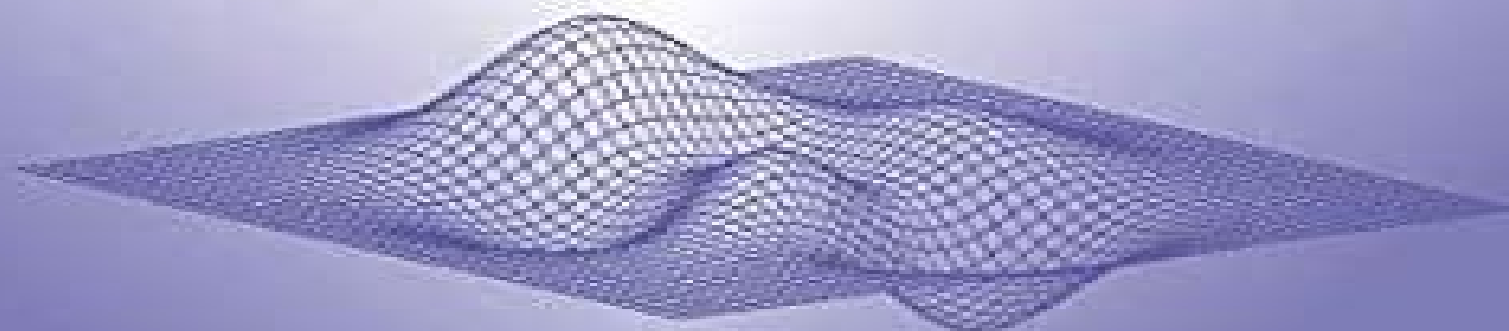


NONCONVEX OPTIMIZATION AND ITS APPLICATIONS

# Robust Optimization-Directed Design

Edited by Andrew J. Kurdila, Panos M. Pardalos  
and Michael Zabarankin



 Springer

# Robust Optimization Directed Design

**DJ Losen**



## **Robust Optimization Directed Design:**

*Robust Optimization-Directed Design* Andrew J. Kurdila, Panos M. Pardalos, Michael Zabrankin, 2006-06-04 Robust design that is managing design uncertainties such as model uncertainty or parametric uncertainty is the often unpleasant issue crucial in much multidisciplinary optimal design work Recently there has been enormous practical interest in strategies for applying optimization tools to the development of robust solutions and designs in several areas including aerodynamics the integration of sensing e.g. laser radars vision based systems and millimeter wave radars and control cooperative control with poorly modeled uncertainty cascading failures in military and civilian applications multi mode seekers sensor fusion and data association problems and tracking systems The contributions to this book explore these different strategies The expression optimization directed in this book's title is meant to suggest that the focus is not agonizing over whether optimization strategies identify a true global optimum but rather whether these strategies make significant design improvements

*Robust Static Super-replication of Barrier Options* Jan H. Maruhn, 2009 Static hedge portfolios for barrier options are very sensitive with respect to changes of the volatility surface To prevent potentially significant hedging losses this book develops a static super replication strategy with market typical robustness against volatility skew and liquidity risk as well as model errors Empirical results and various numerical examples confirm that the static superhedge successfully eliminates the risk of a changing volatility surface Combined with associated sub replication strategies this leads to robust price bounds for barrier options which are also relevant in the context of dynamic hedging The mathematical techniques used to prove appropriate existence duality and convergence results range from financial mathematics stochastic and semi infinite optimization convex analysis and partial differential equations to semidefinite programming

*Optimization in Science and Engineering* Themistocles M. Rassias, Christodoulos A. Floudas, Sergiy Butenko, 2014-05-29 Optimization in Science and Engineering is dedicated in honor of the 60th birthday of Distinguished Professor Panos M. Pardalos Pardalos's past and ongoing work has made a significant impact on several theoretical and applied areas in modern optimization As tribute to the diversity of Dr. Pardalos's work in Optimization this book comprises a collection of contributions from experts in various fields of this rich and diverse area of science Topics highlight recent developments and include Deterministic global optimization Variational inequalities and equilibrium problems Approximation and complexity in numerical optimization Non smooth optimization Statistical models and data mining Applications of optimization in medicine energy systems and complex network analysis This volume will be of great interest to graduate students researchers and practitioners in the fields of optimization and engineering

