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Linear Programming with MATLAB - Michael C. Ferris 2007-01-01
A self-contained introduction to linear programming using MATLAB® software to elucidate the development of algorithms and theory. Exercises are included in each chapter, and additional information is provided in two appendices and an accompanying Web site. Only a basic knowledge of linear algebra and calculus is required.
Proceedings of the Thirty-ninth Annual ACM Symposium on Theory of Computing - ACM Special Interest Group for Algorithms and Computation Theory 2007

Container Terminals and Cargo Systems - Kap Hwan Kim 2007-08-06
This book presents new insights and successful solutions to the operational problems of automated container terminals and cargo systems. It comprises reports on the state of the art, applications of quantitative methods, as well as case studies and simulation results. Its contributions are written by leading experts from academia and business and address practitioners and researchers in logistics, transportation, and management.
Linear Programming - Robert J Vanderbei 2013-07-16
This Fourth Edition introduces the latest theory and applications in optimization. It emphasizes constrained optimization, beginning with a substantial treatment of linear programming and then proceeding to

convex analysis, network flows, integer programming, quadratic programming, and convex optimization. Readers will discover a host of practical business applications as well as non-business applications. Topics are clearly developed with many numerical examples worked out in detail. Specific examples and concrete algorithms precede more abstract topics. With its focus on solving practical problems, the book features free C programs to implement the major algorithms covered, including the two-phase simplex method, primal-dual simplex method, path-following interior-point method, and homogeneous self-dual methods. In addition, the author provides online JAVA applets that illustrate various pivot rules and variants of the simplex method, both for linear programming and for network flows. These C programs and JAVA tools can be found on the book's website. The website also includes new online instructional tools and exercises.
Interior Point Methods for Linear Optimization - Cornelis Roos 2006-02-08
The era of interior point methods (IPMs) was initiated by N. Karmarkar's 1984 paper, which triggered turbulent research and reshaped almost all areas of optimization theory and computational practice. This book offers comprehensive coverage of IPMs. It details the main results of more than a decade of IPM research. Numerous exercises are provided to aid in understanding the material.

Innovations in Information Systems for Business Functionality and Operations Management - Wang, John 2012-04-30
"This book offers the latest research in IS/IT applications related to business and operations management, with contributions in the form of case studies, methodologies, best practices, frameworks, and research"-- Provided by publisher.

Proceedings of the ...ACM Symposium on Theory of Computing - 2007

Linear Network Optimization - Dimitri P. Bertsekas 1991
Linear Network Optimization presents a thorough treatment of classical approaches to network problems such as shortest path, max-flow, assignment, transportation, and minimum cost flow problems.

Combined Traffic Signal Control and Traffic Assignment - Chungwon Lee 2005

Network Optimization - Dimitri P. Bertsekas 1998
An insightful, comprehensive, and up-to-date treatment of linear, nonlinear, and discrete/combinatorial network optimization problems, their applications, and their analytical and algorithmic methodology. It covers extensively theory, algorithms, and applications, and it aims to bridge the gap between linear and nonlinear network optimization on one hand, and integer/combinatorial network optimization on the other. It complements several of our books: Convex Optimization Theory (Athena Scientific, 2009), Convex Optimization Algorithms (Athena Scientific, 2015), Introduction to Linear Optimization (Athena Scientific, 1997), Nonlinear Programming (Athena Scientific, 1999), as well as our other book on the subject of network optimization Network Flows and Monotropic Optimization (Athena Scientific, 1998).

Hybrid Metaheuristics - Christian Blum 2016-05-23
This book explains the most prominent and some promising new, general techniques that combine metaheuristics with other optimization methods. A first introductory chapter reviews the basic principles of local search, prominent metaheuristics, and tree search, dynamic

programming, mixed integer linear programming, and constraint programming for combinatorial optimization purposes. The chapters that follow present five generally applicable hybridization strategies, with exemplary case studies on selected problems: incomplete solution representations and decoders; problem instance reduction; large neighborhood search; parallel non-independent construction of solutions within metaheuristics; and hybridization based on complete solution archives. The authors are among the leading researchers in the hybridization of metaheuristics with other techniques for optimization, and their work reflects the broad shift to problem-oriented rather than algorithm-oriented approaches, enabling faster and more effective implementation in real-life applications. This hybridization is not restricted to different variants of metaheuristics but includes, for example, the combination of mathematical programming, dynamic programming, or constraint programming with metaheuristics, reflecting cross-fertilization in fields such as optimization, algorithmics, mathematical modeling, operations research, statistics, and simulation. The book is a valuable introduction and reference for researchers and graduate students in these domains.

