Numerical Methods And Optimization An Introduction Chapman Hallcrc Numerical Analysis And Scientific Computing Series

Dedicated to Professor P. Neittaanmäki on His 60th Birthday
Numerical Methods and Optimization in Finance
Numerical Methods and Optimization
An Introduction
Theory and Practice for Engineers
Numerical Methods in Scientific Computing:
Iterative Methods for Optimization
Numerical Optimization Techniques
Parallel and Distributed Computation: Numerical Methods
An Introduction to Numerical Methods and Optimization Techniques
Numerical Analysis and Optimization
Numerical PDE-Constrained Optimization
Matrix, Numerical, and Optimization Methods in Science and Engineering
Numerical Methods for Differential Equations, Optimization, and Technological Problems
Numerical Methods
NAO-IV, Muscat, Oman, January 2017
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Numerical Methods and Optimization
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Numerical Analysis and Optimization
A MATLAB-Based Introduction
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Numerical Methods for Differential Equations, Optimization, and Technological Problems
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Numerical Methods & Optimization
Numerical Methods in Economics
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Introduction to Numerical Linear Algebra and Optimisation
Numerical Methods for Energy Applications
A First Course in Numerical Methods
From Analysis to Algorithms
Numerical Methods for Unconstrained Optimization and Nonlinear Equations
Advanced Numerical Methods to Optimize Cutting Operations of Five Axis Milling Machines
Numerical Methods in Engineering with Python
Numerical Methods in Optimization

GLOVER CALLAHAN

Dedicated to Professor P. Neittaanmäki on His 60th Birthday Springer Science & Business Media
To harness the full power of computer technology, economists need to use a broad range of mathematical techniques. In this book, Kenneth Judd presents techniques from the numerical analysis and applied mathematics literatures and shows how to use them in economic analyses. The book is divided into five parts. Part I provides a general introduction. Part II presents basics from numerical analysis on R^n, including linear equations, iterative methods, optimization, nonlinear equations, approximation methods, numerical integration and differentiation, and Monte Carlo methods. Part III covers methods for dynamic problems, including finite difference methods, projection methods, and numerical dynamic programming. Part IV covers perturbation and asymptotic solution methods. Finally, Part V covers applications to dynamic equilibrium analysis, including solution methods for perfect foresight models and rational expectation models. A website contains supplementary material including programs and answers to exercises.
Numerical Methods and Optimization in Finance Springer
For students in industrial and systems engineering (ISE) and operations research (OR) to understand optimization at an advanced level, they must first grasp the analysis of algorithms, computational complexity, and other concepts and modern developments in numerical methods. Satisfying this prerequisite, Numerical Methods and Optimization: An Introduction combines the materials from introductory numerical methods and introductory optimization courses into a single text. This classroom-tested approach enriches a standard numerical methods syllabus with optional chapters on numerical optimization and provides a valuable numerical methods background for students taking an introductory OR or optimization course. The first part of the text introduces the necessary mathematical background, the digital representation of numbers, and different types of errors associated with numerical methods. The second part explains how to solve typical problems using numerical methods. Focusing on optimization methods, the final part presents basic theory and algorithms for linear and nonlinear optimization. The book assumes minimal prior knowledge of the topics. Taking a rigorous yet accessible approach to the material, it includes some mathematical proofs as samples of rigorous analysis but in most cases, uses only examples to illustrate the concepts. While the authors provide a MATLAB® guide and code available for download, the book can be used with other software packages.
Numerical Methods and Optimization Springer Nature
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.
An Introduction SIAM
This work familiarises students with mathematical models (PDEs) and methods of numerical solution and optimisation. Including numerous exercises and examples, this is an ideal text for advanced students in Applied Mathematics, Engineering, Physical Science and Computer Science.
Theory and Practice for Engineers Academic Press
This work addresses the increasingly important role of numerical methods in science and engineering. It combines traditional and well-developed topics with other material such as interval arithmetic, elementary functions, operator series, convergence acceleration, and continued fractions.
Numerical Methods in Scientific Computing: Springer Science & Business Media
This book highlights recent compelling research results and trends in various aspects of contemporary mathematics, emphasizing applicabilitions to real-world situations. The chapters present exciting new findings and developments in situations where mathematical rigor is combined with common sense. A multi-disciplinary approach, both within each chapter and in the volume as a whole, leads to practical insights that may result in a more synthetic understanding of specific global issues as well as their possible solutions. The volume will be of interest not only to experts in mathematics, but also to graduate students, scientists, and practitioners from other fields including physics, biology, geology, management, and medicine.
Iterative Methods for Optimization Springer
This book presents a carefully selected group of methods for unconstrained and bound constrained optimization problems and analyzes them in depth both theoretically and algorithmically. It focuses on clarity in algorithmic description and analysis rather than generality, and while it provides pointers to the literature for the most general theoretical results and robust software, the author thinks it is more important that readers have a complete understanding of special cases that convey essential ideas. A companion to Kelley's book, Iterative Methods for Linear and Nonlinear Equations (SIAM, 1995), this book contains many exercises and examples and can be used as a text, a tutorial for self-study, or a reference. Iterative Methods for Optimization does more than cover traditional gradient-based optimization: it is the first book to treat sampling methods, including the Hooke-Jeeves, implicit filtering, MDS, and Nelder-Mead schemes in a unified way, and also the first book to make connections between sampling methods and the traditional gradient-methods. Each of the main algorithms in the text is described in pseudocode, and a collection of MATLAB codes is available. Thus, readers can experiment with the algorithms in an easy way as well as implement them in other languages.
Numerical Optimization Techniques SIAM
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 MatlabTM is available on the author’s personal website and presents both numerical and optimization methods.
Parallel and Distributed Computation: Numerical Methods Academic Press
This book contains the results in numerical analysis and optimization presented at the ECCOMAS thematic conference “Computational Analysis and Optimization” (CAO 2011) held in Jyväskylä,

