A pickup and delivery problem in two regions with fixed and flexible long-hauls

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Abstract

This work adresses a logistical problem occurring in and between two regions (cities) in a three stage setting. Packages have to be transported between and within those cites. Within a city they are transported by small short-haul vehicles. Between them, the packages are transported by long-haul vehicles (train, plane or truck) that operate either on a fixed or on a flexible schedule. In addition, we have time windows for the pickup and delivery nodes of varying size, depot opening hours, tour length restrictions for the short-haul vehicles, capacity restrictions for both the long-haul and short-haul vehicles, a limited number of vehicles at our disposal and the possibility of direct delivery of request at high costs and with additional vehicles if they cannot be served by our fleet. We propose a hybrid solution approach based on the savings algorithm, the pilot method and a commercial MIP solver. Preliminary computational results are presented and future extensions of the problem formulation and of the solution method are discussed.

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