

Practical Methods Of Optimization

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Optimization Principles - Narayan S. Rau 2003-09-22

Today's need-to-know optimization techniques, at your fingertips The use of optimization methods is familiar territory to academicians and researchers. Yet, in today's world of deregulated electricity markets, it's just as important for electric power professionals to have a solid grasp of these increasingly relied upon techniques. Making those techniques readily accessible is the hallmark of *Optimization Principles: Practical Applications to the Operation and Markets of the Electric Power Industry*. With deregulation, market rules and economic principles dictate that commodities be priced at the marginal value of their production. As a result, it's necessary to work with ever-more-sophisticated algorithms using optimization techniques-either for the optimal dispatch of the system itself, or for pricing commodities and the settlement of markets. Succeeding in this new environment takes a good understanding of methods that involve linear and nonlinear optimization, including optimal power flow, locational marginal prices for energy, and the auction of hedging instruments. In its comprehensive, skill-building overview of optimization techniques, *Optimization Principles* puts you on the same footing with algorithm-savvy software developers. Starting with a helpful look at matrix algebra fundamentals, this just-in-time reference covers: * Deregulated electricity markets: terminology and acronyms * Solution of equations, inequalities, and linear programs * Unconstrained and constrained nonlinear optimization * Applications to practical problems addressing system dispatch, market design, and material procurement * And related topics As an aid to the uninitiated, appendices provide a brief description of basic principles of electricity, and the development of network equations. *Optimization Principles* allows you to learn optimization methods at your own pace using Microsoft Excel or MATLAB software, and it includes an FTP web site with downloadable Excel spreadsheets and problems. After mastering these practical applications, you can then refer to chapters that highlight the theoretical background of the algorithms and resulting solutions. The book also includes a Web site with downloadable files of all example problems and solved problems. Ideal for engineers, other electric power professionals, and advanced engineering students, *Optimization Principles* demystifies the electric power industry under deregulation-and delivers a complete, learn-as-you-go tutorial of optimization techniques that no other resource can match.

Fundamentals of Optimization - Mark French 2018-05-02

This textbook is for readers new or returning to the practice of optimization whose interest in the subject may relate to a wide range of products and processes. Rooted in the idea of "minimum principles," the book introduces the reader to the analytical tools needed to apply optimization practices to an array of single- and multi-variable problems. While comprehensive and rigorous, the treatment requires no more than a basic understanding of technical math and how to display mathematical results visually. It presents a group of simple, robust methods and illustrates their use in clearly-defined examples. Distinct from the majority of optimization books on the market intended for a mathematically sophisticated audience who might want to develop their own new methods of optimization or do research in the field, this volume fills the void in instructional material for those who need to understand the basic ideas. The text emerged from a set of applications-driven lecture notes used in optimization courses the author has taught for over 25 years. The book is class-tested and refined based on student feedback, devoid of unnecessary abstraction, and ideal for students and practitioners from across the spectrum of engineering disciplines. It provides context through practical examples and sections describing commercial application of optimization ideas, such as how containerized freight and changing sea routes have been used to continually reduce the cost of moving freight across oceans. It also features 2D and 3D plots and an appendix illustrating the most widely used MATLAB optimization functions.

Convex Optimization - Stephen Boyd 2004-03-08

A comprehensive introduction to the tools, techniques and applications of convex optimization.

