

<<车辆路径问题>>

图书基本信息

书名：<<车辆路径问题>>

13位ISBN编号：9787302244943

10位ISBN编号：7302244944

出版时间：2011-2

出版时间：清华大学出版社

作者：(美)托夫 等著

页数：367

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

<<车辆路径问题>>

内容概要

in the field of combinatorial optimization problems, the vehicle routing problem (vrp) is one of the most challenging. defined more than 40 years ago, the problem involves designing the optimal set of routes for fleets of vehicles for the purpose of serving a given set of customers . interest in vrp is motivated by its practical relevance as well as its considerable difficulty.

the vehicle routing problem covers both exact and heuristic methods developed for the vrp and some of its main variants, emphasizing the practical issues common to vrp. the book is composed of three parts containing contributions from well-known experts. the first part covers basic vrp, known more commonly as capacitated vrp. the second part covers three main variants of vrp: with time windows, backhauls, and pickup and delivery. the third part covers issues arising in real-world vrp applications and includes both case studies and references to software packages.

this book will be of interest to both researchers and graduate-level students in the communities of operations research and mathematical sciences. it focuses on a specific family of problems while offering a complete overview of the effective use of the most important techniques proposed for the solution of hard combinatorial problems. practitioners will find this book particularly useful.

reader need a basic knowledge of the main methods for the solution of combinatorial optimization problems.

作者简介

作者：（美国）托夫（Paolo Toth）（美国）Daniele Vigo Paolo Toth is a Professor of Combinatorial Optimization at the Faculty of Engineering of the University of Bologna. His current research interests concern the design of algorithms for combinatorial optimization and graph theory problems and their application in real-world transportation, crew management and routing and loading problems. In July 1998, he was awarded the Euro Gold Medal. He has published more than 90 papers internationally, has co-authored and edited several books, and serves as editor for several journals. He is president of the International Federation of the Operational Research Societies (IFORS) for the period 2001-2003. Daniele Vigo is an Associate Professor of Operations Research at the Faculty of Engineering of the University of Bologna. His main research activities are in the field of combinatorial optimization, with particular interest in the design of algorithms for routing, cutting, packing, and crew management problems. He has published more than 30 papers internationally and serves as Associate Editor for the journal Operations Research.

<<车辆路径问题>>

书籍目录

- list of contributors
- preface
- 1 an overview of vehicle routing problems
 - 1.1 introduction
 - 1.2 problem definition and basic notation
 - 1.2.1 capacitated and distance-constrained vrp
 - 1.2.2 vrp with time windows
 - 1.2.3 vrp with backhauls
 - 1.2.4 vrp with pickup and delivery
 - 1.3 basic models for the vrp
 - 1.3.1 vehicle flow models
 - 1.3.2 extensions of vehicle flow models
 - 1.3.3 commodity flow models
 - 1.3.4 set-partitioning models
 - 1.4 test instances for the cvrp and other vrps
- bibliography
- capacitated vehicle routing problem
- 2 branch-and-bound algorithms for the capacitated vrp
 - 2.1 introduction
 - 2.2 basic relaxations
 - 2.2.1 bounds based on assignment and matching
 - 2.2.2 bounds based on arborescences and trees
 - 2.2.3 comparison of the basic relaxations
 - 2.3 better relaxations
 - 2.3.1 additive bounds for acvrp
 - 2.3.2 further lower bounds for acvrp
 - 2.3.3 lagrangian lower bounds for scvrp
 - 2.3.4 lower bounds from a set-partitioning formulation
 - 2.3.5 comparison of the improved lower bounds
 - 2.4 structure of the branch-and-bound algorithms for cvrp
 - 2.4.1 branching schemes and search strategies
 - 2.4.2 reduction, dominance rules, and other features
 - 2.4.3 performance of the branch-and-bound algorithms
 - 2.5 distance-constrained vrp
- bibliography
- 3 branch-and-cut algorithms for the capacitated vrp
 - 3.1 introduction and two-index flow model
 - 3.2 branch-and-cut
 - 3.3 polyhedral studies
 - 3.3.1 capacity constraints
 - 3.3.2 generalized capacity constraints
 - 3.3.3 framed capacity constraints
 - 3.3.4 valid inequalities from stsp
 - ? 3.3.5 valid inequalities combining bin packing and stsp
 - 3.3.6 valid inequalities from the stable set problem

