

Solving Transportation Problems With Mixed Constraints

Real-life decisions are usually made in the state of uncertainty such as randomness and fuzziness. How do we model optimization problems in uncertain environments? How do we solve these models? In order to answer these questions, this book provides a self-contained, comprehensive and up-to-date presentation of uncertain programming theory, including numerous modeling ideas, hybrid intelligent algorithms, and applications in system reliability design, project scheduling problem, vehicle routing problem, facility location problem, and machine scheduling problem. Researchers, practitioners and students in operations research, management science, information science, system science, and engineering will find this work a stimulating and useful reference.

"Neutrosophic Sets and Systems" has been created for publications on advanced studies in neutrosophy, neutrosophic set, neutrosophic logic, neutrosophic probability, neutrosophic statistics that started in 1995 and their applications in any field, such as the neutrosophic structures developed in algebra, geometry, topology, etc.

This book includes research studies, novel theory, as well as new methodology and applications in mathematics and management sciences. The book will provide a comprehensive range of mathematics applied to engineering areas for different tasks. It will offer an international perspective and a bridge between classical theory and new methodology in many areas, along with real-life applications. Features Offers solutions to multi-objective transportation problem under cost reliability using utility function Presents optimization techniques to support eco-efficiency assessment in manufacturing processes Covers distance-based function approach for optimal design of engineering processes with multiple quality characteristics Provides discrete time sliding mode control for non-linear networked control systems Discusses second law of thermodynamics as instruments for optimizing fluid dynamic systems and aerodynamic systems

There are a myriad of mathematical problems that cannot be solved using traditional methods. The development of fuzzy expert systems has provided new opportunities for problem-solving amidst uncertainties. Fuzzy Systems: Concepts, Methodologies, Tools, and Applications is a comprehensive reference source on the latest scholarly research and developments in fuzzy rule-based methods and examines both theoretical foundations and real-world utilization of these logic sets. Featuring a range of extensive coverage across innovative topics, such as fuzzy logic, rule-based systems, and fuzzy analysis, this is an essential publication for scientists, doctors, engineers, physicians, and researchers interested in emerging perspectives and uses of fuzzy systems in various sectors.

Exploring Services Science

Genetic Algorithms and Engineering Optimization

Handbook of Research on Investigations in Artificial Life Research and Development

17th International Conference, IPMU 2018, Cádiz, Spain, June 11-15, 2018, Proceedings, Part III

Novel Theories, Technologies, and Applications

Proceedings of ICCET 2019

Every day we need to solve large problems for which supercomputers are needed. High performance computing (HPC) is a paradigm that allows to efficiently implement large-scale computational tasks on powerful supercomputers unthinkable without optimization. We try to minimize our effort and to maximize the achieved profit. Many challenging real world problems arising in engineering, economics, medicine and other areas can be formulated as large-scale computational tasks. The volume is a comprehensive collection of extended contributions from the High performance computing conference held in Borovets, Bulgaria, September 2019. This book presents recent advances in high performance computing. The topics of interest included into this volume are: HP software tools, Parallel Algorithms and Scalability, HPC in Big Data analytics, Modelling, Simulation & Optimization in a Data Rich Environment, Advanced numerical methods for HPC, Hybrid parallel or distributed algorithms. The volume is focused on important large-scale applications like Environmental and Climate Modeling, Computational Chemistry and Heuristic Algorithms.

This book explores the methodological and application developments of network design in transportation and logistics. It identifies trends, challenges and research perspectives in network design for these areas. Network design is a major class of problems in operations research where network flow, combinatorial and mixed integer optimization meet. The analysis and planning of transportation and logistics systems continues to be one of the most important application areas of operations research. Networks provide the natural way of depicting such systems, so the optimal design and operation of networks is the main methodological area of operations research that is used for the analysis and planning of these systems. This book defines the current state of the art in the general area of network design, and then turns to its applications to transportation and logistics. New research challenges are addressed. Network Design with Applications to Transportation and Logistics is divided into three parts. Part I examines basic design problems including fixed-cost network design and parallel algorithms. After addressing the basics, Part II focuses on more advanced models. Chapters cover topics such as multi-facility network design, flow-constrained network design, and robust network design. Finally Part III is dedicated entirely to the potential application areas for network design. These areas range from rail networks, to city logistics, to energy transport. All of the chapters are written by leading researchers in the field, which should appeal to analysts and planners.