Finland, June 9–11, 2011. Both the conference and this volume are dedicated to Professor Pekka Neittaanmäki on the occasion of his sixtieth birthday. It consists of five parts that are closely related to his scientific activities and interests: Numerical Methods for Nonlinear Problems; Reliable Methods for Computer Simulation; Analysis of Noised and Uncertain Data; Optimization Methods; Mathematical Models Generated by Modern Technological Problems. The book also includes a short biography of Professor Neittaanmäki.

An Introduction to Numerical Methods and Optimization Techniques Springer Nature

This volume contains 13 selected keynote papers presented at the Fourth International Conference on Numerical Analysis and Optimization. Held every three years at Sultan Qaboos University in Muscat, Oman, this conference highlights novel and advanced applications of recent research in numerical analysis and optimization. Each peer-reviewed chapter featured in this book reports on developments in key fields, such as numerical analysis, numerical optimization, numerical linear algebra, numerical differential equations, optimal control, approximation theory, applied mathematics, derivative-free optimization methods, programming models, and challenging applications that frequently arise in statistics, econometrics, finance, physics, medicine, biology, engineering and industry. Any graduate student or researched wishing to know the latest research in the field will be interested in this volume. This book is dedicated to the late Professors Mike JD Powell and Roger Fletcher, who were the pioneers and leading figures in the mathematics of nonlinear optimization.

Numerical Analysis and Optimization Springer Nature

This text is for engineering students and a reference for practising engineers, especially those who wish to explore Python. This new edition features 18 additional exercises and the addition of rational function interpolation. Brent's method of root finding was replaced by Ridder's method, and the Fletcher-Reeves method of optimization was dropped in favor of the downhill simplex method. Each numerical method is explained in detail, and its shortcomings are pointed out. The examples that follow individual topics fall into two categories: hand computations that illustrate the inner workings of the method and small programs that show how the computer code is utilized in solving a problem. This second edition also includes more robust computer code with each method, which is available on the book website. This code is made simple and easy to understand by avoiding complex bookkeeping schemes, while maintaining the essential features of the method.

Numerical PDE-Constrained Optimization Technical Publications

This highly acclaimed work, first published by Prentice Hall in 1989, is a comprehensive and theoretically sound treatment of parallel and distributed numerical methods. It focuses on algorithms that are naturally suited for massive parallelization, and it explores the fundamental convergence, rate of convergence, communication, and synchronization issues associated with such algorithms. This is an extensive book, which aside from its focus on parallel and distributed algorithms, contains a wealth of material on a broad variety of computation and optimization topics. It is an excellent supplement to several of our other books, including Convex Optimization Algorithms (Athena Scientific, 2015), Nonlinear Programming (Athena Scientific, 1999), Dynamic Programming and Optimal Control (Athena Scientific, 2012), Neuro-Dynamic Programming (Athena Scientific, 1996), and Network Optimization (Athena Scientific, 1998). The on-line edition of the book contains a 95-page solutions manual.

