A Matheuristic for Attractive Arc Routing

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This work focuses on a household (or door to door) waste collection problem in a Portuguese municipality that is modelled as a Mixed Capacitated Arc Routing Problem (MCARP). The MCARP is known to be NP–hard. The proposed methodology uses: i) a GIS (Geographic Information System), available at the municipality, for the input/output stages as well as to reduce problem dimensions; ii) one matheuristic that iteratively solves a new hybrid model; and iii) two versions of a two–phase matheuristic specifically developed for this case study. This later pursues the generation of connected and compacted trips. During the first phase, called initial sectoring, some links demanding for service are assigned to sectors, one per vehicle, while in the second phase, the hybrid model helps to finish the sectoring and to generate a feasible set of trips. The quality of the generated solutions is accessed through the total time, as well as with some attractiveness measures. These measures evaluate the adequacy of the solutions to the real case–study, a crucial aspect for trips that need to be accepted by practitioners. Computational results with 265–1223 nodes and 492–2254 links, point to the good performance of the proposed methodology.

References

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