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Network Design with Applications to Transportation and Logistics John Wiley & Sons

Integer Programming: Theory, Applications, and Computations provides information pertinent to the theory, applications, and computations of integer programming. This book presents the computational advantages of the various techniques of integer programming. Organized into eight chapters, this book begins with an overview of the general categorization of integer applications and explains the three fundamental techniques of integer programming. This text

then explores the concept of implicit enumeration, which is general in a sense that it is applicable to any well-defined binary program. Other chapters consider the branch-and-bound methods, the cutting-plane method, and its closely related asymptotic problem. This book discusses as well several specialized algorithms for certain well-known integer models and provides an alternative approach to the solution of the integer problem. The final chapter deals with a number of observations about the formulations and executions of integer programming models. This book is a valuable

resource for industrial engineers and research workers.

Trends in Optimization

Springer Science & Business Media

A practical, accessible guide to optimization problems with discrete or integer variables Integer Programming stands out from other textbooks by explaining in clear and simple terms how to construct custom-made algorithms or use existing commercial software to obtain optimal or near-optimal solutions for a variety of real-world problems, such as airline timetables, production line schedules, or electricity production on a regional or national scale. Incorporating recent developments that have made it possible to solve

difficult optimization problems with greater accuracy, author Laurence A. Wolsey presents a number of state-of-the-art topics not covered in any other textbook. These include improved modeling, cutting plane theory and algorithms, heuristic methods, and branch-and-cut and integer programming decomposition algorithms. This self-contained text: Distinguishes between good and bad formulations in integer programming problems Applies lessons learned from easy integer programs to more difficult problems Demonstrates with applications theoretical and practical aspects of problem solving Includes useful

notes and end-of-chapter exercises Offers tremendous flexibility for tailoring material to different needs Integer Programming is an ideal text for courses in integer/mathematical programming-whether in operations research, mathematics, engineering, or computer science departments. It is also a valuable reference for industrial users of integer programming and researchers who would like to keep up with advances in the field.

Encyclopedia of Mobile Computing and Commerce
CRC Press

The editors and authors dedicate this book to Bernhard Korte on the occasion of his seventieth birthday. We, the editors, are happy about the

overwhelming feedback to our initiative to honor him with this book and with a workshop in Bonn on November 3–7, 2008. Although this would be a reason to look back, we would rather like to look forward and see what are the interesting research directions today. This book is written by leading experts in combinatorial optimization. All papers were carefully reviewed, and eventually twenty-three of the invited papers were accepted for this book. The breadth of topics is typical for the field: combinatorial optimization builds bridges between areas like combinatorics and graph theory, submodular functions and matroids, networks and connectivity, approximation

algorithms and mathematical programming, computational geometry and polyhedral combinatorics. All these topics are related, and they are all addressed in this book. Combinatorial optimization is also known for its numerous applications. To limit the scope, however, this book is not primarily about applications, although some are mentioned at various places. Most papers in this volume are surveys that provide an excellent overview of an active research area, but this book also contains many new results. Highlighting many of the currently most interesting research directions in combinatorial optimization, we hope that this book constitutes a good basis for future

research in these areas.

Integer Programming and Combinatorial Optimization
American Mathematical Soc.
Theory of Linear and Integer Programming
Alexander Schrijver
Centrum voor Wiskunde en Informatica,
Amsterdam, The Netherlands
This book describes the theory of linear and integer programming and surveys the algorithms for linear and integer programming problems, focusing on complexity analysis. It aims at complementing the more practically oriented books in this field. A special feature is the author's coverage of important recent developments in linear and integer programming. Applications to combinatorial optimization are given, and the author also includes extensive historical surveys and bibliographies. The book is intended for graduate students and researchers in operations research, mathematics and computer science. It will also be of interest to mathematical historians. Contents 1

Introduction and preliminaries; 2 Problems, algorithms, and complexity; 3 Linear algebra and complexity; 4 Theory of lattices and linear diophantine equations; 5 Algorithms for linear diophantine equations; 6 Diophantine approximation and basis reduction; 7 Fundamental concepts and results on polyhedra, linear inequalities, and linear programming; 8 The structure of polyhedra; 9 Polarity, and blocking and anti-blocking polyhedra; 10 Sizes and the theoretical complexity of linear inequalities and linear programming; 11 The simplex method; 12 Primal-dual, elimination, and relaxation methods; 13 Khachiyan's method for linear programming; 14 The ellipsoid method for polyhedra more generally; 15 Further polynomiality results in linear programming; 16 Introduction to integer linear programming; 17 Estimates in integer linear programming; 18 The complexity of integer linear programming; 19 Totally unimodular matrices: fundamental properties and examples; 20 Recognizing total unimodularity; 21 Further theory related to total unimodularity; 22 Integral polyhedra and total dual integrality; 23 Cutting planes; 24 Further methods in integer linear programming; Historical and further notes on integer linear programming; References; Notation index; Author index; Subject index

Operations Research Springer

The goal of the Encyclopedia of Optimization is to introduce the reader to a complete set of topics that show the spectrum of research, the richness of ideas, and the breadth of applications that has come from this field. The second edition builds on the success of the former edition with more than 150 completely new entries, designed to ensure that the reference addresses recent areas where optimization theories and techniques have advanced. Particularly heavy attention resulted in health science and transportation, with entries such as "Algorithms for Genomics", "Optimization and Radiotherapy Treatment Design", and "Crew Scheduling".

