Decomposition and heuristics methods for the Pollution-Routing Problem with stochastic speed limits.

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Abstract

Reducing pollution is an arising challenge faced by governments and organizations. An important portion of the overall gas emissions are caused by the transportation sector, and more specifically, road transportation. These emissions are affected by numbers of parameters, including loads and speeds of the vehicles. As an extension to the VRP with time windows, the pollution routing problem (PRP) has focused on minimizing a comprehensive cost function that includes gas emissions. It is assumed in the PRP that speeds limits on the route legs are fixed and known in advance. Such an assumption is strong and does not reflect reality where speed limits are affected by various uncertainties such as congestion or weather conditions. The PRP with stochastic speed limits is a variant of the PRP where the speed limits are considered as stochastic. It was shown that considering stochastic speed limits can save up to 7.9% of the total cost when tested on instances with 10 customers. In order to tackle larger and more realistic instances, we will introduce in this talk new resolution techniques for the PRP with speed limits. In these approaches, decompositions techniques and heuristic approaches are used to generate good quality solutions or optimal solutions for large instances. The techniques proposed will be tested on the PRP-lib instances available and compared to existing results for the same set of instances.

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