Solving Transport Problems establishes fundamental points and good practice in resolving matters regarding green transportation. This is to prompt further research in conveyance issues by providing readers with new knowledge and grounds for integrated models and solution methods. Focusing on green transportation, this book covers various sub-topics and thus consists of diverse content. Traditionally, academia and transport practitioners have mainly concentrated on efficient fleet management to achieve economic benefits and better-quality service. More recently, due to growing public environmental concerns and the industry understanding of the issue, the academic community has started to address environmental issues. The studies of green transportation compiled in this book have identified certain areas of interest, such as references, viewpoints, algorithms and ideas. Solving Transport Problems is for researchers, environmental decision-makers and other concerned parties, to start discussion on developing optimized technology and alternative fuel-based integrated models for environmentally cleaner transport systems.

This book presents recent work that analyzes general issues of green transportation. The contributed chapters consider environmental objectives in transportation, including topics such as battery swap stations for electric vehicles, efficient home healthcare routing, waste collection, and various vehicle routing problems. The content will be valuable for researchers and postgraduate students in computer science, operations research, and urban planning.

Advances in Management Research

Applications of Computational Intelligence in Business Management

Solving Transport Problems

Theoretical and Applied Mathematics in International Business

NBS Special Publication

A Classified Bibliography 1981–1984

This book covers advancements across business domains in knowledge and information management. It presents research trends in the fields of management, innovation, and technology, and is composed of research papers that show applications of IT, analytics, and business operations in industry and in educational institutions. It offers a combination of scientific research methods and concepts, with contributions from globally renowned authors; presents various management domains from a number of countries for a global perspective; and provides a unique combination of topics and methods while giving insights into the management domain using a holistic approach. The book provides scholars with a platform to derive maximum utility in the area of management, research, and technology by subscribing to the idea of managing business through performance and management technology.

Hybrid Predictive Control for Dynamic Transport Problems develops methods for the design of predictive control strategies for nonlinear-dynamic hybrid discrete-/continuous-variable systems. The methodology is designed for real-time applications, particularly the study of dynamic transport systems. Operational and service policies are considered, as well as cost reduction. The control structure is based on a sound definition of the key variables and their evolution. A flexible objective function able to capture the predictive behaviour of the system variables is described. Coupled with efficient algorithms, mainly drawn from area of computational intelligence, this is shown to optimize performance indices for real-time applications. The framework of the proposed predictive control methodology is generic and, being able to solve nonlinear mixed integer optimization problems dynamically, is readily extendable to other industrial processes. The main topics of this book are: hybrid predictive control (HPC) design based on evolutionary multiobjective optimization (EMO); HPC based on EMO for dial-a-ride systems; and HPC based on EMO for operational decisions in public transport systems. Hybrid Predictive Control for Dynamic Transport Problems is a comprehensive analysis of HPC and its application to dynamic transport systems. Introductory material on evolutionary algorithms is presented in summary in an appendix. The text will be of interest to control and transport engineers working on the operational optimization of transport systems and to academic researchers working with hybrid systems. The potential applications of the generic methods presented here to other process fields will make the book of interest to a wider group of researchers, scientists and graduate students working in other control-related disciplines.

Artificial Intelligence (AI) describes machines/computers that mimic cognitive functions that humans associate with other human minds, such as learning and problem solving. As businesses have evolved to include more automation of processes, it has become more vital to understand AI and its various applications. Additionally, it is important for workers in the marketing industry to understand how to coincide with and utilize these techniques to enhance and make their work more efficient. The Handbook of Research on Applied AI for International Business and Marketing Applications is a critical scholarly publication that provides comprehensive research on artificial intelligence applications within the context of international business. Highlighting a wide range of topics such as diversification, risk management, and artificial intelligence, this book is ideal for marketers, business professionals, academicians, practitioners, researchers, and students.

