minimizing the CO₂ emissions and the costs related to driver's wages. Because these two objectives are conflicting, a multi-objective approach is suited. In this sense, Demir et al. (2014) have proposed the bi-Objective Pollution-Routing Problem (bPRP) where the two objectives are treated separately. The bPRP is a very complex problem and, to the best of our knowledge, no method in the literature is able to produce high quality solutions for this problem in a reasonable amount of time. In this context, we propose a multi-objective approach based on a Two-Phase Pareto Local Search. During the first phase, an initial set composed by supported solutions is generated solving aggregated mono-objective problems. Then, in the second phase, the neighborhood of these solutions is explored by means of a Pareto Local Search procedure. Computational results show that the proposed approach lead to better solutions than those obtained by others multi-objective techniques available in the literature. The quality of the generated efficient solutions sets is assessed using Hypervolume (H) and R Measure (R) indicators. Outperformance Relations have also been used for further analysis.

Note:

Luciano Costa is a Ph.D. student in Applied Mathematics at the École Polytechnique de Montreal. He is a member of GERAD and is currently working with Guy Desaulniers and Claudio Contardo in the development of exact methods for the Vehicle Routing Problem. He has experience in mathematical programming and metaheuristics applied to vehicle routing problems and its variants.

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