Handbook of Scheduling - Joseph Y-T. Leung 2004-04-27
Researchers in management, industrial engineering, operations, and computer science have intensely studied scheduling for more than 50 years, resulting in an astounding body of knowledge in this field. Handbook of Scheduling: Algorithms, Models, and Performance Analysis, the first handbook on scheduling, provides full coverage of the most re

Learning Structured Prediction Models - Ben Taskar 2004

Linear Programming and Network Flows - Mokhtar S. Bazaraa 1990
Table of contents

Network Flows and Monotropic Optimization - R. Tyrell Rockafellar 1999-06-01
A rigorous and comprehensive treatment of network flow theory and monotropic optimization by one of the world's most renowned applied mathematicians. This classic textbook covers extensively the duality

theory and the algorithms of linear and nonlinear network optimization optimization, and their significant extensions to monotropic programming (separable convex constrained optimization problems, including linear programs). It complements our other book on the subject of network optimization Network Optimization: Continuous and Discrete Models (Athena Scientific, 1998). Monotropic programming problems are characterized by a rich interplay between combinatorial structure and convexity properties. Rockafellar develops, for the first time, algorithms and a remarkably complete duality theory for these problems. Among its special features the book: (a) Treats in-depth the duality theory for linear and nonlinear network optimization (b) Uses a rigorous step-by-step approach to develop the principal network optimization algorithms (c) Covers the main algorithms for specialized network problems, such as max-flow, feasibility, assignment, and shortest path (d) Develops in detail the theory of monotropic programming, based on the author's highly acclaimed research (e) Contains many examples, illustrations, and exercises (f) Contains much new material not found in any other textbook

Introduction to Probability - Dimitri P. Bertsekas 2008-07-01
An intuitive, yet precise introduction to probability theory, stochastic processes, statistical inference, and probabilistic models used in science, engineering, economics, and related fields. This is the currently used textbook for an introductory probability course at the Massachusetts Institute of Technology, attended by a large number of undergraduate and graduate students, and for a leading online class on the subject. The book covers the fundamentals of probability theory (probabilistic models, discrete and continuous random variables, multiple random variables, and limit theorems), which are typically part of a first course on the subject. It also contains a number of more advanced topics, including transforms, sums of random variables, a fairly detailed introduction to Bernoulli, Poisson, and Markov processes, Bayesian inference, and an introduction to classical statistics. The book strikes a balance between simplicity in exposition and sophistication in analytical reasoning. Some of the more mathematically rigorous analysis is explained intuitively in the main text, and then developed in detail (at the level of advanced

calculus) in the numerous solved theoretical problems.

Essentials of Business Analytics - Bhimasankaram Pochiraju 2019-07-10
This comprehensive edited volume is the first of its kind, designed to serve as a textbook for long-duration business analytics programs. It can also be used as a guide to the field by practitioners. The book has contributions from experts in top universities and industry. The editors have taken extreme care to ensure continuity across the chapters. The material is organized into three parts: A) Tools, B) Models and C) Applications. In Part A, the tools used by business analysts are described in detail. In Part B, these tools are applied to construct models used to solve business problems. Part C contains detailed applications in various functional areas of business and several case studies. Supporting material can be found in the appendices that develop the pre-requisites for the main text. Every chapter has a business orientation. Typically, each chapter begins with the description of business problems that are transformed into data questions; and methodology is developed to solve these questions. Data analysis is conducted using widely used software, the output and results are clearly explained at each stage of development. These are finally transformed into a business solution. The companion website provides examples, data sets and sample code for each chapter.

