A Granular Tabu Search Algorithm for a Real Case Study of a Vehicle Routing Problem with a Heterogeneous Fleet and Time Windows

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Abstract

We consider a real case study of a vehicle routing problem with a heterogeneous fleet and time windows (HFVRPTW) for a franchise company bottling Coca-Cola products in Colombia. This study aims to determine the routes to be performed to fulfill the demand of the customers by using a heterogeneous fleet and considering soft time windows. The objective is to minimize the distance traveled by the performed routes. We propose a two-phase heuristic algorithm. In the proposed approach, after an initial phase (first phase), a granular tabu search is applied during the improvement phase (second phase). Two additional procedures are considered to help that the algorithm could escape from local optimum, given that during a given number of iterations there has been no improvement. Computational experiments on real instances show that the proposed algorithm is able to obtain high-quality solutions within a short computing time compared to the results found by the software that the company currently uses to plan the daily routes.

Keywords
Vehicle Routing Problem, Heterogeneous Fleet, Time Windows, Real Case Study

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Biographies

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