

NONCONVEX OPTIMIZATION AND ITS APPLICATIONS

Deterministic Global Optimization

Theory, Methods and Applications

Christodoulos A. Floudas



Springer Science+Business Media, B.V.

Deterministic Global Optimization Theory Methods And Applications 1st Edition

Daniel Scholz



Deterministic Global Optimization Theory Methods And Applications 1st Edition:

Deterministic Global Optimization Christodoulos A. Floudas, 2013-03-09 The vast majority of important applications in science engineering and applied science are characterized by the existence of multiple minima and maxima as well as first second and higher order saddle points The area of Deterministic Global Optimization introduces theoretical algorithmic and computational advances that i address the computation and characterization of global minima and maxima ii determine valid lower and upper bounds on the global minima and maxima and iii address the enclosure of all solutions of nonlinear constrained systems of equations Global optimization applications are widespread in all disciplines and they range from atomistic or molecular level to process and product level representations The primary goal of this book is three fold first to introduce the reader to the basics of deterministic global optimization second to present important theoretical and algorithmic advances for several classes of mathematical problems that include biconvex and bilinear problems signomial problems general twice differentiable nonlinear problems mixed integer nonlinear problems and the enclosure of all solutions of nonlinear constrained systems of equations and third to tie the theory and methods together with a variety of important applications

Optimization and Optimal Control Altannar Chinchuluun, Panos M. Pardalos, Renssen Enkhbat, Ider Tseveendorj, 2010-08-05 Optimization and optimal control are the main tools in decision making Because of their numerous applications in various disciplines research in these areas is accelerating at a rapid pace Optimization and Optimal Control Theory and Applications brings together the latest developments in these areas of research as well as presents applications of these results to a wide range of real world problems This volume can serve as a useful resource for researchers practitioners and advanced graduate students of mathematics and engineering working in research areas where results in optimization and optimal control can be applied

Models, Algorithms, and Technologies for Network Analysis Valery A. Kalyagin, Alexey I. Nikolaev, Panos M. Pardalos, Oleg A. Prokopyev, 2017-06-23 This valuable source for graduate students and researchers provides a comprehensive introduction to current theories and applications in optimization methods and network models Contributions to this book are focused on new efficient algorithms and rigorous mathematical theories which can be used to optimize and analyze mathematical graph structures with massive size and high density induced by natural or artificial complex networks Applications to social networks power transmission grids telecommunication networks stock market networks and human brain networks are presented Chapters in this book cover the following topics Linear max min fairness Heuristic approaches for high quality solutions Efficient approaches for complex multi criteria optimization problems Comparison of heuristic algorithms New heuristic iterative local search Power in network structures Clustering nodes in random graphs Power transmission grid structure Network decomposition problems Homogeneity hypothesis testing Network analysis of international migration Social networks with node attributes Testing hypothesis on degree distribution in the market graphs Machine learning applications to human brain network studies This proceeding is a result of The 6th

International Conference on Network Analysis held at the Higher School of Economics Nizhny Novgorod in May 2016 The conference brought together scientists and engineers from industry government and academia to discuss the links between network analysis and a variety of fields **Theory, Algorithms, and Experiments in Applied Optimization** Boris Goldengorin,2025-12-04 This book celebrates the remarkable contributions of Panos M Pardalos offering a comprehensive collection of 19 rigorously peer reviewed articles that span the breadth of his research interests From deterministic and stochastic global optimization to combinatorial optimization this volume provides insights into solving modern applied problems in planning theory support vector machines data mining supply chain optimization and more Readers will encounter a diverse array of topics including Pareto optimality game and equilibrium theory vehicle routing problems energy systems and financial markets Each article stands alone in its scientific methodological and practical individuality making this collection a must read for both junior university students and seasoned professionals The contributing authors many of whom are former students and now esteemed professors offer unique perspectives and cutting edge research findings This book is an invaluable resource for researchers academics and practitioners in fields such as operations research resource management computer science and data analysis Whether you are taking your first steps in optimization or are an advanced professional seeking to deepen your understanding this volume provides the tools and insights necessary to navigate the complex landscape of applied optimization problems **Numerical Computations: Theory and Algorithms** Yaroslav D. Sergeyev,Dmitri E. Kvasov,Annabella Astorino,2024-12-31 The three volume set LNCS 14476 14478 constitutes the post conference proceedings of the 4th International Conference on Numerical Computations Theory and Algorithms NUMTA 2023 held in Pizzo Calabro Italy during June 14 20 2023 The 45 full papers presented in this book together with 60 short papers were carefully reviewed and selected from 170 submissions The papers focus on topics such as continuous and discrete single and multi objective problems local global and large scale optimization classification in machine learning optimal control and applications computational and applied mathematics such as approximation theory computational geometry computational fluid dynamics dynamical systems and differential equations numerical algebra etc and applications in engineering and science numerical models methods and software using traditional and emerging high performance computational tools and paradigms including the infinity and quantum computing and their application in artificial intelligence and data science bioinformatics economics and management engineering and technology mathematical education number theory and foundations of mathematics etc **Parallel Computing Technologies** Victor Malyshkin,2015-07-24 This book constitutes the proceedings of the 13th International Conference on Parallel Computing Technologies PaCT 2015 held in Petrozavodsk Russia during August September 2015 The 37 full papers and 14 short papers presented were carefully reviewed and selected from 87 submissions The papers are organized in topical sections on parallel models algorithms and programming methods unconventional computing cellular automata distributed computing special

processors programming techniques applications *The British National Bibliography* Arthur James Wells,2000