A First Course in Combinatorial Optimization - Jon Lee 2004-02-09
A First Course in Combinatorial Optimization is a text for a one-semester introductory graduate-level course for students of operations research, mathematics, and computer science. It is a self-contained treatment of the subject, requiring only some mathematical maturity. Topics include: linear and integer programming, polytopes, matroids and matroid optimization, shortest paths, and network flows. Central to the exposition is the polyhedral viewpoint, which is the key principle underlying the successful integer-programming approach to combinatorial-optimization problems. Another key unifying topic is matroids. The author does not dwell on data structures and implementation details, preferring to focus on the key mathematical ideas that lead to useful models and algorithms.

Problems and exercises are included throughout as well as references for further study.

Probability and Algorithms - National Research Council 1992-02-01 Some of the hardest computational problems have been successfully attacked through the use of probabilistic algorithms, which have an element of randomness to them. Concepts from the field of probability are also increasingly useful in analyzing the performance of algorithms, broadening our understanding beyond that provided by the worst-case or average-case analyses. This book surveys both of these emerging areas on the interface of the mathematical sciences and computer science. It is designed to attract new researchers to this area and provide them with enough background to begin explorations of their own.

*OPERATIONS RESEARCH : PRINCIPLES AND APPLICATIONS -
SRINIVASAN, G. 2017-06-01*
This text, now in the Third Edition, aims to provide students with a clear, well-structured and comprehensive treatment of the theory and applications of operations research. The methodology used is to first introduce the students to the fundamental concepts through numerical illustrations and then explain the underlying theory, wherever required. Inclusion of case studies in the existing chapters makes learning easier and more effective. The book introduces the readers to various models of Operations Research (OR), such as transportation model, assignment model, inventory models, queueing theory and integer programming models. Various techniques to solve OR problems' faced by managers are also discussed. Separate chapters are devoted to Linear Programming, Dynamic Programming and Quadratic Programming which greatly help in the decision-making process. The text facilitates easy comprehension of topics by the students due to inclusion of: • Examples and situations from the Indian context. • Numerous exercise problems arranged in a graded manner. • A large number of illustrative examples. The text is primarily intended for the postgraduate students of management, computer applications, commerce, mathematics and statistics. Besides, the undergraduate students of mechanical engineering and industrial engineering will find this book extremely useful. In addition, this text can

also be used as a reference by OR analysts and operations managers. NEW TO THE THIRD EDITION • Includes two new chapters: – Chapter 14: Project Management—PERT and CPM – Chapter 15: Miscellaneous Topics (Game Theory, Sequencing and Scheduling, Simulation, and Replacement Models) • Incorporates more examples in the existing chapters to illustrate new models, algorithms and concepts • Provides short questions and additional numerical problems for practice in each chapter

Communications, Signal Processing, and Systems - Qilian Liang 2019-05-04
This book brings together papers from the 2018 International Conference on Communications, Signal Processing, and Systems, which was held in Dalian, China on July 14–16, 2018. Presenting the latest developments and discussing the interactions and links between these multidisciplinary fields, the book spans topics ranging from communications, signal processing and systems. It is aimed at undergraduate and graduate electrical engineering, computer science and mathematics students, researchers and engineers from academia and industry as well as government employees.

Convex Optimization Theory - Dimitri Bertsekas 2009-06-01
An insightful, concise, and rigorous treatment of the basic theory of convex sets and functions in finite dimensions, and the analytical/geometrical foundations of convex optimization and duality theory. Convexity theory is first developed in a simple accessible manner, using easily visualized proofs. Then the focus shifts to a transparent geometrical line of analysis to develop the fundamental duality between descriptions of convex functions in terms of points, and in terms of hyperplanes. Finally, convexity theory and abstract duality are applied to problems of constrained optimization, Fenchel and conic duality, and game theory to develop the sharpest possible duality results within a highly visual geometric framework. This on-line version of the book, includes an extensive set of theoretical problems with detailed high-quality solutions, which significantly extend the range and value of the book. The book may be used as a text for a theoretical convex

optimization course; the author has taught several variants of such a course at MIT and elsewhere over the last ten years. It may also be used as a supplementary source for nonlinear programming classes, and as a theoretical foundation for classes focused on convex optimization models (rather than theory). It is an excellent supplement to several of our books: Convex Optimization Algorithms (Athena Scientific, 2015), Nonlinear Programming (Athena Scientific, 2017), Network Optimization(Athena Scientific, 1998), Introduction to Linear Optimization (Athena Scientific, 1997), and Network Flows and Monotropic Optimization (Athena Scientific, 1998).

