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Evolutionary Multi-Criterion Optimization-Shigeru Obayashi 2007-02-12 This book constitutes the refereed proceedings of the 4th International Conference on Evolutionary Multi-Criterion Optimization, EMO 2007, held in Matsushima, Japan in March 2007. The 65 revised full papers presented together with 4 invited papers are organized in topical sections on algorithm design, algorithm improvements, alternative methods, applications, engineering design, many objectives, objective handling, and performance assessments.

Parallel Problem Solving from Nature-PPSN VI-france Conference on Parallel Problem Solving from Nature 2000 Paris 2000-09-06 This book constitutes the refereed proceedings of the 6th International Conference on Parallel Problem Solving from Nature, PPSN VI, held in Paris, France in September 2000. The 87 revised full papers presented together with two invited papers were carefully reviewed and selected from 168 submissions. The presentations are organized in topical sections on analysis and theory of evolutionary algorithms, genetic programming, scheduling, representations and operators, co-evolution, constraint handling techniques, noisy and non-stationary environments, combinatorial optimization, applications, machine learning and classifier systems, new algorithms and metaphors, and multiobjective optimization.

Multi-Objective Optimization using Evolutionary Algorithms-Kalyanmoy Deb 2001-07-05 Evolutionary algorithms are relatively new, but very powerful techniques used to find solutions to many real-world search and optimization problems. Many of these problems have multiple objectives, which leads to the need to obtain a set of optimal solutions, known as effective solutions. It has been found that using evolutionary algorithms is a highly effective way of finding multiple effective solutions in a single simulation run. Comprehensive coverage of this growing area of research Carefully introduces each algorithm with examples and in-depth discussion Includes many applications to real-world problems, including engineering design and scheduling Includes discussion of advanced topics and future research Can be used as a course text or for self-study Accessible to those with limited knowledge of classical multi-objective optimization and evolutionary algorithms The integrated presentation of theory, algorithms and examples will benefit those working and researching in the areas of optimization, optimal design and evolutionary computing. This text provides an excellent introduction to the use of evolutionary algorithms in multi-objective optimization, allowing use as a graduate course text or for self-study.

Evolutionary Computation 2-Thomas Baeck 2017-06-29 Evolutionary Computation 2: Advanced Algorithms and Operators expands upon the basic ideas underlying evolutionary algorithms. The focus is on fitness evaluation, constraint-handling techniques, population structures, advanced techniques in evolutionary computation, and the implementation of evolutionary algorithms. It is intended to be used by individual researchers and students in the
Multi-Objective Memetic Algorithms - Chi-Keong Goh 2009-02-26 The application of sophisticated evolutionary computing approaches for solving complex problems with multiple conflicting objectives in science and engineering have increased steadily in the recent years. Within this growing trend, Memetic algorithms are, perhaps, one of the most successful stories, having demonstrated better efficacy in dealing with multi-objective problems as compared to its conventional counterparts. Nonetheless, researchers are only beginning to realize the vast potential of multi-objective Memetic algorithms and there remain many open topics in its design. This book presents a very first comprehensive collection of works, written by leading researchers in the field, and reflects the current state-of-the-art in the theory and practice of multi-objective Memetic algorithms. "Multi-Objective Memetic algorithms" is organized for a wide readership and will be a valuable reference for engineers, researchers, senior undergraduates and graduate students who are interested in the areas of Memetic algorithms and multi-objective optimization.

Evolutionary Multiobjective Optimization - Ajith Abraham 2006-03-30 Evolutionary Multi-Objective Optimization is an expanding field of research. This book brings a collection of papers with some of the most recent advances in this field. The topic and content is currently very fashionable and has immense potential for practical applications and includes contributions from leading researchers in the field. Assembled in a compelling and well-organised fashion, Evolutionary Computation Based Multi-Criteria Optimization will prove beneficial for both academic and industrial scientists and engineers engaged in research and development and application of evolutionary algorithm based MCO. Packed with must-find information, this book is the first to comprehensively and clearly address the issue of evolutionary computation based MCO, and is an essential read for any researcher or practitioner of the technique.