Optimization Modelling - Ruhul Amin Sarker 2007-10-15

Although a useful and important tool, the potential of mathematical modelling for decision making is often neglected. Considered an art by many and weird science by some, modelling is not as widely appreciated in problem solving and decision making as perhaps it should be. And although many operations research, management science, and optimization books touch on modelling techniques, the short shrift they usually get in coverage is reflected in their minimal application to problems in the real world. Illustrating the important influence of modelling on the decision making process, *Optimization Modelling: A Practical Approach* helps you come to grips with a wide range of modelling techniques. Highlighting the modelling aspects of optimization problems, the authors present the techniques in a clear and straightforward manner, illustrated by examples. They provide and analyze the formulation and modelling of a number of well-known theoretical and practical problems and touch on solution approaches. The book demonstrates the use of optimization packages through the solution of various mathematical models and provides an interpretation of some of those solutions. It presents the practical aspects and difficulties of problem solving and solution implementation and studies a number of practical problems. The book also discusses the use of available software packages in solving optimization models without going into difficult mathematical details and complex solution methodologies. The emphasis on modelling techniques rather than solution algorithms sets this book apart. It is a single source for a wide range of methods, classic theoretical and practical problems, data collection and input preparation, the use of different optimization software, and practical issues of modelling, model solving, and implementation. The authors draw directly from their experience to provide lessons learned when applying modelling techniques to practical problem solving and implementation difficulties.

The Basics of Practical Optimization - Adam B. Levy 2009-06-25

Introduces undergraduate students to optimization and its applications using relevant and realistic problems.

Practical Augmented Lagrangian Methods for Constrained Optimization - Ernesto G. Birgin 2014-04-30

This book focuses on Augmented Lagrangian techniques for solving practical constrained optimization problems. The authors rigorously delineate mathematical convergence theory based on sequential optimality conditions and novel constraint qualifications. They also orient the book to practitioners by giving priority to results that provide insight on the practical behavior of algorithms and by providing geometrical and algorithmic interpretations of every mathematical result, and they fully describe a freely available computational package for constrained optimization and illustrate its usefulness with applications.

Practical Optimization - Philip E. Gill 2019-12-16

In the intervening years since this book was published in 1981, the field of optimization has been exceptionally lively. This fertility has involved not only progress in theory, but also faster numerical algorithms and extensions into unexpected or previously unknown areas such as semidefinite programming. Despite these changes, many of the important principles and much of the intuition can be found in this Classics version of *Practical Optimization*. This book provides model algorithms and pseudocode, useful tools for users who prefer to write their own code as well as for those who want to understand externally provided code. It presents algorithms in a step-by-step format, revealing the overall structure of the underlying procedures and thereby allowing a high-level perspective on the fundamental differences. And it contains a wealth of techniques and strategies that are well suited for optimization in the twenty-first century, and particularly in the now-flourishing fields

of data science, "big data," and machine learning. Practical Optimization is appropriate for advanced undergraduates, graduate students, and researchers interested in methods for solving optimization problems. *Practical Optimization Methods* - M. Asghar Bhatti 2012-12-06 This introductory textbook adopts a practical and intuitive approach, rather than emphasizing mathematical rigor. Computationally oriented books in this area generally present algorithms alone, and expect readers to perform computations by hand, and are often written in traditional computer languages, such as Basic, Fortran or Pascal. This book, on the other hand, is the first text to use Mathematica to develop a thorough understanding of optimization algorithms, fully exploiting Mathematica's symbolic, numerical and graphic capabilities.

Nonlinear Optimization - H. A. Eiselt 2019-11-09

This book provides a comprehensive introduction to nonlinear programming, featuring a broad range of applications and solution methods in the field of continuous optimization. It begins with a summary of classical results on unconstrained optimization, followed by a wealth of applications from a diverse mix of fields, e.g. location analysis, traffic planning, and water quality management, to name but a few. In turn, the book presents a formal description of optimality conditions, followed by an in-depth discussion of the main solution techniques. Each method is formally described, and then fully solved using a numerical example.

Numerical Optimization - Jorge Nocedal 2006-12-11

Optimization is an important tool used in decision science and for the analysis of physical systems used in engineering. One can trace its roots to the Calculus of Variations and the work of Euler and Lagrange. This natural and reasonable approach to mathematical programming covers numerical methods for finite-dimensional optimization problems. It begins with very simple ideas progressing through more complicated concepts, concentrating on methods for both unconstrained and constrained optimization.

Engineering Optimization - G. V. Reklaitis 1983

A basic text for engineering students and practicing engineers dealing with design problems in all engineering disciplines. Optimization algorithms are developed through illustrative examples. Includes numerical results on the efficiencies of various algorithms, comparison of constrained-optimization methods, and strategies for optimization studies. Also includes several actual case studies.