Research on artificial life is critical to solving various dynamic obstacles individuals face on a daily basis. From electric wheelchairs to navigation, artificial life can play a role in improving both the simple and complex aspects of civilian life. The Handbook of Research on Investigations in Artificial Life Research and Development is a vital scholarly reference source that examines emergent research in handling real-world problems through the application of various computation technologies and techniques. Examining topics such as computational intelligence, multi-agent systems, and fuzzy logic, this publication is a valuable resource for academicians, scientists, researchers, and individuals interested in artificial intelligence developments.

Theory and Practice of Uncertain Programming

Ideas and Schemes of Optimization Methods for Strategic Planning and Operations Management

Computational Management

Network Design with Applications to Transportation and Logistics

Hybrid Predictive Control for Dynamic Transport Problems

Innovation and Technology

Data-Driven Solutions to Transportation Problems explores the fundamental principle of analyzing different types of transportation-related data using methodologies such as the data fusion model, the big data mining approach, computer vision-enabled traffic sensing data analysis, and machine learning. The book examines the state-of-the-art in data-enabled methodologies, technologies and applications in transportation. Readers will learn how to solve problems relating to energy efficiency under connected vehicle environments, urban travel behavior, trajectory data-based travel pattern identification, public transportation analysis, traffic signal control efficiency, optimizing traffic networks network, and much more. Synthesizes the newest developments in data-driven transportation science Includes case studies and examples in each chapter that illustrate the application of methodologies and technologies employed Useful for both theoretical and technically-oriented researchers

The book is a collection of selected high quality research papers presented at the International Conference on Computing in Engineering and Technology (ICCT 2019), held on January 10–11, 2019 at Deogiri Institute of Engineering and Management Studies, Aurangabad, India. Focusing on frontier topics and next-generation technologies, it presents original and innovative research from academics, scientists, students, and engineers alike. This book presents recent advances in computational optimization. The book includes important real problems like modeling of physical processes, parameter settings for controlling different processes, transportation problems, machine scheduling, air pollution modeling, solving multiple integrals and systems of differential and integral equations which describe real processes, solving engineering and financial problems. It shows how to develop algorithms for them based on new intelligent methods like evolutionary computations, ant colony optimization, constrain programming Monte Carlo method and others. This research demonstrates how some real-world problems arising in engineering, economics and other domains can be formulated as optimization problems.

This work examines all the fuzzy multicriteria methods recently developed, such as fuzzy AHP, fuzzy TOPSIS, interactive fuzzy multiobjective stochastic linear programming, fuzzy multiobjective dynamic programming, grey fuzzy multiobjective optimization, fuzzy multiobjective geometric programming, and more. Each of the 22 chapters includes practical applications along with new developments/results. This book may be used as a textbook in graduate operations research, industrial engineering, and economics courses. It will also be an excellent resource, providing new suggestions and directions for further research, for computer programmers, mathematicians, and scientists in a variety of disciplines where multicriteria decision making is needed.

Advances in High Performance Computing

Recent Advances in Computational Optimization

Data-Driven Solutions to Transportation Problems

EXTENDED TRANSPORTATION PROBLEM

Computer Literature Bibliography: 1946–1963

Solving Optimization Problems with MATLAB®

Neutrosophic (NS) set hypothesis gives another way to deal with the vulnerabilities of the shortest path problems (SPP). Several researchers have worked on fuzzy shortest path problem (FSPP) in a fuzzy graph with vulnerability data and completely different applications in real world eventualities. However, the uncertainty related to the inconsistent information and indeterminate information isn't properly expressed by fuzzy set. The neutrosophic set deals these forms of uncertainty. This paper presents a model for shortest path problem with various arrangements of integer-valued trapezoidal neutrosophic (INVTpNS) and integer-valued triangular neutrosophic (INVTNS). We characterized this issue as Neutrosophic Shortest way problem (NSSPP). The established linear programming (LP) model solves the classical SPP that consists of crisp parameters. To the simplest of our data, there's no multi objective applied mathematics approach in literature for finding the Neutrosophic shortest path problem (NSSPP). This book constitutes the refereed proceedings of the 46th International Conference on Current Trends in Theory and Practice of Informatics, SOFSEM 2020, held in Limassol, Cyprus, in January 2020. The 40 full papers presented together with 17 short papers and 3 invited papers were carefully reviewed and selected from 125 submissions. They presented new research results in the theory and practice of computer science in the each sub-area of SOFSEM 2020: foundations of computer science, foundations of data science and engineering, foundations of software engineering, and foundations of algorithmic computational biology.