Multiobjective Programming and Goal Programming - Vincent Barichard 2009-01-30 This book gives the reader an insight into the state of the art in the field of multiobjective (linear, nonlinear and combinatorial) programming, goal programing and multiobjective metaheuristics. The 26 papers describe all relevant trends in this fields of research. They cover a wide range of topics ranging from theoretical investigations to algorithms, dealing with uncertainty, and applications to real world problems such as engineering design, water distribution systems and portfolio selection. The book is based on the papers of the seventh international conference on multiple objective programming and goal programming (MOPGP06).

Advances in Evolutionary and Deterministic Methods for Design, Optimization and Control in Engineering and Sciences - David Greiner 2014-11-14 This book contains state-of-the-art contributions in the field of evolutionary and deterministic methods for design, optimization and control in engineering and sciences. Specialists have written each of the 34 chapters as extended versions of selected papers presented at the International Conference on Evolutionary and Deterministic Methods for Design, Optimization and Control with Applications to Industrial and Societal Problems (EUROGEN 2013). The conference was one of the Thematic Conferences of the European Community on Computational Methods in Applied Sciences (ECCOMAS). Topics treated in the various chapters are classified in the following sections: theoretical and numerical methods and tools for optimization (theoretical methods and tools; numerical methods and tools) and engineering design and societal applications (turbo machinery; structures, materials and civil engineering; aeronautics and astronautics; societal applications; electrical and electronics applications), focused particularly on intelligent systems for multidisciplinary design optimization (mdo) problems based on multi-hybridized software, adjoint-based and one-shot methods, uncertainty quantification and optimization, multidisciplinary design optimization, applications of game theory to industrial optimization problems, applications in structural and civil engineering optimum design and surrogate models based optimization methods in aerodynamic design.

Optimization in Theory and Practice is a simplified two-part approach to multi-objective optimization (MOO) problems. This second part focuses on the use of metaheuristic algorithms in more challenging practical cases. The book includes ten chapters that cover several advanced MOO techniques. These include the determination of Pareto-optimal sets of solutions, metaheuristic algorithms, genetic search algorithms and evolution strategies, decomposition algorithms, hybridization of different metaheuristics, and many-objective (more than three objectives) optimization and parallel computation. The final section of the book presents information about the design and types of fifty test problems for which the Pareto-optimal front is approximated. For each of them, the package NSGA-II is used to approximate the Pareto-optimal front. It is an essential handbook for students and teachers involved in advanced optimization courses in engineering, information science and mathematics degree programs.

**Evolutionary Optimization** - Ruhul Sarker
2006-04-11
Evolutionary computation techniques have attracted increasing attention in recent years for solving complex optimization problems. They are more robust than traditional methods based on formal logics or mathematical programming for many real-world OR/MS problems. Evolutionary computation techniques can deal with complex optimization problems better than traditional optimization techniques. However, most papers on the application of evolutionary computation techniques to Operations Research/Management Science (OR/MS) problems have scattered around in different journals and conference proceedings. They also tend to focus on a very special and narrow topic. It is the right time that an archival book series publishes a special volume which includes critical reviews of the state-of-art of those evolutionary computation techniques which have been found particularly useful for OR/MS problems, and a collection of papers which represent the latest development in tackling various OR/MS problems by evolutionary computation techniques. This special volume of the book series on Evolutionary Optimization aims at filling in this gap in the current literature. The special volume consists of invited papers written by leading researchers in the field. All papers were peer reviewed by at least two recognised reviewers. The book covers the foundation as well as the practical side of evolutionary optimization.