Optimization Methods - Marco Cavazzuti 2012-09-11

This book is about optimization techniques and is subdivided into two parts. In the first part a wide overview on optimization theory is presented. Optimization is presented as being composed of five topics, namely: design of experiment, response surface modeling, deterministic optimization, stochastic optimization, and robust engineering design. Each chapter, after presenting the main techniques for each part, draws application oriented conclusions including didactic examples. In the second part some applications are presented to guide the reader through the process of setting up a few optimization exercises, analyzing critically the choices which are made step by step, and showing how the different topics that constitute the optimization theory can be used jointly in an optimization process. The applications which are presented are mainly in the field of thermodynamics and fluid dynamics due to the author's background.

Practical Methods of Optimization - R. Fletcher 2000-07-26

Fully describes optimization methods that are currently most valuable in solving real-life problems. Since optimization has applications in almost every branch of science and technology, the text emphasizes their practical aspects in conjunction with the heuristics useful in making them perform more reliably and efficiently. To this end, it presents comparative numerical studies to give readers a feel for possible applications and to illustrate the problems in assessing evidence. Also provides theoretical background which provides insights into how methods are derived. This edition offers revised coverage of basic theory and standard techniques, with updated discussions of line search methods, Newton and quasi-Newton methods, and conjugate direction methods, as well as a comprehensive treatment of restricted step or trust region methods not commonly found in the literature. Also includes recent developments in hybrid methods for nonlinear least squares; an extended discussion of linear programming, with new methods for stable updating of LU factors; and a completely new section on network programming. Chapters include computer subroutines, worked examples, and study questions.

Practical Methods of Optimization - R. Fletcher 1987

Fully describes optimization methods that are currently most valuable in

solving real-life problems. Since optimization has applications in almost every branch of science and technology, the text emphasizes their practical aspects in conjunction with the heuristics useful in making them perform more reliably and efficiently. To this end, it presents comparative numerical studies to give readers a feel for possible applications and to illustrate the problems in assessing evidence. Also provides theoretical background which provides insights into how methods are derived. This edition offers revised coverage of basic theory and standard techniques, with updated discussions of line search methods, Newton and quasi-Newton methods, and conjugate direction methods, as well as a comprehensive treatment of restricted step or trust region methods not commonly found in the literature. Also includes recent developments in hybrid methods for nonlinear least squares; an extended discussion of linear programming, with new methods for stable updating of LU factors; and a completely new section on network programming. Chapters include computer subroutines, worked examples, and study questions.

Artificial Intelligence Methods for Optimization of the Software Testing Process - Sahar Tahvili 2022-08-05

Artificial Intelligence Methods for Optimization of the Software Testing Process: With Practical Examples and Exercises presents different AI-based solutions for overcoming the uncertainty found in many initial testing problems. The concept of intelligent decision making is presented as a multi-criteria, multi-objective undertaking. The book provides guidelines on how to manage diverse types of uncertainty with intelligent decision-making that can help subject matter experts in many industries improve various processes in a more efficient way. As the number of required test cases for testing a product can be large (in industry more than 10,000 test cases are usually created). Executing all these test cases without any particular order can impact the results of the test execution, hence this book fills the need for a comprehensive resource on the topics on the how's, what's and whys. To learn more about Elsevier's Series, Uncertainty, Computational Techniques and Decision Intelligence, please visit this link:

<https://www.elsevier.com/books-and-journals/book-series/uncertainty-computational-techniques-and-decision-intelligence> Presents one of the first empirical studies in the field, contrasting theoretical assumptions on innovations in a real industrial environment with a large set of use cases from developed and developing testing processes at various large industries Explores specific comparative methodologies, focusing on developed and developing AI-based solutions Serves as a guideline for conducting industrial research in the artificial intelligence and software testing domain Explains all proposed solutions through real industrial case studies

Practical Mathematical Optimization - Jan A Snyman 2018-05-02

This book presents basic optimization principles and gradient-based algorithms to a general audience, in a brief and easy-to-read form. It enables professionals to apply optimization theory to engineering, physics, chemistry, or business economics.