The scientific monograph of a survey kind presented to the reader's attention deals with fundamental ideas and basic schemes of optimization methods that can be effectively used for solving strategic planning and operations management problems related, in particular, to transportation. This monograph is an English translation of a considerable part of the author's book with a similar title that was published in Russian in 1992. The material of the monograph embraces methods of linear and nonlinear programming; nonsmooth and nonconvex optimization; integer programming, solving problems on graphs, and solving problems with mixed variables; routing, scheduling, solving network flow problems, and solving the transportation problem; stochastic programming, multicriteria optimization, game theory, and optimization on fuzzy sets and under fuzzy goals; optimal control of systems described by ordinary differential equations, partial differential equations, generalized differential equations (differential inclusions), and functional equations with a variable that can assume only discrete values; and some other methods that are based on or adjoin to the listed ones.

Computational intelligence (CI) lies at the interface between engineering and computer science; control engineering, where problems are solved using computer-assisted methods. Thus, it can be regarded as an indispensable basis for all artificial intelligence (AI) activities. This book collects surveys of most recent theoretical approaches focusing on fuzzy systems, neurocomputing, and nature inspired algorithms. It also presents surveys of up-to-date research and application with special focus on fuzzy systems as well as on applications in life sciences and neuronal computing.

OPTIMIZATION AND OPERATIONS RESEARCH - Volume II

Operations Research in Transportation Systems

Computational Intelligence

Mathematics in Engineering Sciences

Results of the Workshop on Computational Optimization WCO 2021

Results of the International Conference on "High Performance Computing" Borovets, Bulgaria, 2019

This book focuses on solving optimization problems with MATLAB. Descriptions and solutions of nonlinear equations of any form are studied first. Focuses are made on the solutions of various types of optimization problems, including unconstrained and constrained optimizations, mixed integer, multiobjective and dynamic programming problems. Comparative studies and conclusions on intelligent global solvers are also provided.

This book contains the refereed proceedings of the 7th International Conference on Exploring Service Science (IESS), held in Bucharest, Romania, in May 2016. Service science constitutes an interdisciplinary approach to systematic innovation in service systems, integrating managerial, social, legal, and engineering aspects to address the theoretical and practical challenges of the service industry and its economy. The 45 full papers and 13 short papers accepted for IESS were selected from 119 submissions. The papers consider the topics service exploration theories and processes; modeling service relations and methods; service value co-creation through knowledge management and user-centric services; service design methodologies and patterns; service innovation and strategy; IT-based service design; service-oriented agents; IoT and mobile apps for public transport service management; e-health services and medical data interoperability; and service and IT-oriented learning and education systems.

This book offers a timely review of cutting-edge applications of computational intelligence to business management and financial analysis. It covers a wide range of intelligent and optimization techniques, reporting in detail on their application to real-world problems relating to portfolio management and demand forecasting, decision making, knowledge acquisition, and supply chain scheduling and management.

Appendices A.1 Tabular Results for Different Models A.2 Tabular Results for Different Algorithms B OptiTrans B.1 Input Data B.1.1 Input Data Common to all Solution Approaches B.1.2 Specific Input Data for the MILP Model and the Column Enumeration Approach B.1.3 Specific Input Data for the Heuristic Methods B.1.3.1 Penalty Criteria B.1.3.2 Control Parameters of the OptiTrans Software B.2 Tabular Results B.2.1 Tabular Results for the MILP Model B.2.2 Tabular Results for the Heuristic Methods B.2.2.1 Input Data for a Whole Day - Offline Analysis B.2.2.2 Results for Cih and SA References Index Preface This book covers the analysis and development of online algorithms involving exact optimization and heuristic techniques, and their application to solve two real life problems. The first problem is concerned with a complex technical system: a special carousel based high-speed storage system - Rotastore. It is shown that this logistic problem leads to an NP-hard Batch Presorting Problem (BPSPP) which is not easy to solve optimally in logistic situations. We consider a polynomial case and develop an exact algorithm for offline situations. Competitive analysis showed that the proposed online algorithm is 312-competitive. Online algorithms with lookahead improve the online solutions in particular cases. If the capacity constraint on additional storage is neglected the problem has a totally unimodular polyhedron.