**Evolutionary Multi-Criterion Optimization** - Carlos A. Coello Coello
2005-02-17
This book constitutes the refereed proceedings of the Third International Conference on Evolutionary Multi-Criterion Optimization, EMO 2005, held in Guanajuato, Mexico, in March 2005. The 59 revised full papers presented together with 2 invited papers and the summary of a tutorial were carefully reviewed and selected from the 115 papers submitted. The papers are organized in topical sections on algorithm improvements, incorporation of preferences, performance analysis and comparison, uncertainty and noise, alternative methods, and applications in a broad variety of fields.

**Multiobjective Optimization** - Jürgen Branke
2008-10-18
Multiobjective optimization deals with solving problems having not only one, but multiple, often conflicting, criteria. Such problems can arise in practically every field of science, engineering and business, and the need for efficient and reliable solution methods is increasing. The task is challenging due to the fact that, instead of a single optimal solution, multiobjective optimization results in a number of solutions with different trade-offs among criteria, also known as Pareto optimal or efficient solutions. Hence, a decision maker is needed to provide additional preference information and to identify the most satisfactory solution. Depending on the paradigm used, such information may be introduced before, during, or after the optimization process. Clearly, research and application in multiobjective optimization involve expertise in optimization as well as in decision support. This state-of-the-art survey originates from the International Seminar on Practical Approaches to Multiobjective Optimization, held in Dagstuhl Castle, Germany, in December 2006, which brought together leading experts from various contemporary multiobjective optimization fields, including evolutionary multiobjective optimization (EMO), multiple criteria decision making (MCDM) and multiple criteria decision aiding (MCDA). This book gives a unique and detailed account of the current status of research and applications in the field of multiobjective optimization. It contains 16 chapters grouped in the following 5 thematic sections: Basics on Multiobjective Optimization; Recent Interactive and Preference-Based Approaches; Visualization
Modern Optimization with R - Paulo Cortez 2021-07-30 The goal of this book is to gather in a single work the most relevant concepts related in optimization methods, showing how such theories and methods can be addressed using the open source, multi-platform R tool. Modern optimization methods, also known as metaheuristics, are particularly useful for solving complex problems for which no specialized optimization algorithm has been developed. These methods often yield high quality solutions with a more reasonable use of computational resources (e.g. memory and processing effort). Examples of popular modern methods discussed in this book are: simulated annealing; tabu search; genetic algorithms; differential evolution; and particle swarm optimization. This book is suitable for undergraduate and graduate students in computer science, information technology, and related areas, as well as data analysts interested in exploring modern optimization methods using R. This new edition integrates the latest R packages through text and code examples. It also discusses new topics, such as: the impact of artificial intelligence and business analytics in modern optimization tasks; the creation of interactive Web applications; usage of parallel computing; and more modern optimization algorithms (e.g., iterated racing, ant colony optimization, grammatical evolution).

Multi-Objective Optimization in Computational Intelligence: Theory and Practice - Thu Bui, Lam 2008-05-31 Multi-objective optimization (MO) is a fast-developing field in computational intelligence research. Giving decision makers more options to choose from using some post-analysis preference information, there are a number of competitive MO techniques with an increasingly large number of MO real-world applications. Multi-Objective Optimization in Computational Intelligence: Theory and Practice explores the theoretical, as well as empirical, performance of MOs on a wide range of optimization issues including combinatorial, real-valued, dynamic, and noisy problems. This book provides scholars, academics, and practitioners with a fundamental, comprehensive collection of research on multi-objective optimization techniques, applications, and practices.

Proceedings of Fourth International Conference on Soft Computing for Problem Solving - Kedar Nath Das 2014-12-23 The Proceedings of SocProS 2014 serves as an academic bonanza for scientists and researchers working in the field of Soft Computing. This book contains theoretical as well as practical aspects using fuzzy logic, neural networks, evolutionary algorithms, swarm intelligence algorithms, etc., with many applications under the umbrella of ‘Soft Computing’. The book is beneficial for young as well as experienced researchers dealing across complex and intricate real world problems for which finding a solution by traditional methods is a difficult task. The different application areas covered in the Proceedings are: Image Processing, Cryptanalysis, Industrial Optimization, Supply Chain Management, Newly Proposed Nature Inspired Algorithms, Signal Processing, Problems related to Medical and Healthcare, Networking Optimization Problems, etc.

