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External Master Thesis

A framework for the vehicle routing problem with dynamically inserted intermediate stops and its application to the skip loader problem

Preliminaries

The thesis will be supervised by an employee of PTV AG in Karlsruhe. The thesis will ideally be worked on directly in Karlsruhe. There, the work can be based on an existing code base can be used.

Your task

In the context of this thesis, a theoretical framework for VRP variants shall be developed which have the following in common: along a tour, in addition to order stops (e.g., pickup or delivery stops) have to be scheduled in order for the tour to be valid. In rare cases, more than one intermediate stop is made.

A problem with this feature is the skip loader problem. The skip loader is used to transport empty skips to customers. As a rule, full skips are taken away and immediately driven to a disposal site. The empty skip can then be dropped off at the next customer. The problem becomes more difficult due to the fact that there are skips in two sizes (different DIN), whereby each vehicle can transport both types of skips (homogeneous fleet). It is possible that an empty skip is first driven to a loading point, where another skip has to be loaded, in case the next customer requires a different type of skip. In this simple case, there is only one loading point (here, called a depot) and the vehicle has to drive there if the next customer requires a different type of skip than the one that is loaded.

In this thesis a theoretical framework will be developed to solve such problems. After implementing a solution procedure for the skip loader problem, the effectiveness will be investigated by means of generated test instances. Different problems with the above property should be solvable with the framework and discussed in the thesis (i.e., a simple variant of the EVRP and a simple variant of the truck-and-trailer problem).

Your profile

- Reliable, independent and motivated way of working
- Conscientious and structured way of working
- Good knowledge of German and English
- Programming knowledge in C++ or the willingness to acquire the necessary knowledge on your own

If you are interested, please send an e-mail including your CV and transcript of records to Stefan Bomsdorf (bomsdorf@dpo.rwth-aachen.de).