Practical Methods of Optimization - R. Fletcher 2013-06-06

Fully describes optimization methods that are currently most valuable in solving real-life problems. Since optimization has applications in almost every branch of science and technology, the text emphasizes their practical aspects in conjunction with the heuristics useful in making them perform more reliably and efficiently. To this end, it presents comparative numerical studies to give readers a feel for possible applications and to illustrate the problems in assessing evidence. Also provides theoretical background which provides insights into how methods are derived. This edition offers revised coverage of basic theory and standard techniques, with updated discussions of line search methods, Newton and quasi-Newton methods, and conjugate direction methods, as well as a comprehensive treatment of restricted step or trust region methods not commonly found in the literature. Also includes recent developments in hybrid methods for nonlinear least squares; an extended discussion of linear programming, with new methods for stable updating of LU factors; and a completely new section on network programming. Chapters include computer subroutines, worked examples, and study questions.

Facility Layout - Miguel F. Anjos 2021-04-24

This book presents a structured approach to develop mathematical optimization formulations for several variants of facility layout. The range of layout problems covered includes row layouts, floor layouts, multi-floor layouts, and dynamic layouts. The optimization techniques used to formulate the problems are primarily mixed-integer linear programming, second-order conic programming, and semidefinite

programming. The book also covers important practical considerations for solving the formulations. The breadth of approaches presented help the reader to learn how to formulate a variety of problems using mathematical optimization techniques. The book also illustrates the use of layout formulations in selected engineering applications, including manufacturing, building design, automotive, and hospital layout.

Practical Optimization - Andreas Antoniou 2007-03-12

Practical Optimization: Algorithms and Engineering Applications is a hands-on treatment of the subject of optimization. A comprehensive set of problems and exercises makes the book suitable for use in one or two semesters of a first-year graduate course or an advanced undergraduate course. Each half of the book contains a full semester's worth of complementary yet stand-alone material. The practical orientation of the topics chosen and a wealth of useful examples also make the book suitable for practitioners in the field.

Numerical Optimization - Joseph-Frédéric Bonnans 2013-03-14

This book starts with illustrations of the ubiquitous character of optimization, and describes numerical algorithms in a tutorial way. It covers fundamental algorithms as well as more specialized and advanced topics for unconstrained and constrained problems. This new edition contains computational exercises in the form of case studies which help understanding optimization methods beyond their theoretical description when coming to actual implementation.

Trust Region Methods - A. R. Conn 2000-01-01

Mathematics of Computing -- General.

Advances in Optimization and Linear Programming - Ivan Stanimirović 2022-01-27

This new volume provides the information needed to understand the simplex method, the revised simplex method, dual simplex method, and more for solving linear programming problems. Following a logical order, the book first gives a mathematical model of the linear programming and describes the usual assumptions under which the problem is solved. It gives a brief description of classic algorithms for solving linear programming problems as well as some theoretical results. It goes on to explain the definitions and solutions of linear programming problems, outlining the simplest geometric methods and showing how they can be implemented. Practical examples are included along the way. The book concludes with a discussion of multi-criteria decision-making methods. Advances in Optimization and Linear Programming is a highly useful guide to linear programming for professors and students in optimization and linear programming.

Practical Optimization with MATLAB - Mircea Ancău 2019-10-03

This easy-to-follow guide provides academics and industrial engineers with a state-of-the-art numerical approach to the most frequent technical and economical optimization methods. In an engaging manner, it provides the reader with not only a systematic and comprehensive study, but also with necessary and directly implementable code written in the versatile and readily available platform Matlab. The book offers optimization methods for univariate and multivariate constrained or unconstrained functions, general optimization methods and multicriteria optimization methods; provides intuitively, step-by-step explained sample Matlab code, that can be easily adjusted to meet individual requirements; and uses a clear, concise presentation style, which will be suited to readers even without a programming background, as well as to students preparing for examinations in optimization methods.

Matrix, Numerical, and Optimization Methods in Science and Engineering - Kevin W. Cassel 2021-03-04

Address vector and matrix methods necessary in numerical methods and optimization of linear systems in engineering with this unified text.