<<车辆路径问题>>

- 3.4 separation procedures
 - 3.4.1 exact separation of capacity constraints
 - 3.4.2 heuristics for capacity and related constraints
 - 3.4.3 stsp constraints
- 3.5 branching strategies
- 3.6 computational results
- 3.7 conclusions
- bibliography
- 4 set-covering-based algorithms for the capacitated vrp
 - 4.1 introduction
 - 4.2 solving the linear programming relaxation of p
 - 4.3 set-covering-based solution methods
 - 4.3.1 branch-and-bound algorithm for problem cg
 - 4.3.2 polyhedral branch-and-bound algorithm
 - 4.3.3 pseudo-polynomial lower bound on cmin
 - 4.3.4 solving pa via dual-ascent and branch-and-bound
 - 4.4 solving the set-covering integer program
 - 4.4.1 a cutting plane method
 - 4.4.2 branch-and-price
 - 4.4.3 additional comments on computational approaches
 - 4.5 computational results
 - 4.6 effectiveness of the set-covering formulation
 - 4.6.1 worst-case analysis
 - 4.6.2 average-case analysis
 - bibliography
- 5 classical heuristics for the capacitated vrp
 - 5.1 introduction
 - 5.2 constructive methods
 - 5.2.1 clarke and wright savings algorithm
 - 5.2.2 enhancements of the clarke and wright algorithm
 - 5.2.3 matching-based savings algorithms
 - 5.2.4 sequential insertion heuristics
 - 5.3 two-phase methods
 - 5.3.1 elementary clustering methods
 - 5.3.2 truncated branch-and-bound
 - 5.3.3 petal algorithms
 - 5.3.4 route-first, cluster-second methods
 - 5.4 improvement heuristics
 - 5.4.1 single-route improvements
 - 5.4.2 multiroute improvements
 - 5.5 conclusions
 - bibliography
- 6 metaheuristics for the capacitated vrp
 - 6.1 introduction
 - 6.2 simulated annealing
 - 6.2.1 two early simulated annealing algorithms
 - 6.2.2 osman's simulated annealing algorithms

<<车辆路径问题>>

- 6.2.3 van breedam's experiments
- 6.3 deterministic annealing
- 6.4 tabu search
 - 6.4.1 two early tabu search algorithms
 - 6.4.2 osman's tabu search algorithm
 - 6.4.3 taburoute
 - 6.4.4 taillard's algorithm
 - 6.4.5 xu and kelly's algorithm
 - 6.4.6 rego and roucairol's algorithms
 - 6.4.7 barbarosoglu and ozgur's algorithm
 - 6.4.8 adaptive memory procedure of rochat and taillard
 - 6.4.9 granular tabu search of toth and vigo
 - 6.4.10 computational comparison
- 6.5 genetic algorithms
 - 6.5.1 simple genetic algorithm
 - 6.5.2 application to sequencing problems
 - 6.5.3 application to the vrp
- 6.6 ant algorithms
- 6.7 neural networks
- 6.8 conclusions
- bibliography
- important variants of the vehicle routing problem
- 7 vrp with time windows
 - 7.1 introduction
 - 7.2 problem formulation
 - 7.2.1 formulation
 - 7.2.2 network lower bound
 - 7.2.3 linear programming lower bound
 - 7.2.4 algorithms
 - 7.3 upper bounds: heuristic approaches
 - 7.3.1 route construction
 - 7.3.2 route improvement
 - ? 7.3.3 composite heuristics
 - 7.3.4 metaheuristics
 - 7.3.5 parallel implementations
 - 7.3.6 optimization-based heuristics
 - 7.3.7 asymptotically optimal heuristics
 - 7.4 lower bounds from decomposition approaches
 - 7.4.1 lagrangian relaxation
 - 7.4.2 capacity and time-constrained shortest-path problem.
 - 7.4.3 variable splitting
 - 7.4.4 column generation
 - 7.4.5 set-partitioning formulation
 - 7.4.6 lower bound
 - 7.4.7 commodity aggregation
 - 7.4.8 hybrid approach
 - 7.5 integer solutions