Operations Research Calculations Handbook
 Springer Nature
 Constitutes the refereed proceedings of the Second International Conference MCO 2008, Metz, France, September 2008. This title organizes the papers in topical sections on optimization and decision making; data mining theory, systems and applications; computer vision and image processing; and computer communications and networks.

Integer Programming
 Springer Science & Business Media
 Since its start in 1990, the IPCO conference series (held under the auspices of the Mathematical Programming Society) has become an important forum for the presentation of recent results in Integer Programming and

Combinatorial Optimization. This volume compiles the papers presented at IPCO XI, the eleventh conference in this series, held June 8–10, 2005, at the Technische Universität Berlin. The high interest in this conference series is evident in the large number of submissions. For IPCO XI, 119 extended abstracts of up to 10 pages were submitted. During its meeting on January 29–30, 2005, the Program Committee carefully selected 34 contributions for presentation in non-parallel sessions at the conference. The final choices were not easy at all, since, due to the limited number of time slots, many very good papers could not be accepted. During the selection process the contributions were refereed according to the

standards of refereed conferences. As a result of this procedure, you have in your hands a volume that contains papers describing high-quality research efforts. The page limit for contributions to this proceedings volume was set to 15. You may find full versions of the papers in scientific journals in the near future. We thank all the authors who submitted papers. Furthermore, the Program Committee is indebted to the many reviewers who, with their specific expertise, helped a lot in making the decisions. Nonlinear and Mixed-Integer Optimization World Scientific

This book provides a forum for research and applications dealing with the design, the development and the implementation of decision

support systems in the manufacturing domain. The book brings together contributions from leading experts in the field. It will appeal to all those concerned with decision support for manufacturing.

Introduction to Stochastic Programming John Wiley & Sons

The aim of stochastic programming is to find optimal decisions in problems which involve uncertain data.

This field is currently developing rapidly with contributions from many disciplines including operations research, mathematics, and probability.

At the same time, it is now being applied in a wide variety of subjects ranging from agriculture to financial planning and from industrial engineering to computer networks. This textbook provides a first course in

stochastic programming suitable for students with a basic knowledge of linear programming, elementary analysis, and probability. The authors aim to present a broad overview of the main themes and methods of the subject. Its prime goal is to help students develop an intuition on how to model uncertainty into mathematical problems, what uncertainty changes bring to the decision process, and what techniques help to manage uncertainty in solving the problems. In this extensively updated new edition there is more material on methods and examples including several new approaches for discrete variables, new results on risk measures in modeling and Monte Carlo sampling methods, a new chapter on relationships to other methods including approximate dynamic programming, robust optimization and online methods. The book is highly

illustrated with chapter summaries and many examples and exercises. Students, researchers and practitioners in operations research and the optimization area will find it particularly of interest. Review of First Edition: "The discussion on modeling issues, the large number of examples used to illustrate the material, and the breadth of the coverage make 'Introduction to Stochastic Programming' an ideal textbook for the area." (Interfaces, 1998)

Integer Programming and Related Areas Springer Science & Business Media

A new approach to the solution of mixed integer programming problems is developed, largely an extension of the group theoretic methods now being applied to all-integer problems. Discretization is used to replace any mixed integer programming

problem by an equivalent integer programming problem. This permits the group theoretic approach of Gomory to be applied to such problems, resulting in a new 'asymptotic' classification of mixed integer problems into three types which somewhat reflect degrees of difficulty. Given this classification, new solution methods for certain problems within these classes are developed, based mainly on the concepts of basis search and relaxation. It is also shown how mixed integer problems in which the number of constraints exceeds the number of continuous variables, and a variety of special problems, such as the plant location problem, can be very simply replaced by integer problems. This makes possible the direct solution of these problems by the existing group theoretic integer programming algorithms. (Author).

Integer Programming and Combinatorial Optimization
Springer Science & Business Media

This book constitutes the refereed proceedings of the 12th International Conference on Integer Programming and Combinatorial Optimization, IPCO 2007, held in Ithaca, NY, USA, in June 2007. Among the topics addressed in the 36 revised full papers are approximation algorithms, algorithmic game theory, computational biology, integer programming, polyhedral combinatorics, scheduling theory and scheduling algorithms, as well as semidefinite programs.