Parallel Problem Solving from Nature - PPSN VIII - Xin Yao 2004-12-16 We are very pleased to present this LNCS volume, the proceedings of the 8th International Conference on Parallel Problem Solving from Nature (PPSN VIII). PPSN is one of the most respected and highly regarded conference series in evolutionary computation and natural computing/computation. This biennial event was rst held in Dortmund in 1990, and then in Brussels (1994), Jerusalem (1994), Berlin (1996), Amsterdam (1998), Paris (2000), and Granada (2002). PPSN VIII continues to be the conference of choice by researchers all over the world who value its high quality. We received a record 358 paper submissions this year. After an extensive peer review process involving more than 1100 reviews, the programme committee selected the top 119 papers for inclusion in this volume and, of course, for presentation at the conference. This represents an acceptance rate of 33%. Please note that review reports with scores only but no textual comments were not considered in the chairs’ ranking decisions. The papers included in this volume cover a wide range of topics, from evolutionary computation to swarm intelligence and from bio-inspired computing to real-world applications. They represent some of the latest and best research in evolutionary and
natural computation. Following the PPSN tradition, all - persatPPSNVIII were presented as posters. There were 7 sessions; each session consisting of around 17 papers. For each session, we covered as wide a range of topics as possible so that participants with different interests would find some relevant papers at every session.

**Multi-Objective Optimization** - Gade Pandu Rangaiah, 2009

Optimization has been playing a key role in the design, planning and operation of chemical and related processes for nearly half a century. Although process optimization for multiple objectives was studied by several researchers back in the 1970s and 1980s, it has attracted active research in the last 10 years, spurred by the new and effective techniques for multi-objective optimization. In order to capture this renewed interest, this monograph presents the recent and ongoing research in multi-optimization techniques and their applications in chemical engineering. Following a brief introduction and general review on the development of multi-objective optimization applications in chemical engineering since 2000, the book gives a description of selected multi-objective techniques and then goes on to discuss chemical engineering applications. These applications are from diverse areas within chemical engineering, and are presented in detail. All chapters will be of interest to researchers in multi-objective optimization and/or chemical engineering; they can be read individually and used in one’s learning and research. Several exercises are included at the end of many chapters, for use by both practicing engineers and students.

**Evolutionary Algorithms for Solving Multi-Objective Problems** - Carlos Coello Coello, 2007-08-26

This textbook is a second edition of Evolutionary Algorithms for Solving Multi-Objective Problems, significantly expanded and adapted for the classroom. The various features of multi-objective evolutionary algorithms are presented here in an innovative and student-friendly fashion, incorporating state-of-the-art research. The book disseminates the application of evolutionary algorithm techniques to a variety of practical problems. It contains exhaustive appendices, index and bibliography and links to a complete set of teaching tutorials, exercises and solutions.

**Evolutionary Multi-Criterion Optimization** - Portugal Emo 200 (2003 Faro 2003-04-07)

This book constitutes the refereed proceedings of the Second International Conference on Evolutionary Multi-Criterion Optimization, EMO 2003, held in Faro, Portugal, in April 2003. The 56 revised full papers presented were carefully reviewed and selected from a total of 100 submissions. The papers are organized in topical sections on objective handling and problem decomposition, algorithm improvements, online adaptation, problem construction, performance analysis and comparison, alternative methods, implementation, and applications.