Supercomputing Vladimir Voevodin,Sergey Sobolev,2018-12-31 This book constitutes the refereed proceedings of the 4th Russian Supercomputing Days RuSCDays 2018 held in Moscow Russia in September 2018 The 59 revised full papers and one revised short paper presented were carefully reviewed and selected from 136 submissions The papers are organized in topical sections on parallel algorithms supercomputer simulation high performance architectures tools and technologies

Deterministic global optimization and applications Sven Leyffer,Jorge Moré,2005 Genome Research ,2003

Deterministic Global Optimization Daniel Scholz,2011-11-06 This monograph deals with a general class of solution approaches in deterministic global optimization namely the geometric branch and bound methods which are popular algorithms for instance in Lipschitzian optimization d c programming and interval analysis It also introduces a new concept for the rate of convergence and analyzes several bounding operations reported in the literature from the theoretical as well as from the empirical point of view Furthermore extensions of the prototype algorithm for multicriteria global optimization problems as well as mixed combinatorial optimization problems are considered Numerical examples based on facility location problems support the theory Applications of geometric branch and bound methods namely the circle detection problem in image processing the integrated scheduling and location makespan problem and the median line location problem in the three dimensional space are also presented The book is intended for both researchers and students in the areas of mathematics operations research engineering and computer science *Mathematical Perspectives on Neural Networks* Paul

Smolensky,Michael C. Mozer,David E. Rumelhart,1996 First Published in 1996 Routledge is an imprint of Taylor Francis an informa company

Global Optimization Reiner Horst,Hoang Tuy,2013-11-27 The enormous practical need for solving global optimization problems coupled with a rapidly advancing computer technology has allowed one to consider problems which a few years ago would have been considered computationally intractable As a consequence we are seeing the creation of a large and increasing number of diverse algorithms for solving a wide variety of multiextremal global optimization problems The goal of this book is to systematically clarify and unify these diverse approaches in order to provide insight into the underlying concepts and their properties Aside from a coherent view of the field much new material is presented By definition a multiextremal global optimization problem seeks at least one global minimizer of a real valued objective function that possesses different local n minimizers The feasible set of points in \mathbb{R}^n is usually determined by a system of inequalities It is well known that in practically all disciplines where mathematical models are used there are many real world problems which can be formulated as multi extremal global optimization problems **International Books in Print** ,1997

Deterministic Global Optimization Yaroslav D. Sergeyev,Dmitri E. Kvasov,2017-06-18 This book begins with a concentrated introduction into deterministic global optimization and moves forward to present new original results from the authors who are well known experts in the field Multiextremal continuous problems that have an unknown structure with

Lipschitz objective functions and functions having the first Lipschitz derivatives defined over hyperintervals are examined. A class of algorithms using several Lipschitz constants is introduced which has its origins in the DIRECT Dividing RECTangles method. This new class is based on an efficient strategy that is applied for the search domain partitioning. In addition, a survey on derivative free methods and methods using the first derivatives is given for both one dimensional and multi dimensional cases. Non smooth and smooth minorants and acceleration techniques that can speed up several classes of global optimization methods with examples of applications and problems arising in numerical testing of global optimization algorithms are discussed. Theoretical considerations are illustrated through engineering applications. Extensive numerical testing of algorithms described in this book stretches the likelihood of establishing a link between mathematicians and practitioners. The authors conclude by describing applications and a generator of random classes of test functions with known local and global minima that is used in more than 40 countries of the world. This title serves as a starting point for students, researchers, engineers, and other professionals in operations research, management science, computer science, engineering, economics, environmental sciences, industrial and applied mathematics to obtain an overview of deterministic global optimization. Journal of Guidance, Control, and Dynamics, 2007

Handbook of Applications of Chaos Theory

Christos H. Skiadas, Charilaos Skiadas, 2017-12-19. In addition to explaining and modeling unexplored phenomena in nature and society, chaos uses vital parts of nonlinear dynamical systems theory and established chaotic theory to open new frontiers and fields of study. Handbook of Applications of Chaos Theory covers the main parts of chaos theory along with various applications to diverse areas. Expert contributors from around the world show how chaos theory is used to model unexplored cases and stimulate new applications. Accessible to scientists, engineers, and practitioners in a variety of fields, the book discusses the intermittency route to chaos, evolutionary dynamics, and deterministic chaos and the transition to phase synchronization, chaos. It presents important contributions on strange attractors, self-exciting and hidden attractors, stability theory, Lyapunov exponents, and chaotic analysis. It explores the state of the art of chaos in plasma physics, plasma harmonics, and overtone coupling. It also describes flows and turbulence, chaotic interference versus decoherence, and an application of microwave networks to the simulation of quantum graphs. The book proceeds to give a detailed presentation of the chaotic rogue and noisy optical dissipative solitons, parhellic like circle, and chaotic light scattering and interesting forms of the hyperbolic prism, the Poincaré disc, and foams. It also covers numerous application areas from the analysis of blood pressure data and clinical digital pathology to chaotic pattern recognition to economics to musical arts and research.

International Journal of Computers & Applications, 2000 **American Book Publishing Record Cumulative**

1998 R R Bowker Publishing, 1999-03 Journal of Dynamic Systems, Measurement, and Control, 1981

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