Electric Energy Systems Springer

This book is an elegant and rigorous presentation of integer programming, exposing the subject's mathematical depth and broad applicability. Special attention is given to the theory behind the algorithms used in state-of-the-art solvers. An abundance of concrete examples and exercises of both theoretical and real-world interest explore the wide range of applications and ramifications of the theory. Each chapter is accompanied by an expertly informed guide to the literature and special topics, rounding out the reader's understanding and serving as a gateway to deeper study. Key topics include: formulations polyhedral theory cutting planes decomposition enumeration semidefinite relaxations Written by renowned experts in integer programming and combinatorial optimization, *Integer Programming* is destined to become an essential text in the field.

Integer Programming and Related Areas Springer

Science & Business Media

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.

Mixed Integer Nonlinear Programming CRC Press

Management of logistics distribution networks is a challenging task. Decision-makers rely on logistics assistance systems that recommend actions to optimise the networks. These systems can be based on simheuristics to benefit from metaheuristics in exploring possible solutions and on simulation for modelling the networks. This book presents three approaches to recommend promising solutions to optimise the networks with fewer simulation runs. The first approach utilises information from the network to guide the search of metaheuristics. In this approach, domain-specific information is defined and

assigned to actions. The metaheuristic algorithm utilises this domain-specific information to find more-promising solutions. The second approach is reducing the number of possible solutions by grouping actions with respect to their domain-specific attributes. Here, the smaller solution space decreases the number of required simulation runs. The last approach looks for equivalent solutions that cause the same changes in the network. This approach aims to skip unnecessary evaluations and, thus, simulation effort.

Encyclopedia of Optimization North Holland
The field of Operations Research (OR) covers a wide range of mathematical topics. Because it is so broad, results and formulas relevant to the field are widely scattered in different texts and journals and can be hard to find. As the field continues to grow, OR practitioners and students

need a convenient, one-stop source for the results relevant to

Integer Programming Springer
Science & Business Media
SPREADSHEET MODELING AND DECISION ANALYSIS, Seventh Edition, provides instruction in the most commonly used management science techniques and shows how these tools can be implemented using Microsoft Office Excel 2013. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Chemical Production Scheduling John Wiley & Sons

Integer Programming John Wiley & Sons

Integer Programming Springer
Science & Business Media
The fields of integer programming and

combinatorial optimization continue to be areas of great vitality, with an ever increasing number of publications and journals appearing. A classified bibliography thus continues to be necessary and useful today, even more so than it did when the project, of which this is the fifth volume, was started in 1970 in the Institut für Ökonometrie und Operations Research of the University of Bonn. The pioneering first volume was compiled by Claus Kastning during the years 1970 - 1975 and appeared in 1976 as Volume 128 of the series Lecture Notes in Economics and Mathematical Systems published by the Springer Verlag. Work on the project was continued by Dirk Hausmann, Reinhardt Euler, and Rabe von Randow, and resulted in the publication of the second, third, and fourth volumes in 1978, 1982, and 1985 (Volumes 160, 197, and

243 of the above series). The present book constitutes the fifth volume of the bibliography and covers the period from autumn 1984 to the end of 1987. It contains 5864 new publications by 4480 authors and was compiled by Rabe von Randow. Its form is practically identical to that of the first four volumes, some additions having been made to the subject list. Oxford University Press on Demand

Many engineering, operations, and scientific applications include a mixture of discrete and continuous decision variables and nonlinear relationships involving the decision variables that have a pronounced effect on the set of feasible and optimal solutions. Mixed-integer nonlinear programming (MINLP) problems combine the numerical difficulties of handling nonlinear functions with the challenge of

optimizing in the context of nonconvex functions and discrete variables. MINLP is one of the most flexible modeling paradigms available for optimization; but because its scope is so broad, in the most general cases it is hopelessly intractable. Nonetheless, an expanding body of researchers and practitioners — including chemical engineers, operations researchers, industrial engineers, mechanical engineers, economists, statisticians, computer scientists, operations managers, and mathematical programmers — are interested in solving large-scale MINLP instances.

Integer and Combinatorial Optimization Springer Science & Business Media

In 1958, Ralph E. Gomory transformed the field of integer programming when he published a paper that described a cutting-plane algorithm for pure integer programs and announced that the

method could be refined to give a finite algorithm for integer programming. In 2008, to commemorate the anniversary of this seminal paper, a special workshop celebrating fifty years of integer programming was held in Aussois, France, as part of the 12th Combinatorial Optimization Workshop. It contains reprints of key historical articles and written versions of survey lectures on six of the hottest topics in the field by distinguished members of the integer programming community. Useful for anyone in mathematics, computer science and operations research, this book exposes mathematical optimization, specifically integer programming and combinatorial optimization, to a broad audience.