

## **Insights on the integration of local search in a large neighborhood search heuristic for the dial-a-ride problem**

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The dial-a-ride problem (DARP) is a vehicle routing problem considering the transportation of people between individual origin and destination locations. Typically, a time window on pickup or delivery, and a maximum ride time are imposed to ensure the quality of service. The goal is to find a set of minimum cost routes for a set of capacitated vehicles such that all transportation requests are fulfilled. In the past, mainly metaheuristic methods based on Local Search (LS) provided good results for the DARP (e.g., VNS, Threshold Accepting). More recently, several hybrid methods, combining aspects from different heuristic approaches, have been successfully proposed (e.g., Evolutionary LS, GA+LS, ALNS + intra-route LS), a trend which is observed in general vehicle routing literature as well.

In this work, we provide some experimental results on a similar hybridization approach: integrating inter- and intra-route LS in an ALNS heuristic. Although the idea as such may not be new, both methods can be combined in several ways. We intend to provide some insights by comparing different hybridizations, using relatively simple components for both methods. Our goal is to answer two research questions: 1) Can we provide any general guidelines on how to best integrate LS in an ALNS framework? 2) Can a simple hybrid algorithm, using simple components for each method, compete with more complex (hybrid) methods?

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