Hybrid Column Generation and Large Neighborhood Search for the Time-Dependent Selective PDPTW

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Abstract

The time-dependent selective pickup and delivery problem with time windows is the generalization to the case of pickup and delivery problem. In this problem, each request consists of a pickup location and a delivery location and a profits is collected from the visit to its pickup location. A limited amount of vehicles with capacity limit are available to serve the requests. The profit of a request can be collected by one vehicle at most. The objective is to determine a set of tours with departure times at a depot such that maximize the difference between the collected profits and the total routes duration cost. Time-dependent travel times are considered to capture road congestion. We propose a hybrid column generation and large neighborhood search algorithm for this problem. To show the effectiveness and efficiency of this method, we compare it with exact procedure and iterated local search meta-heuristic method on a set of typical instances.