**Application of Evolutionary Algorithms for Multi-objective Optimization in VLSI and Embedded Systems** - M.C. Bhuvaneswari, 2014-08-20

This book describes how evolutionary algorithms (EA), including genetic algorithms (GA) and particle swarm optimization (PSO) can be utilized for solving multi-objective optimization problems in the area of embedded and VLSI system design. Many complex engineering optimization problems can be modelled as multi-objective formulations. This book provides an introduction to multi-objective optimization using meta-heuristic algorithms, GA and PSO and how they can be applied to problems like hardware/software partitioning in embedded systems, circuit partitioning in VLSI, design of operational amplifiers in analog VLSI, design space exploration in high-level synthesis, delay fault testing in VLSI testing and scheduling in heterogeneous distributed systems. It is shown how, in each case, the various aspects of the EA, namely its representation and operators like crossover, mutation, etc, can be separately formulated to solve these problems. This book is intended for design engineers and researchers in the field of VLSI and embedded system design. The book introduces the multi-objective GA and PSO in a simple and easily understandable way that will appeal to introductory readers.

**Multi-Objective Optimization in Theory and Practice I: Classical Methods** - Andre A. Keller, 2017-12-13

Multi-Objective Optimization in Theory and Practice is a traditional two-part approach to solving multi-objective optimization (MOO) problems namely the use of classical methods and evolutionary algorithms. This first
book is devoted to classical methods including the extended simplex method by Zeleny and preference-based techniques. This part covers three main topics through nine chapters. The first topic focuses on the design of such MOO problems, their complexities including nonlinearities and uncertainties, and optimality theory. The second topic introduces the founding solving methods including the extended simplex method to linear MOO problems and weighting objective methods. The third topic deals with particular structures of MOO problems, such as mixed-integer programming, hierarchical programming, fuzzy logic programming, and bimatrix games. Multi-Objective Optimization in Theory and Practice is a user-friendly book with detailed, illustrated calculations, examples, test functions, and small-size applications in Mathematica® (among other mathematical packages) and from scholarly literature. It is an essential handbook for students and teachers involved in advanced optimization courses in engineering, information science, and mathematics degree programs.

**NEO 2015**- Oliver Schütze 2016-09-15 This volume comprises a selection of works presented at the Numerical and Evolutionary Optimization (NEO) workshop held in September 2015 in Tijuana, Mexico. The development of powerful search and optimization techniques is of great importance in today’s world that requires researchers and practitioners to tackle a growing number of challenging real-world problems. In particular, there are two well-established and widely known fields that are commonly applied in this area: (i) traditional numerical optimization techniques and (ii) comparatively recent bio-inspired heuristics. Both paradigms have their unique strengths and weaknesses, allowing them to solve some challenging problems while still failing in others. The goal of the NEO workshop series is to bring together people from these and related fields to discuss, compare and merge their complimentary perspectives in order to develop fast and reliable hybrid methods that maximize the strengths and minimize the weaknesses of the underlying paradigms. Through this effort, we believe that the NEO can promote the development of new techniques that are applicable to a broader class of problems. Moreover, NEO fosters the understanding and adequate treatment of real-world problems particularly in emerging fields that affect us all such as health care, smart cities, big data, among many others. The extended papers the NEO 2015 that comprise this book make a contribution to this goal.

**Multi-objective Evolutionary Algorithms**- Sanaz Mostaghim 2005

**Parallel Problem Solving from Nature**- PPSN IX- Thomas Philip Runarsson 2006-09-13 This book constitutes the refereed proceedings of the 9th International Conference on Parallel Problem Solving from Nature, PPSN 2006. The book presents 106 revised full papers covering a wide range of topics, from evolutionary computation to swarm intelligence and bio-inspired computing to real-world applications. These are organized in topical sections on theory, new algorithms, applications, multi-objective optimization, evolutionary learning, as well as representations, operators, and empirical evaluation.