<<车辆路径问题>>

- 7.5.1 binary decisions on arc flow variables
- 7.5.2 integer decisions on arc flow variables
- 7.5.3 binary decisions on path flow variables
- 7.5.4 subtour elimination and 2-path cuts
- 7.5.5 k-path cuts and parallelism
- 7.5.6 integer decisions on (fractional and integer) time

variables

- 7.6 special cases
 - 7.6.1 multiple tsp with time windows
 - 7.6.2 vrp with backhauls and time windows

7.7 extensions

- 7.7.1 heterogeneous fleet, multiple-depot, and initial

conditions

- 7.7.2 fleet size
- 7.7.3 multiple time windows
- 7.7.4 soft time windows
- 7.7.5 time- and load-dependent costs
- 7.7.6 driver considerations

7.8 computational results for vrptw.

7.9 conclusions

bibliography

8 vrp with backhauls

8.1 introduction

- 8.1.1 benchmark instances

8.2 integer linear programming models

- 8.2.1 formulation of toth and vigo
- 8.2.2 formulation of mingozi, giorgi, and baldacci

8.3 relaxations

- 8.3.1 relaxation obtained by dropping the cccs
- 8.3.2 relaxation based on projection
- 8.3.3 lagrangian relaxation
- 8.3.4 overall additive lower bound
- 8.3.5 relaxation based on the set-partitioning model

8.4 exact algorithms

- 8.4.1 algorithm of toth and vigo
- 8.4.2 algorithm of mingozi, giorgi, and baldacci
- 8.4.3 computational results for the exact algorithms

8.5 heuristic algorithms

- 8.5.1 algorithm of deif and bodin
- 8.5.2 algorithms of goetschalckx and jacobs-blecha
- 8.5.3 algorithm of toth and vigo
- 8.5.4 computational results for the heuristics

bibliography

9 vrp with pickup and delivery

9.1 introduction

9.2 mathematical formulation

- 9.2.1 construction of the networks

<<车辆路径问题>>

- 9.2.2 formulation
- 9.2.3 service quality
- 9.2.4 reduction of the network size
- 9.3 heuristics
 - 9.3.1 construction and improvement
 - 9.3.2 clustering algorithms
 - 9.3.3 metaheuristics
 - 9.3.4 neural network heuristics
 - 9.3.5 theoretical analysis of algorithms
- 9.4 optimization-based approaches
 - 9.4.1 single vehicle cases
 - 9.4.2 multiple vehicle cases
- 9.5 applications
- 9.6 computational results
- 9.7 conclusions
- bibliography
- applications and case studies
- 10 routing vehicles in the real world: applications in the solid waste,
 - 10.1 introduction
 - 10.2 computerized vehicle routing in the solid waste industry
 - 10.2.1 history
 - 10.2.2 background
 - 10.2.3 commercial collection
 - 10.2.4 residential collection
 - 10.2.5 case studies
 - 10.2.6 roll-on-roll-off
 - 10.2.7 further remarks
 - 10.3 vehicle routing in the beverage, food, and dairy industries
 - 10.3.1 introduction
 - 10.3.2 beverage industry
 - 10.3.3 food industry
 - 10.3.4 dairy industry
 - 10.4 distribution and routing in the newspaper industry
 - 10.4.1 industry background
 - 10.4.2 newspaper distribution problem
 - 10.4.3 vehicle routing algorithms for ndp
 - 10.4.4 three case studies
 - 10.4.5 further remarks
 - 10.5 conclusions
 - bibliography
- 11 capacitated arc routing problem with vehicle-site dependencies: the philadelphia experience
 - 11.1 introduction
 - 11.2 networks, assumptions, and goals of the carp-vsd

