
A new approach to solve the demand weighted vehicle routing problem

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Abstract

The demand weighted vehicle routing problem (DWVRP) is a variant of the capacitated vehicle routing problem that models bus shuttle services. In this problem, bus shuttles run from the demand points (bus stops) to the depot or hub (that could represent, for instance, a hotel, the airport, the university, a train station, downtown, etc.) and vice versa. Specifically, shuttle buses always perform a complete route and passengers are picked up from the demand points to the hub or from the hub back to the demand point. Of course, shuttle buses have a capacity and the problem seeks to minimize the distance traveled by the buses weighted by the number of passengers on the routes. Note that, in the DWVRP, passengers travel along the entire route, instead of just travelling from the hub to the bus stop location, that is, just a portion of the route.

The interest of the DWVRP arises in many real-world situations in which public or private companies provide a transportation service to their customers picking them up at several locations placed far away from the hub. The shuttle bus runs frequently performing routes starting and finishing at the hub.

In this work, we present a new metaheuristic method to tackle this problem in an efficient way. Our results are promising in relation to the current state of the art.

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