

The Vehicle Routing Problem with Service Level Constraints

Teobaldo Bulhões *

Instituto de Computação, Universidade Federal Fluminense, Niterói, Brazil
tbulhoes@ic.uff.br

Minh Hoàng Hà

FPT Technology Research Institute, FPT University, Hanoi, Viet Nam
hoanghm@fpt.edu.vn

Rafael Martinelli

Departamento de Engenharia Industrial, Pontifícia Universidade Católica do Rio de Janeiro, Brazil
martinelli@puc-rio.br

Thibaut Vidal

Departamento de Informática, Pontifícia Universidade Católica do Rio de Janeiro, Brazil
vidalt@inf.puc-rio.br

Abstract. We consider a vehicle routing problem which seeks to minimize cost subject to service level constraints on several groups of deliveries. This problem captures some essential challenges faced by a logistics provider which operates transportation services for a limited number of partners and should respect contractual obligations on service levels. The problem also generalizes several important classes of vehicle routing problems with profits. To solve it, we propose a compact mathematical formulation, a branch-and-price algorithm, and a hybrid genetic algorithm with population management, which relies on problem-tailored solution representation, crossover and local search operators, as well as an adaptive penalization mechanism establishing a good balance between service levels and costs. Our computational experiments show that the proposed heuristic returns very high-quality solutions for this difficult problem, matches all optimal solutions found for small and medium-scale benchmark instances, and improves upon existing algorithms for two important special cases: the vehicle routing problem with private fleet and common carrier, and the capacitated profitable tour problem. The branch-and-price algorithm also produces new optimal solutions for all three problems.

Keywords. Routing, collaborative logistics, service level constraints, integer programming, genetic algorithms.

The Vehicle Routing Problem With Service Level Constraints

R Sandford



The Vehicle Routing Problem With Service Level Constraints:

This book delves into The Vehicle Routing Problem With Service Level Constraints. The Vehicle Routing Problem With Service Level Constraints is an essential topic that must be grasped by everyone, from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into The Vehicle Routing Problem With Service Level Constraints, encompassing both the fundamentals and more intricate discussions.

1. This book is structured into several chapters, namely:
 - Chapter 1: Introduction to The Vehicle Routing Problem With Service Level Constraints
 - Chapter 2: Essential Elements of The Vehicle Routing Problem With Service Level Constraints
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 - Chapter 4: The Vehicle Routing Problem With Service Level Constraints in Specific Contexts
 - Chapter 5: Conclusion
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