Treats the mathematical models that describe and predict the evolution of our processes and systems, and the numerical methods required to obtain approximate solutions. Explores the dynamical systems theory used to describe and characterize system behaviour, alongside the techniques used to optimize their performance. Integrates and unifies matrix and eigenfunction methods with their applications in numerical and optimization methods. Consolidating, generalizing, and unifying these topics into a single coherent subject, this practical resource is suitable for advanced undergraduate students and graduate students in engineering, physical sciences, and applied mathematics.

Interior Point Techniques in Optimization - B. Jansen 2013-03-14

Operations research and mathematical programming would not be as advanced today without the many advances in interior point methods during the last decade. These methods can now solve very efficiently and robustly large scale linear, nonlinear and combinatorial optimization problems that arise in various practical applications. The main ideas

underlying interior point methods have influenced virtually all areas of mathematical programming including: analyzing and solving linear and nonlinear programming problems, sensitivity analysis, complexity analysis, the analysis of Newton's method, decomposition methods, polynomial approximation for combinatorial problems etc. This book covers the implications of interior techniques for the entire field of mathematical programming, bringing together many results in a uniform and coherent way. For the topics mentioned above the book provides theoretical as well as computational results, explains the intuition behind the main ideas, gives examples as well as proofs, and contains an extensive up-to-date bibliography. Audience: The book is intended for students, researchers and practitioners with a background in operations research, mathematics, mathematical programming, or statistics.

Optimization Theory and Methods - Wenyu Sun 2006-08-06

Optimization Theory and Methods can be used as a textbook for an optimization course for graduates and senior undergraduates. It is the result of the author's teaching and research over the past decade. It describes optimization theory and several powerful methods. For most methods, the book discusses an idea's motivation, studies the derivation, establishes the global and local convergence, describes algorithmic steps, and discusses the numerical performance.

Algorithms for Optimization - Mykel J. Kochenderfer 2019-03-12

A comprehensive introduction to optimization with a focus on practical algorithms for the design of engineering systems. This book offers a comprehensive introduction to optimization with a focus on practical algorithms. The book approaches optimization from an engineering perspective, where the objective is to design a system that optimizes a set of metrics subject to constraints. Readers will learn about computational approaches for a range of challenges, including searching high-dimensional spaces, handling problems where there are multiple competing objectives, and accommodating uncertainty in the metrics. Figures, examples, and exercises convey the intuition behind the mathematical approaches. The text provides concrete implementations in the Julia programming language. Topics covered include derivatives and their generalization to multiple dimensions; local descent and first- and second-order methods that inform local descent; stochastic methods, which introduce randomness into the optimization process; linear constrained optimization, when both the objective function and the constraints are linear; surrogate models, probabilistic surrogate models, and using probabilistic surrogate models to guide optimization; optimization under uncertainty; uncertainty propagation; expression optimization; and multidisciplinary design optimization. Appendixes offer an introduction to the Julia language, test functions for evaluating algorithm performance, and mathematical concepts used in the derivation and analysis of the optimization methods discussed in the text. The book can be used by advanced undergraduates and graduate students in mathematics, statistics, computer science, any engineering field, (including electrical engineering and aerospace engineering), and operations research, and as a reference for professionals.

Practical Methods of Optimization - Roger Fletcher 1986

Numerical Methods for Unconstrained Optimization and Nonlinear Equations - J. E. Dennis, Jr. 1996-12-01

This book has become the standard for a complete, state-of-the-art description of the methods for unconstrained optimization and systems of nonlinear equations. Originally published in 1983, it provides information needed to understand both the theory and the practice of these methods and provides pseudocode for the problems. The algorithms covered are all based on Newton's method or "quasi-Newton" methods, and the heart of the book is the material on computational methods for multidimensional unconstrained optimization and nonlinear equation problems. The republication of this book by SIAM is driven by a continuing demand for specific and sound advice on how to solve real problems. The level of presentation is consistent throughout, with a good mix of examples and theory, making it a valuable text at both the graduate and undergraduate level. It has been praised as excellent for courses with approximately the same name as the book title and would also be useful as a supplemental text for a nonlinear programming or a numerical analysis course. Many exercises are provided to illustrate and develop the ideas in the text. A large appendix provides a mechanism for class projects and a reference for readers who want the details of the algorithms. Practitioners may use this book for self-study and reference. For complete understanding, readers should have a background in calculus and linear algebra. The book does contain background material in multivariable calculus and numerical linear algebra.

