Multiple solve approaches applied to the Heterogeneous Vehicle Routing Problem

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Abstract

In the context of this presentation, we focus on Asymmetric HVRP where the shortest path between two customers nodes is vehicle dependent. Moreover, the distance matrices doesn't verify the triangular inequality. Case which is common when we consider a real road network at the fastest with the objective to minimize the total distance. The problem in itself contains a set of multiple vehicle types with a limit number on their usage, as well as a capacity limit at the parcels number they can load to deliver at the customers nodes.

At this purpose, the instances provided by C. Duhamel and al(2011) and named New real life Duhamel–Lacomme–Prodhon_HVRP instances (DLP_HVRP), based on realistic distances between french cities, are considered as the main comparison set.

The current approach use at first step a GRASP+ALNS metaheuristic, method known to provide good results in a short computation time. In a second step, a constraint programming model of the problem is used to shuffle the problem and provide an additional local search starting from the current solution. Data are exchanged iteratively in order to benefit from each solve step improvement.

The aim behind the use of multiple models is to expose the possible synergies between those methods. Multiple solve scenarios will be presented to discuss about the multiple layout available between the two previously mentioned solve steps and show their impact on the resolution.

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