**Optimization and Optimal Control** Altannar Chinchuluun, Panos M. Pardalos, Rentsen Enkhbat, Ider Tseveendorj, 2010-07-07 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      *Alternative Investments And Strategies* Rudiger Kiesel,Rudi Zagst,Matthias Scherer,2010-06-18 This book combines academic research and practical expertise on alternative assets and trading strategies in a unique way The asset classes that are discussed include credit risk cross asset derivatives energy private equity freight agreements alternative real assets ARA and socially responsible investments SRI The coverage on trading and investment strategies are directed at portfolio insurance especially constant proportion portfolio insurance CPPI and constant proportion debt obligation CPDO strategies robust portfolio optimization and hedging strategies for exotic options      **Uncertainty-Based Ship Design Optimization** Zuyuan Liu,Xiao Wei,Baiwei Feng,Haichao Chang,2024-07-16 The book focused on the basic bottleneck issues in the ship uncertainty based design optimization Based on the concepts of robustness and reliability design uncertainty classification uncertainty modeling uncertainty analysis and propagation methods were systematically explained revealing the influence mechanism and rules of multi source aleatory and epistemic uncertainty on ship design Finally a hull form design optimization method with mixed uncertainty was established The theory of uncertainty design optimization is not yet mature and this book gives a detailed introduction The illustrations and tables in this book compared the differences between uncertainty based optimization and traditional deterministic optimization reflecting the advantages of uncertainty optimization This book will be a useful reference for researchers and engineers in the field of ship design      *Relaxation in Optimization Theory and Variational Calculus* Tomáš Roubíček,2020-11-09 The relaxation method has enjoyed an intensive development during many decades and this new edition of this comprehensive text reflects in particular the main achievements in the past 20 years Moreover many further improvements and extensions are included both in the direction of optimal control and optimal design as well as in numerics and applications in materials science along with an updated treatment of the abstract parts of the theory      *Real-World Applications of Evolutionary Computing* Stefano Cagnoni,Riccardo Poli,George D. Smith,David Corne,Martin Oates,Emma Hart,Pier L. Lanzi,Egbert J. Willem,Yun Li,Ben Paechter,Terence C. Fogarty,2003-07-31 The increasingly active eld of Evolutionary Computation EC provides val ble tools inspired by the theory of natural selection and genetic inheritance to problem solving machine learning and optimization in many real world app cations Despite some early intuitions about EC that can be dated back to the vention of computers and a better formal de nition of EC made in the 1960s the quest for real world applications of EC only began in the late 1980s The dramatic increase in computer performances in the last decade of the 20th c tury gave rise to a positive feedback process EC techniques became more and more applicable stimulating the growth of interest in their study and allowing in turn new powerful EC paradigms to be devised In parallel with new theoretical results the number of elds to which EC is being applied is increasing day by day along with the complexity of applications and application domains In

particular industrially relevant elds such as signal and image processing computer vision pattern recognition industrial control telecommunication scheduling and timetabling and aerospace engineering are employing EC techniques to solve complex real world problems

**FX Options and Structured Products** Uwe Wystup,2007-01-11 There has been an explosive growth in the number of corporates investors and financial institutions turning to structured productsto achieve cost savings risk controls and yield enhancements However the exact nature risks and applications of these productsand solutions can be complex and problems arise if the fundamentalbuilding blocks and principles are not fully understood This bookexplains the most popular products and strategies with a focus oneverything beyond vanilla options dealing with these products in aliterate yet accessible manner giving practical applications andcase studies A special emphasis on how the client uses the products withinterviews and descriptions of real life deals means that it willbe possible to see how the products are applied in day to daysituations the theory is translated into practice Note CD ROM DVD and other supplementary materials arenot included as part of eBook file

**Robust Optimization** Subir Chowdhury,Shin Taguchi,2016-02-08 Robust Optimization is a method to improve robustness using low cost variations of a single conceptual design The benefits of Robust Optimization include faster product development cycles faster launch cycles fewer manufacturing problems fewer field problems lower cost higher performing products and processes and lower warranty costs All these benefits can be realized if engineering and product development leadership of automotive and manufacturing organizations leverage the power of using Robust Optimization as a competitive weapon Written by world renowned authors Robust Optimization World s Best Practices for Developing Winning Vehicles is a ground breaking book whichintroduces the technical management strategy of Robust Optimization The authors discuss what the strategy entails 8 steps for Robust Optimization and Robust Assessment and how to lead it in a technical organization with an implementation strategy Robust Optimization is defined and it is demonstrated how the techniques can be applied to manufacturing organizations especially those with automotive industry applications so that Robust Optimization creates the flexibility that minimizes product development cost reduces product time to market and increases overall productivity Key features Presents best practices from around the globe on Robust Optimization that can be applied in any manufacturing and automotive organization in the world Includes 19 successfully implemented best case studies from automotive original equipment manufacturers and suppliers Provides manufacturing industries with proven techniques to become more competitive in the global market Provides clarity concerning the common misinterpretations on Robust Optimization Robust Optimization World s Best Practices for Developing Winning Vehicles is a must have book for engineers and managers who are working on design product manufacturing mechanical electrical process quality area all levels of management especially in product development area research and development personnel and consultants It also serves as an excellent reference for students and teachers in engineering