Practical Methods for Aircraft and Rotorcraft Flight Control Design - Mark Brian Tischler 2017

Numerical Methods and Optimization - Jean-Pierre Corriou 2022-01-05

This text, covering a very large span of numerical methods and optimization, is primarily aimed at advanced undergraduate and graduate students. A background in calculus and linear algebra are the only mathematical requirements. The abundance of advanced methods and practical applications will be attractive to scientists and researchers working in different branches of engineering. The reader is progressively introduced to general numerical methods and optimization algorithms in each chapter. Examples accompany the various methods and guide the students to a better understanding of the applications. The user is often provided with the opportunity to verify their results with complex programming code. Each chapter ends with graduated exercises which furnish the student with new cases to study as well as ideas for exam/homework problems for the instructor. A set of programs made in Matlab™ is available on the author's personal website and presents both numerical and optimization methods.

Optimization Methods, Theory and Applications - Honglei Xu 2015-06-17

This book presents the latest research findings and state-of-the-art solutions on optimization techniques and provides new research direction and developments. Both the theoretical and practical aspects of the book will be much beneficial to experts and students in optimization and operation research community. It selects high quality papers from The International Conference on Optimization: Techniques and Applications (ICOTA2013). The conference is an official conference series of POP (The Pacific Optimization Research Activity Group; there are over 500 active members). These state-of-the-art works in this book authored by recognized experts will make contributions to the development of optimization with its applications.

Optimization Methods in Finance - Gerard Cornuejols 2006-12-21

Optimization models play an increasingly important role in financial decisions. This is the first textbook devoted to explaining how recent advances in optimization models, methods and software can be applied to solve problems in computational finance more efficiently and accurately. Chapters discussing the theory and efficient solution methods for all major classes of optimization problems alternate with chapters illustrating their use in modeling problems of mathematical finance. The reader is guided through topics such as volatility estimation, portfolio optimization problems and constructing an index fund, using techniques such as nonlinear optimization models, quadratic programming formulations and integer programming models respectively. The book is based on Master's courses in financial engineering and comes with worked examples, exercises and case studies. It will be welcomed by applied mathematicians, operational researchers and others who work in mathematical and computational finance and who are seeking a text for self-learning or for use with courses.

Practical Methods of Optimization: Unconstrained optimization - Roger Fletcher 1980

Practical Mathematical Optimization - Jan Snyman 2005-12-15

This book presents basic optimization principles and gradient-based algorithms to a general audience, in a brief and easy-to-read form. It enables professionals to apply optimization theory to engineering, physics, chemistry, or business economics.

Engineering Optimization - S. S. Rao 2000

A Rigorous Mathematical Approach To Identifying A Set Of Design Alternatives And Selecting The Best Candidate From Within That Set, Engineering Optimization Was Developed As A Means Of Helping Engineers To Design Systems That Are Both More Efficient And Less Expensive And To Develop New Ways Of Improving The Performance Of Existing Systems. Thanks To The Breathtaking Growth In Computer Technology That Has Occurred Over The Past Decade, Optimization Techniques Can Now Be Used To Find Creative Solutions To Larger, More Complex Problems Than Ever Before. As A Consequence, Optimization Is Now Viewed As An Indispensable Tool Of The Trade For Engineers Working In Many Different Industries, Especially The Aerospace, Automotive, Chemical, Electrical, And Manufacturing Industries. In Engineering Optimization, Professor Singiresu S. Rao Provides An Application-Oriented Presentation Of The Full Array Of Classical And Newly Developed Optimization Techniques Now Being Used By Engineers In A Wide Range Of Industries. Essential Proofs And Explanations Of The Various Techniques Are Given In A Straightforward,