A Multi Objective Programming Approach to Solve Integer Valued Neutrosophic Shortest Path Problems

Neutrosophic Sets in Decision Analysis and Operations Research

SOFSEM 2020: Theory and Practice of Computer Science

46th International Conference on Current Trends in Theory and Practice of Informatics, SOFSEM 2020, Limassol, Cyprus, January 20/24, 2020, Proceedings

Concepts, Methodologies, Tools, and Applications

A comprehensive guide to a powerful new analytical tool by two of its foremost innovators The past decade has witnessed many exciting advances in the use of genetic algorithms (GAs) to solve optimization problems in everything from product design to scheduling and client/server networking. Aided by GAs, analysts and designers now routinely evolve solutions to complex combinatorial and multiobjective optimization problems with an ease and rapidity unthinkable withconventional methods. Despite the continued growth and refinement of this powerful analytical tool, there continues to be a lack of up-to-date guides to contemporary GA optimization principles and practices. Written by two of the world's leading experts in the field, this book fills that gap in the literature.

Taking an intuitive approach, Mitsuo Gen and Runwei Cheng employ numerous illustrations and real-world examples to help readers gain a thorough understanding of basic GA concepts—including encoding, adaptation, and genetic optimizations—and to show how GAs can be used to solve an array of constrained, combinatorial, multiobjective, and fuzzy optimization problems. Focusing on problems commonly encountered in manufacturing—Professors Gen and Cheng provide in-depth coverage of advanced GA techniques for: * Reliability design * Manufacturing cell design * Scheduling * Advanced transportation problems * Network design and routing Genetic Algorithms and Engineering Optimization is an indispensable working resource for industrial engineers and designers, as well as systems analysts, operations researchers, and management scientists working in manufacturing and related industries. It also makes an excellent primary or supplementary text for advanced courses in industrial engineering, management science, operations research, computer science, and artificial intelligence.

This book presents a novel approach to the formulation and solution of three classes of problems: the fully fuzzy transportation problem, the fully fuzzy transshipment problem, and fully fuzzy solid transportation problem. It points out some limitations of the existing formulations and approaches, indicating some possible, conceptually and algorithmically attractive solutions to alleviate them. In particular, the book describes new conceptual and algorithmic solutions for finding the fuzzy optimal solutions of the single-objective fully fuzzy transportation problems, the fully fuzzy transshipment problems and the fully fuzzy solid transportation problems. Moreover, based on the novel concepts and solutions proposed by combining the concept of a fully fuzzy solid transportation problem and a fully fuzzy transshipment problem, it describes a new class of problems, i.e. the fully fuzzy solid trans-shipment problem, together with its fuzzy linear programming formulation and some methods to find its fuzzy optimal solution. The book offers the readers a timely piece of literature in the field of fuzzy linear programming, and is expected to act as a source of inspiration for future research and applications.

In this dissertation, various optimization problems from the area of transportation and power systems will be respectively investigated and the uncertainty will be considered in each problem. Specifically, a long-term problem of electricity infrastructure investment is studied to address the planning for capacity expansion in electrical power systems with the integration of short-term operations. The future investment costs and real-time customer demands cannot be perfectly forecasted and thus are considered to be random. Another maintenance scheduling problem is studied for power systems, particularly for natural gas fueled power plants, taking into account gas contracting and the opportunity of purchasing and selling gas in the spot market as well as the maintenance scheduling considering the uncertainty of electricity and gas prices in the spot market. In addition, different vehicle routing problems are researched seeking the route for each vehicle so that the total traveling cost is minimized subject to the constraints and uncertain parameters in corresponding transportation systems.

In information technology, the concepts of cost, time, delivery, space, quality, durability, and price have gained greater importance in solving managerial decision-making problems in supply chain models, transportation problems, and inventory control problems. Moreover, competition is becoming tougher in imprecise environments. Neutrosophic sets and logic are gaining significant attention in solving real-life problems that involve uncertainty, impreciseness, vagueness, incompleteness, inconsistency, and indeterminacy. Neutrosophic Sets in Decision Analysis and Operations Research is a critical, scholarly publication that examines various aspects of organizational research through mathematical equations and algorithms and presents neutrosophic theories and their applications in various optimization fields. Featuring a wide range of topics such as information retrieval, decision making, and matrices, this book is ideal for engineers, technicians, designers, mathematicians, practitioners of mathematics in economy and technology, scientists, academicians, professionals, managers, researchers, and students.

