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# An exact method for the vehicle routing problem with backhauls and splits.

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## Abstract

We face a Vehicle Routing Problem in which two types of customers must be served: the linehauls, to which good must be delivered from a depot and the backhauls, from which good must be collected and shipped back to the depot. In each route all linehauls must be visited before all backhauls. Each customer is allowed to be visited more than once (i.e. splits are allowed). We aim to serve customers with a homogeneous fleet of capacitated vehicles at minimum traveling cost.

The problem of this case study is called hereafter Split Vehicle Routing Problem with Clustered Backhauls (SVRPCB) and, as far as we are aware, it has not been addressed in its current form in the literature before. As a generalization of the Split Vehicle Routing Problem (SVRP), the SVRPCB is NP-hard.

We present a set covering formulation for this problem and propose an exact method for solving this problem by column generation. Preliminary results will be presented during the talk.

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