**Applications of Multi-objective Evolutionary Algorithms**- Carlos A. Coello Coello 2004 - Detailed MOEA applications discussed by international experts - State-of-the-art practical insights in tackling statistical optimization with MOEAs - A unique monograph covering a wide spectrum of real-world applications - Step-by-step discussion of MOEA applications in a variety of domains

**Evolutionary Computation in Scheduling**- Amir H. Gandomi 2020-04-09 Presents current developments in the field of evolutionary scheduling and demonstrates the applicability of evolutionary computational techniques to solving scheduling problems This book provides insight into the use of evolutionary computations (EC) in real-world scheduling, showing readers how to choose a specific evolutionary computation and how to validate the results using metrics and statistics. It offers a spectrum of real-world optimization problems, including applications of EC in industry and service organizations such as healthcare scheduling, aircraft industry, school timetabling, manufacturing systems, and transportation scheduling in the supply chain. It also features problems with different degrees of complexity, practical requirements, user constraints, and MOEC solution approaches. Evolutionary Computation in Scheduling starts.
with a chapter on scientometric analysis to analyze scientific literature in evolutionary computation in scheduling. It then examines the role and impacts of ant colony optimization (ACO) in job shop scheduling problems, before presenting the application of the ACO algorithm in healthcare scheduling. Other chapters explore task scheduling in heterogeneous computing systems and truck scheduling using swarm intelligence, application of sub-population scheduling algorithm in multi-population evolutionary dynamic optimization, task scheduling in cloud environments, scheduling of robotic disassembly in remanufacturing using the bees algorithm, and more. This book: Provides a representative sampling of real-world problems currently being tackled by practitioners Examines a variety of single-, multi-, and many-objective problems that have been solved using evolutionary computations, including evolutionary algorithms and swarm intelligence Consists of four main parts: Introduction to Scheduling Problems, Computational Issues in Scheduling Problems, Evolutionary Computation, and Evolutionary Computations for Scheduling Problems Evolutionary Computation in Scheduling is ideal for engineers in industries, research scholars, advanced undergraduates and graduate students, and faculty teaching and conducting research in Operations Research and Industrial Engineering.

Computational Intelligence and Intelligent Systems-Zhenhua Li 2009-11-03 Volumes CCIS 51 and LNCS 5812 constitute the proceedings of the Fourth Interational Symposium on Intelligence Computation and Applications, ISICA 2009, held in Huangshi, China, during October 23-25. ISICA 2009 attracted over 300 submissions. Through rigorous reviews, 58 papers were included in LNCS 5821, and 54 papers were collected in CCIS 51. ISICA conferences are one of the first series of international conferences on computational intelligence that combine elements of learning, adaptation, evolution and fuzzy logic to create programs as alternative solutions to artificial intelligence.


Design of Trajectory Optimization Approach for Space Maneuver Vehicle Skip Entry Problems-Runqi Chai 2019-07-30 This book explores the design of optimal trajectories for space maneuver vehicles (SMVs) using optimal control-based techniques. It begins with a comprehensive introduction to and overview of three main approaches to trajectory optimization, and subsequently focuses on the design of a novel hybrid optimization strategy that combines an initial guess generator with an improved gradient-based inner optimizer. Further, it highlights the development of multi-objective spacecraft trajectory optimization problems, with a particular focus on multi-objective transcription methods and multi-objective evolutionary algorithms. In its final sections, the book studies spacecraft flight scenarios with noise-perturbed dynamics and probabilistic constraints, and designs and validates new chance-constrained optimal control frameworks. The comprehensive and systematic treatment of practical issues in spacecraft trajectory optimization is one of the book’s major features, making it particularly suited for readers who are seeking practical solutions in spacecraft trajectory optimization. It offers a valuable asset for researchers, engineers, and graduate students in GNC systems, engineering optimization, applied optimal control theory, etc.

