A HEURISTIC APPROACH FOR A LOGISTICS DISTRICTING PROBLEM

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ABSTRACT. *This article addresses a logistics districting problem for a company whose operations consist of the pickup and delivery of packages within a region. The service region is to be divided into districts, each served by a single vehicle that departs from a central depot. The district design aims to optimize two criteria: compact district shape and balance of workload content among districts. We present a mathematical formulation of the problem as well as a multi-start heuristic procedure to solve the problem. The procedure combines some elements of metaheuristics such as Tabu Search and GRASP. Experimental results in comparison with CPLEX solutions are presented.*
Keywords: Districting, Compactness, Workload balance, Tabu search, GRASP

1. **Introduction.** Districting is a geographical problem that involves the partitioning of a region into smaller areas in order to optimize the operations for some criterion under consideration. A district design is used for a relatively long period of time, and should be robust to small changes in the operations that are performed. For this reason, it is considered a strategic activity [1]. The districting problem has a broad range of applications such as politics, health care, sales territory alignment, schools, and logistics. In each context, districting serves a different purpose and impacts the performance of the operations performed within a determined region. For instance, in a political districting problem, the region under consideration is partitioned into smaller regions from which electoral candidates are selected. On the other hand, logistics districting is mainly associated with the routing activities of a company, having a strong impact on the performance of the daily routing operations [2].

The problem addressed in this work is motivated by a real-world application from a parcel company whose operations consist of the pickup and delivery of packages within a

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