Matrix, Numerical, and Optimization Methods in Science and Engineering Springer Science & Business Media

Computationally-intensive tools play an increasingly important role in financial decisions. Many financial problems-ranging from asset allocation to risk management and from option pricing to model calibration-can be efficiently handled using modern computational techniques. Numerical Methods and Optimization in Finance presents such computational techniques, with an emphasis on simulation and optimization, particularly so-called heuristics. This book treats quantitative analysis as an essentially computational discipline in which applications are put into software form and tested empirically. This revised edition includes two new chapters, a self-contained tutorial on implementing and using heuristics, and an explanation of software used for testing portfolio-selection models. Postgraduate students, researchers in programs on quantitative and computational finance, and practitioners in banks and other financial companies can benefit from this second edition of Numerical Methods and Optimization in Finance. Introduces numerical methods to readers with economics backgrounds Emphasizes core simulation and optimization problems Includes MATLAB and R code for all applications, with sample code in the text and freely available for download

Numerical Methods for Differential Equations, Optimization, and Technological Problems Springer

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.

Numerical Methods SIAM

This book contains the results in numerical analysis and optimization presented at the ECCOMAS thematic conference “Computational Analysis and Optimization” (CAO 2011) held in Jyväskylä, Finland, June 9–11, 2011. Both the conference and this volume are dedicated to Professor Pekka Neittaanmäki on the occasion of his sixtieth birthday. It consists of five parts that are closely related to his scientific activities and interests: Numerical Methods for Nonlinear Problems; Reliable Methods for Computer Simulation; Analysis of Noised and Uncertain Data; Optimization Methods; Mathematical Models Generated by Modern Technological Problems. The book also includes a short biography of Professor Neittaanmäki.

NAO-IV, Muscat, Oman, January 2017 Cambridge University Press

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.

A Consumer Guide Oxford University Press

Numerical Methods and OptimizationAn IntroductionCRC Press

Numerical Methods and Optimization Springer Science & Business Media

The new edition of this book presents a comprehensive and up-to-date description of the most effective methods in continuous optimization. It responds to the growing interest in optimization in engineering, science, and business by focusing on methods best suited to practical problems. This edition has been thoroughly updated throughout. There are new chapters on nonlinear interior methods and derivative-free methods for optimization, both of which are widely used in practice and are the focus of much current research. Because of the emphasis on practical methods, as well as the extensive illustrations and exercises, the book is accessible to a wide audience.

Numerical Optimization Springer Science & Business Media

The method of least squares was discovered by Gauss in 1795. It has since become the principal tool to reduce the influence of errors when fitting models to given observations. Today, applications of least squares arise in a great number of scientific areas, such as statistics, geodetics, signal processing, and control. In the last 20 years there has been a great increase in the capacity for automatic data capturing and computing. Least squares problems of large size are now routinely solved. Tremendous progress has been made in numerical methods for least squares problems, in particular for generalized and modified least squares problems and direct and iterative methods for sparse problems. Until now there has not been a monograph that covers the full spectrum of relevant problems and methods in least squares. This volume gives an in-depth treatment of topics such as methods for sparse least squares problems, iterative methods, modified least squares, weighted problems, and constrained and regularized problems. The more than 800 references provide a comprehensive survey of the available literature on the subject.

ICAMI, San Andres Island, Colombia, November 2013 CRC Press

This book introduces, in an accessible way, the basic elements of Numerical PDE-Constrained Optimization, from the derivation of optimality conditions to the design of solution algorithms. Numerical optimization methods in function-spaces and their application to PDE-constrained problems are carefully presented. The developed results are illustrated with several examples, including linear and nonlinear ones. In addition, MATLAB codes, for representative problems, are included. Furthermore, recent results in the emerging field of nonsmooth numerical PDE constrained optimization are also covered. The book provides an overview on the derivation of optimality conditions and on some solution algorithms for problems involving bound constraints, state-constraints, sparse cost functionals and variational inequality constraints.