<<车辆路径问题>>

- 11.2.1 travel network
- 11.2.2 service network
- 11.2.3 vehicle classes
- 11.2.4 travel network and service network for a vehicle

class

- 11.2.5 vehicle preference list
- 11.2.6 other assumptions
- 11.2.7 goals and constraints of the carp-vsd
- 11.3 vehicle decomposition algorithm (vda)
 - 11.3.1 step a. create and verify vehicle class networks
 - 11.3.2 step b. estimate total work and determine initial fleet

mix

- 11.3.3 step c. partition the service network
- 11.3.4 step d. determine travel path and balance the

partitions

- 11.3.5 step e. revise estimate of total work and adjust fleet

mix

- 11.4 implementation of the vda in philadelphia
- 11.5 enhancements and extensions

bibliography

12 inventory routing in practice

- 12.1 introduction
- 12.2 problem definition
- 12.3 literature review
- 12.4 solution approach
 - 12.4.1 phase i: integer programming model
 - 12.4.2 phase i: solving the integer programming model
 - 12.4.3 phase ii: scheduling
- 12.5 computational experience
 - 12.5.1 instances
 - 12.5.2 solution quality
 - 12.5.3 alternate heuristic
 - 12.5.4 computational experiments

12.6 conclusion

bibliography

13 routing under uncertainty: an application in the scheduling of field service engineers

- 13.1 introduction
- 13.2 vrpst with variable costs of recourse
- 13.3 literature review
 - 13.3.1 vrpst
 - 13.3.2 vrpsd
- 13.4 stochastic integer vrpst formulation
 - 13.4.1 first-stage problem
 - 13.4.2 second-stage problem
- 13.5 paired tree search algorithm (ptsa)
 - 13.5.1 linked trees

<<车辆路径问题>>

- 13.5.2 lower bounds
- 13.5.3 computational implementation
- 13.6 applied maintenance scheduling problem
 - 13.6.1 maintenance scheduling system in practice
 - 13.6.2 stochastic problem setting
- 13.7 modeling the applied problem as a vrpsst
- 13.8 model input
 - 13.8.1 job locations and the road network
 - 13.8.2 service times
- 13.9 model output: computational considerations
 - 13.9.1 framework for the analysis of results
 - 13.9.2 reoptimization
- 13.10 example scenario
- 13.11 overall computational results
- 13.12 conclusion
- bibliography
- 14 evolution of microcomputer-based vehicle routing software: case studies in the united states
 - 14.1 introduction
 - 14.2 definition of the vrp
 - 14.2.1 customer specification
 - 14.2.2 product specification
 - 14.2.3 vehicle specification
 - 14.3 algorithms
 - 14.4 future trends in vehicle routing software
 - 14.5 summary and conclusions
 - bibliography
- index

章节摘录

版权页：插图：In this section we give a formal definition, as graph theoretic models, of the basic problems of the vehicle routing class. These problems, which have received the greatest attention in the scientific literature, are examined in detail in the first two parts of the book. We first describe the Capacitated VRP, which is the simplest and most studied member of the family, then we introduce the Distance-Constrained VRP, the VRP with Time Windows, the VRP with Backhauls, and the VRP with Pickup and Delivery. For each of these problems, several minor variants have been proposed and examined in the literature, and often different problems are given the same name. Although in many cases the solution methods, particularly the heuristic ones, may be adapted to incorporate additional features, this indeterminacy in problem definition generally causes much confusion. Therefore, for each problem we first describe the basic version, i.e., the one that in this book is denoted by the corresponding acronym, and then we discuss the variants. In addition, we make an explicit distinction between the symmetric and asymmetric versions of a problem only if models and solution approaches proposed in the literature make use of this distinction. Also in this section, we introduce all the relevant notation and terminology used throughout the book. Additional notation and definitions required to describe particular variants and practical VRP problems are given in the appropriate chapters. Figure 1.1 summarizes the main problems described in this section and illustrates their connections. In the figure, an arrow moving from problem A to problem B means that B is an extension of A.

<<车辆路径问题>>

编辑推荐

《车辆路径问题(影印版)》：国际著名数学图书

<<车辆路径问题>>

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>