Reinforcement Learning and Optimal Control - Dimitri Bertsekas 2019-07-01

This book considers large and challenging multistage decision problems, which can be solved in principle by dynamic programming (DP), but their exact solution is computationally intractable. We discuss solution methods that rely on approximations to produce suboptimal policies with adequate performance. These methods are collectively known by several essentially equivalent names: reinforcement learning, approximate dynamic programming, neuro-dynamic programming. They have been at the forefront of research for the last 25 years, and they underlie, among others, the recent impressive successes of self-learning in the context of games such as chess and Go. Our subject has benefited greatly from the interplay of ideas from optimal control and from artificial intelligence, as it relates to reinforcement learning and simulation-based neural network methods. One of the aims of the book is to explore the common boundary between these two fields and to form a bridge that is accessible by workers with background in either field. Another aim is to organize coherently the broad mosaic of methods that have proved successful in practice while having a solid theoretical and/or logical foundation. This may help researchers and practitioners to find their way through the maze of competing ideas that constitute the current state of the art. This book relates to several of our other books: Neuro-Dynamic Programming (Athena Scientific, 1996), Dynamic Programming and Optimal Control (4th edition, Athena Scientific, 2017), Abstract Dynamic Programming (2nd edition, Athena Scientific, 2018), and Nonlinear Programming (Athena Scientific, 2016). However, the mathematical style of this book is somewhat different. While we provide a rigorous, albeit short, mathematical account of the theory of finite and infinite horizon dynamic programming, and some fundamental approximation methods, we rely more on intuitive explanations and less on proof-based insights. Moreover, our mathematical requirements are quite modest: calculus, a minimal use of matrix-vector algebra, and elementary probability (mathematically complicated arguments involving laws of large numbers and stochastic convergence are bypassed in favor of intuitive explanations). The book illustrates the methodology with many examples and illustrations, and uses a gradual expository approach, which proceeds along four directions: (a) From exact DP to approximate DP: We first discuss exact DP algorithms, explain why they may be difficult to implement, and then use them as the basis for approximations. (b) From finite horizon to infinite horizon problems: We first discuss finite horizon exact and approximate DP methodologies, which are intuitive and mathematically simple, and then progress to infinite horizon problems. (c) From deterministic to stochastic models: We often discuss separately deterministic and stochastic problems, since deterministic problems are simpler and offer special advantages for some of our methods. (d) From model-based to model-free implementations: We first discuss model-based implementations, and then we identify schemes that can be appropriately modified to work with a simulator. The book is related and supplemented by the companion research monograph Rollout, Policy Iteration, and Distributed Reinforcement Learning (Athena Scientific, 2020), which focuses more closely on several topics related to rollout, approximate policy iteration, multiagent problems, discrete and Bayesian optimization, and distributed computation, which are either discussed in less detail or not covered at all in the present book. The author's website contains class notes, and a series of videolectures and slides from a 2021 course at ASU, which address a selection of topics from both books.

Advances in Spatial and Temporal Databases - Claudia Bauzer Medeiros 2005-07-27

The refereed proceedings of the 9th International Symposium on Spatial and Temporal Databases, SSTD 2005, held in Angra dos Reis, Brazil in August 2005. The 24 revised full papers were thoroughly reviewed and selected from a total of 77 submissions. The book offers topical sections on query optimization and simulation, advanced query processing, spatial/temporal data streams, indexing schemes and structures, novel applications and real systems, moving objects and mobile environments.
Introduction to Linear Optimization - Dimitris Bertsimas 1997-01-01