User-Friendly Manner, And Each Method Is Copiously Illustrated With Real-World Examples That Demonstrate How To Maximize Desired Benefits While Minimizing Negative Aspects Of Project Design. Comprehensive, Authoritative, Up-To-Date, Engineering Optimization Provides In-Depth Coverage Of Linear And Nonlinear Programming, Dynamic Programming, Integer Programming, And Stochastic Programming Techniques As Well As Several Breakthrough Methods, Including Genetic Algorithms, Simulated Annealing, And Neural Network-Based And Fuzzy Optimization Techniques. Designed To Function Equally Well As Either A Professional Reference Or A Graduate-Level Text, Engineering Optimization Features Many Solved Problems Taken From Several Engineering Fields, As Well As Review Questions, Important Figures, And Helpful References. Engineering Optimization Is A Valuable Working Resource For Engineers Employed In Practically All Technological Industries. It Is Also A Superior Didactic Tool For Graduate Students Of Mechanical, Civil, Electrical, Chemical And Aerospace Engineering.

An Introduction to Optimization Techniques - Vikrant Sharma 2021-04-20

An Introduction to Optimization Techniques introduces the basic ideas and techniques of optimization. Optimization is a precise procedure using design constraints and criteria to enable the planner to find the optimal solution. Optimization techniques have been applied in numerous fields to deal with different practical problems. This book is designed to give the reader a sense of the challenge of analyzing a given situation and formulating a model for it while explaining the assumptions and inner structure of the methods discussed as fully as possible. It includes real-world examples and applications making the book accessible to a broader readership. Features Each chapter begins with the Learning Outcomes (LO) section, which highlights the critical points of that chapter. All learning outcomes, solved examples and questions are mapped to six Bloom Taxonomy levels (BT Level). Book offers fundamental concepts of optimization without becoming too complicated. A wide range of solved examples are presented in each section after the theoretical discussion to clarify the concept of that section. A separate chapter on the application of spreadsheets to solve different optimization techniques. At the end of each chapter, a summary reinforces key ideas and helps readers recall the concepts discussed. The wide and emerging uses of optimization techniques make it essential for students and professionals. Optimization techniques have been applied in numerous fields to deal with different practical problems. This book serves as a textbook for UG and PG students of science, engineering, and management programs. It will be equally useful for Professionals, Consultants, and Managers.

Numerical Methods in Sensitivity Analysis and Shape Optimization - Emmanuel Laporte 2002-12-13

Sensitivity analysis and optimal shape design are key issues in engineering that have been affected by advances in numerical tools currently available. This book, and its supplementary online files, presents basic optimization techniques that can be used to compute the sensitivity of a given design to local change, or to improve its performance by local optimization of these data. The relevance and scope of these techniques have improved dramatically in recent years because of progress in discretization strategies, optimization algorithms, automatic differentiation, software availability, and the power of personal computers. Numerical Methods in Sensitivity Analysis and Shape Optimization will be of interest to graduate students involved in mathematical modeling and simulation, as well as engineers and researchers in applied mathematics looking for an up-to-date introduction to optimization techniques, sensitivity analysis, and optimal design.

Nonlinear Optimization with Engineering Applications - Michael Bartholomew-Biggs 2008-12-16

This textbook examines a broad range of problems in science and engineering, describing key numerical methods applied to real life. The case studies presented are in such areas as data fitting, vehicle route planning and optimal control, scheduling and resource allocation, sensitivity calculations and worst-case analysis. Chapters are self-contained with exercises provided at the end of most sections. Nonlinear Optimization with Engineering Applications is ideal for self-study and classroom use in engineering courses at the senior undergraduate or graduate level. The book will also appeal to postdocs and advanced researchers interested in the development and use of optimization algorithms.

Optimization Models - Giuseppe C. Calafiore 2014-10-31

This accessible textbook demonstrates how to recognize, simplify, model and solve optimization problems - and apply these principles to new projects.