*FOCAPD-19/Proceedings of the 9th International Conference on Foundations of*

*Computer-Aided Process Design, July 14 - 18, 2019* Salvador Garcia Munoz, Carl D. Laird, Matthew J. Realff, 2019-07-09  
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Returns from Patenting and Licensing Harun Bulut, 2006 **Robustness Optimization for IoT Topology** Tie Qiu, Ning  
 Chen, Songwei Zhang, 2022-06-11 The IoT topology defines the way various components communicate with each other within  
 a network Topologies can vary greatly in terms of security power consumption cost and complexity Optimizing the IoT  
 topology for different applications and requirements can help to boost the network's performance and save costs More  
 importantly optimizing the topology robustness can ensure security and prevent network failure at the foundation level In  
 this context this book examines the optimization schemes for topology robustness in the IoT helping readers to construct a  
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 framework and the latest empirical research on robustness optimization of IoT topology Starting with the self organization of  
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 practitioners industry professionals and researchers who are eager to comprehend the vulnerabilities of IoT topology It helps  
 them to master the research framework for IoT topology robustness optimization and to build more efficient and reliable IoT  
 topologies in their industry Network Design with Applications to Transportation and Logistics Teodor Gabriel  
 Crainic, Michel Gendreau, Bernard Gendron, 2021-07-16 This book explores the methodological and application developments  
 of network design in transportation and logistics It identifies trends challenges and research perspectives in network design  
 for these areas Network design is a major class of problems in operations research where network flow combinatorial and  
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is dedicated entirely to the potential application areas for network design These areas range from rail networks to city logistics to energy transport All of the chapters are written by leading researchers in the field which should appeal to analysts and planners **Mathematical Reviews** ,2008 **Handbook of Research on Artificial Intelligence**

**Applications in the Aviation and Aerospace Industries** Shmelova, Tetiana,Sikirda, Yuliya,Sterenhartz, Arnold,2019-10-11

With the emergence of smart technology and automated systems in today s world artificial intelligence AI is being incorporated into an array of professions The aviation and aerospace industry specifically is a field that has seen the successful implementation of early stages of automation in daily flight operations through flight management systems and autopilot However the effectiveness of aviation systems and the provision of flight safety still depend primarily upon the reliability of aviation specialists and human decision making The Handbook of Research on Artificial Intelligence Applications in the Aviation and Aerospace Industries is a pivotal reference source that explores best practices for AI implementation in aviation to enhance security and the ability to learn improve and predict While highlighting topics such as computer aided design automated systems and human factors this publication explores the enhancement of global aviation security as well as the methods of modern information systems in the aeronautics industry This book is ideally designed for pilots scientists engineers aviation operators air crash investigators teachers academicians researchers and students seeking current research on the application of AI in the field of aviation Active Robust Optimization: Optimizing for Robustness of

Changeable Products Shaul Salomon,2019-07-06 This book presents a novel framework known as Active Robust Optimization which provides the tools for evaluating comparing and optimizing changeable products Since any product that can change its configuration during normal operation may be considered a changeable product the framework is widely applicable Further the methodology enables designers to use adaptability to deal with uncertainties and so avoid over conservative designs Offering a comprehensive overview of the framework including its unique features such as its ability to optimally respond to uncertain situations the book also defines a new class of optimization problem and examines the effects of changes in various parameters on their solution Lastly it discusses innovative approaches for solving the problem and demonstrates these with two examples from different fields in engineering design optimization of an optical table and optimization of a gearbox

**The British National Bibliography** Arthur James Wells,2006 **Reliable Engineering Computing ,** *Handbook of Mathematical and Digital Engineering Foundations for Artificial Intelligence* Adedeji B. Badiru,Olumuyiwa Asaolu,2023-06-29 Artificial intelligence AI and digital engineering have become prevalent in business industry government and academia However the workforce still has a lot to learn on how to leverage them This handbook presents the preparatory and operational foundations for the efficacy applicability risk and how to take advantage of these tools and techniques Handbook of Mathematical and Digital Engineering Foundations for Artificial Intelligence A Systems Methodology provides a guide for using digital engineering platforms for advancing AI applications The book discusses an interface of education and

research in the pursuit of AI developments and highlights the facilitation of advanced education through AI and digital engineering systems. It presents an integration of soft and hard skills in developing and using AI and offers a rigorous systems approach to understanding and using AI. This handbook will be the go-to resource for practitioners and students on applying systems methodology to the body of knowledge of understanding embracing and using digital engineering tools and techniques. The recent developments and emergence of Chatbots AI tools all have mathematical foundations for their efficacy. Such AI tools include ChatGPT GPT 4 Bard Tidio Support Bot Kuki AI Companion Meena BlenderBot Rose AI Chatbot Replika AI Friend Eviebot and Tay. This handbook highlights the importance of mathematical and digital foundations for AI developments. The handbook will enhance the understanding and appreciation of readers about the prevailing wave of artificial intelligence products and thereby fitting the current market needs.



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