Experimental Algorithms - Evripidis Bampis 2015-06-19
This book constitutes the refereed proceedings of the 14th International Symposium on Experimental Algorithms, SEA 2015, held in Paris, France, in June/July 2015. The 30 revised full papers presented were carefully reviewed and selected from 76 submissions. The main theme of the symposium is the role of experimentation and of algorithm engineering techniques in the design and evaluation of algorithms and data structures. The papers are grouped in topical sections on data structures, graph problems, combinatorial optimization, scheduling and allocation, and transportation networks.
Door Assignment and Sequencing Problems in Crossdocks and Container Terminals - Hector J. Carlo 2006

Introduction to Probability - Dimitri P. Bertsekas 2002

Operations Research and Health Care - Margaret L. Brandeau 2006-04-05
In both rich and poor nations, public resources for health care are inadequate to meet demand. Policy makers and health care providers must determine how to provide the most effective health care to citizens using the limited resources that are available. This chapter describes current and future challenges in the delivery of health care, and outlines the role that operations research (OR) models can play in helping to solve those problems. The chapter concludes with an overview of this book – its intended audience, the areas covered, and a description of the

subsequent chapters. KEY WORDS Health care delivery, Health care planning HEALTH CARE DELIVERY: PROBLEMS AND CHALLENGES 3 1.1 WORLDWIDE HEALTH: THE PAST 50 YEARS Human health has improved significantly in the last 50 years. In 1950, global life expectancy was 46 years [1]. That figure rose to 61 years by 1980 and to 67 years by 1998 [2]. Much of these gains occurred in low- and middle-income countries, and were due in large part to improved nutrition and sanitation, medical innovations, and improvements in public health infrastructure.

The Design of Approximation Algorithms - David P. Williamson 2011-04-26
Discrete optimization problems are everywhere, from traditional operations research planning (scheduling, facility location and network design); to computer science databases; to advertising issues in viral marketing. Yet most such problems are NP-hard; unless P = NP, there are no efficient algorithms to find optimal solutions. This book shows how to design approximation algorithms: efficient algorithms that find provably near-optimal solutions. The book is organized around central algorithmic techniques for designing approximation algorithms, including greedy and local search algorithms, dynamic programming, linear and semidefinite programming, and randomization. Each chapter in the first section is devoted to a single algorithmic technique applied to several different problems, with more sophisticated treatment in the second section. The book also covers methods for proving that optimization problems are hard to approximate. Designed as a textbook for graduate-level algorithm courses, it will also serve as a reference for researchers interested in the heuristic solution of discrete optimization problems.
Convex Optimization - Stephen Boyd 2004-03-08
A comprehensive introduction to the tools, techniques and applications of convex optimization.
Linguistic Structure Prediction - Noah A. Smith 2022-05-31
A major part of natural language processing now depends on the use of text data to build linguistic analyzers. We consider statistical,

computational approaches to modeling linguistic structure. We seek to unify across many approaches and many kinds of linguistic structures. Assuming a basic understanding of natural language processing and/or machine learning, we seek to bridge the gap between the two fields. Approaches to decoding (i.e., carrying out linguistic structure prediction) and supervised and unsupervised learning of models that predict discrete structures as outputs are the focus. We also survey natural language processing problems to which these methods are being applied, and we address related topics in probabilistic inference, optimization, and experimental methodology. Table of Contents: Representations and Linguistic Data / Decoding: Making Predictions / Learning Structure from Annotated Data / Learning Structure from Incomplete Data / Beyond Decoding: Inference

Defense Transportation: Algorithms, Models and Applications for the 21st Century - Robert T. Brigantic 2004-07-22
This book contains papers divided into three general sections according to the title of this text: algorithms, models, and applications. The first section on algorithms contains papers that are theoretical in nature or contain new techniques that relate to Defense Transportation System (DTS) processes. A sampling of the papers contained in this section deals with group theoretic "tabu" search techniques, shortest path sailing distance algorithms, and strategic airlift model validation methods. The second section contains papers on various transportation models used throughout the DoD and transportation industry, as well as some newly developed transportation modelling methods that may eventually find their way into larger scale transportation models. A review of the major strategic mobility models is also contained in this section. The third section contains papers on various transportation applications that have been used to support various DTS studies and analyses. This section also contains a diverse set of topics, with articles ranging from a paper on North Atlantic Treaty Organization (NATO) strategic lift requirements to an analysis paper on theater reception, staging, onward movement, and integration. · Preface by General John W. Handy, Commander, United States Transportation Command · Focus on land, sea, and air transportation models and methods · Manuscripts written by analysts and researchers active in the field and directly supporting the United States Defense Transportation System · Research methods were instrumental in defining the in-place DTS that so efficiently deployed forces for Operation Enduring Freedom and Operation Iraqi Freedom