Computing in Engineering and Technology

Demand Forecasting and Order Planning in Supply Chains and Humanitarian Logistics

Neutrosophic Sets and Systems, Book Series, Vol. 29, 2019

Towards Green Logistics

1946 to 1963

Miscellaneous Publication - National Bureau of Standards

In a decentralized supply chain, most of the supply chain agents may not share information due to confidentiality policies, quality of information, or different system incompatibilities. Every actor holds its own set of information and attempts to maximize its objective (minimizing costs/minimizing inventory holdings) based on the available settings. Therefore, the agents control their own activities with the objective of improving their own competitiveness, which leads them to make decisions that maximize their local performance by ignoring the other agents or even the final consumer. These decisions are myopic because they do not consider the performance of all the partners to satisfy the consumer. Demand Forecasting and Order Planning in Supply Chains and Humanitarian Logistics is a collection of innovative research that focuses on demand anticipation, forecasting, and order planning as well as humanitarian logistics to propose original solutions for existing problems. While highlighting topics including artificial intelligence, information sharing, and operations management, this book is ideally designed for supply chain managers, logistics personnel, business executives, management experts, operation industry professionals, academicians, researchers, and students who want to improve their understanding of supply chain coordination in order to be competitive in the new era of globalization.

This three volume set (CCIS 853-855) constitutes the proceedings of the 17th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems, IPMU 2017, held in Cádiz, Spain, in June 2018. The 193 revised full papers were carefully reviewed and selected from 383 submissions. The papers are organized in topical sections on advances on explainable artificial intelligence; aggregation operators, fuzzy metrics and applications; belief function theory and its applications; current techniques to model, process and describe time series; discrete models and computational intelligence; formal concept analysis and uncertainty; fuzzy implication functions; fuzzy logic and artificial intelligence problems; fuzzy mathematical analysis and applications; fuzzy methods in data mining and knowledge discovery; fuzzy transforms: theory and applications to data analysis and image processing; imprecise probabilities: foundations and applications; mathematical fuzzy logic, mathematical morphology; measures of comparison and entropies for fuzzy sets and their extensions; new trends in data aggregation; pre-aggregation functions and generalized forms of monotonicity; rough and fuzzy similarity modelling tools; soft computing for decision making in uncertainty; soft computing in information retrieval and sentiment analysis; tripartitions and uncertainty; decision making modeling and applications; logical methods in mining knowledge from big data; metaheuristics and machine learning; optimization models for modern analytics; uncertainty in medicine; uncertainty in Video/Image Processing (UVIP).

Optimization and Operations Research is a component of Encyclopaedia of Mathematical Sciences in the global Encyclopaedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The Theme on Optimization and Operations Research is organized into six different topics which represent the main scientific areas of the theme: 1. Fundamentals of Operations Research; 2. Advanced Deterministic Operations Research; 3. Optimization in Infinite Dimensions; 4. Game Theory; 5. Stochastic Operations Research; 6. Decision Analysis, which are then expanded into multiple subtopics, each as a chapter. These four volumes are aimed at the following five major target audiences: University and College students Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

In the past, practical applications motivated the development of mathematical theories, which then became the subject of study in pure mathematics where abstract concepts are studied for their own sake. The activity of applied mathematics is thus intimately connected with research in pure mathematics, which is also referred to as theoretical mathematics. Theoretical and Applied Mathematics in International Business is an essential research publication that explores the importance and implications of applied and theoretical mathematics within international business, including areas such as finance, general management, sales and marketing, and supply chain management. Highlighting topics such as data mining, global economics, and general management, this publication is ideal for scholars, specialists, managers, corporate professionals, researchers, and academicians.

Neutrosophic Sets and Systems, Vol. 29, 2019

Information Processing and Management of Uncertainty in Knowledge-Based Systems. Applications

Theoretical Advances and Applied Applications

Fuzzy Systems: Concepts, Methodologies, Tools, and Applications

Online Storage Systems and Transportation Problems with Applications

Optimization Models and Mathematical Solutions