Malware Diffusion Models for Modern Complex Networks - Vasileios Karyotis 2016-02-02
Malware Diffusion Models for Wireless Complex Networks: Theory and Applications provides a timely update on malicious software (malware), a serious concern for all types of network users, from laymen to experienced administrators. As the proliferation of portable devices, namely smartphones and tablets, and their increased capabilities, has propelled the intensity of malware spreading and increased its consequences in social life and the global economy, this book provides the theoretical aspect of malware dissemination, also presenting modeling approaches that describe the behavior and dynamics of malware diffusion in various types of wireless complex networks. Sections include a systematic introduction to malware diffusion processes in computer and communications networks, an analysis of the latest state-of-the-art malware diffusion modeling frameworks, such as queuing-based techniques, calculus of variations based techniques, and game theory based techniques, also demonstrating how the methodologies can be used for modeling in more general applications and practical scenarios. Presents a timely update on malicious software (malware), a serious concern for all types of network users, from laymen to experienced administrators Systematically introduces malware diffusion processes, providing the relevant mathematical background Discusses malware modeling frameworks and how to apply them to complex wireless networks Provides guidelines and directions for extending the corresponding theories in other application domains, demonstrating such possibility by using application models in information dissemination scenarios

Understanding and Using Linear Programming - Jiri Matousek 2007-07-04

The book is an introductory textbook mainly for students of computer science and mathematics. Our guiding phrase is "what every theoretical computer scientist should know about linear programming". A major focus is on applications of linear programming, both in practice and in theory. The book is concise, but at the same time, the main results are covered with complete proofs and in sufficient detail, ready for presentation in class. The book does not require more prerequisites than basic linear algebra, which is summarized in an appendix. One of its main goals is to help the reader to see linear programming "behind the scenes".

How the World Computes - Barry S. Cooper 2012-05-28
This book constitutes the refereed proceedings of the Turing Centenary Conference and the 8th Conference on Computability in Europe, CiE 2012, held in Cambridge, UK, in June 2012. The 53 revised papers presented together with 6 invited lectures were carefully reviewed and selected with an acceptance rate of under 29,8%. The CiE 2012 Turing Centenary Conference will be remembered as a historic event in the continuing development of the powerful explanatory role of computability across a wide spectrum of research areas. The papers presented at CiE 2012 represent the best of current research in the area, and forms a fitting tribute to the short but brilliant trajectory of Alan Mathison Turing. Both the conference series and the association promote the development of computability-related science, ranging over mathematics, computer science and applications in various natural and engineering sciences such as physics and biology, and also including the promotion of related non-scientific fields such as philosophy and history of computing.

Foundations of Integer Programming - Harvey M. Salkin 1989

Transportation and Traffic Theory - Jean-Baptiste Lesort 1996
Since the first ISTTT in 1959, these triennial symposia have become established as the premier series of conferences in transportation science. ISTTT 13 continues an impressive tradition of dissemination of new ideas on theoretical aspects of transportation science. The scope of the proceedings includes accident analysis, traffic modelling, traffic assignment, public transportation, logistics, and freight transportation. The main emphasis is on road transport, but rail and multimodal transport are also addressed. Prior to acceptance, the articles presented here underwent a rigorous refereeing process. The resulting collection is a timely and important volume of current research, and the list of contributors includes many of the most eminent researchers in the field.

Machine Learning Under a Modern Optimization Lens - Dimitris Bertsimas 2019

Linear and Integer Optimization - Gerard Sierksma 2015-05-01
Presenting a strong and clear relationship between theory and practice, Linear and Integer Optimization: Theory and Practice is divided into two main parts. The first covers the theory of linear and integer optimization, including both basic and advanced topics. Dantzig's simplex algorithm, duality, sensitivity analysis, integer optimization models