Multi-objective Optimization: Techniques And Applications In Chemical Engineering (Second Edition)-Rangaiah Gade Pandu 2016-12-22 Optimization is now essential in the design, planning and operation of chemical and related processes. Although process optimization for multiple objectives was studied in the 1970s and 1980s, it has attracted active research in the last 15 years, spurred by the new and effective techniques for multi-objective optimization (MOO). To capture this renewed interest, this monograph presents recent research in MOO techniques and applications in chemical engineering. Following a brief introduction and review of MOO applications in chemical engineering since 2000, the book presents selected MOO techniques and many chemical engineering applications in detail. In this second edition, several chapters from the first edition have been updated, one chapter is completely revised and three new chapters have been added. One of the new chapters describes three MS Excel programs useful for MOO of application problems. All the chapters will be of interest to
researchers in MOO and/or chemical engineering. Several exercises are included at the end of many chapters, for use by both practicing engineers and students.

**Search Methodologies**- Edmund K. Burke  
2013-10-18 The first edition of Search Methodologies: Introductory Tutorials in Optimization and Decision Support Techniques was originally put together to offer a basic introduction to the various search and optimization techniques that students might need to use during their research, and this new edition continues this tradition. Search Methodologies has been expanded and brought completely up to date, including new chapters covering scatter search, GRASP, and very large neighborhood search. The chapter authors are drawn from across Computer Science and Operations Research and include some of the world's leading authorities in their field. “As I embarked on the pleasant journey of reading through the chapters of this book, I became convinced that this is one of the best sources of introductory material on the search methodologies topic to be found. The book's subtitle, “Introductory Tutorials in Optimization and Decision Support Techniques”, aptly describes its aim, and the editors and contributors to this volume have achieved this aim with remarkable success. The chapters in this book are exemplary in giving useful guidelines for implementing the methods and frameworks described and offers valuable tutorials to students and researchers in the field. "Fred Glover, Leeds School of Business, University of Colorado Boulder, USA  
"[The book] aims to present a series of well written tutorials by the leading experts in their fields. Moreover, it does this by covering practically the whole possible range of topics in the discipline. It enables students and practitioners to study and appreciate the beauty and the power of some of the computational search techniques that are able to effectively navigate through search spaces that are sometimes inconceivably large. I am convinced that this second edition will build on the success of the first edition and that it will prove to be just as popular." Jacek Blazewicz, Institute of Computing Science, Poznan University of Technology and Institute of Bioorganic Chemistry, Polish Academy of Sciences

**Artificial Intelligence on Fashion and Textiles**- Wai Keung Wong  
2018-10-13 The book includes the Proceedings of the Artificial Intelligence on Fashion and Textiles conference 2018 which provides state-of-the-art techniques and applications of AI in the fashion and textile industries. It is essential reading for scientists, researchers and R&D professionals working in the field of AI with applications in the fashion and textile industry; managers in the fashion and textile enterprises; and anyone with an interest in the applications of AI. Over the last two decades, with the great advancement of computer technology, academic research in artificial intelligence (AI) and its applications in fashion and textile supply chain has been becoming a very hot topic and has received greater attention from both academics and industrialists. A number of AI-related techniques has been successfully employed and proven to handle the problems including fashion sales forecasting, supply chain optimization, planning and scheduling, textile material defect detection, fashion and textile image recognition, fashion image and style retrieval, human body modeling and fitting, etc.

**Recent Advances on Hybrid Approaches for Designing Intelligent Systems**- Oscar Castillo  
2014-03-26 This book describes recent advances on hybrid intelligent systems using soft computing techniques for diverse areas of application, such as intelligent control and robotics, pattern recognition, time series prediction and optimization complex problems. Soft Computing (SC) consists of several intelligent computing paradigms, including fuzzy logic, neural networks and bio-inspired optimization algorithms, which can be used to produce powerful hybrid intelligent systems. The book is organized in five main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of type-2 fuzzy logic, which basically consists of papers that propose new models and applications for type-2 fuzzy systems. The second part contains papers with the main theme of bio-inspired optimization algorithms, which are basically papers using nature-inspired techniques to achieve optimization of complex optimization problems in diverse areas of application. The third part contains papers that deal with new models and applications of neural networks in real world problems. The fourth part contains
papers with the theme of intelligent optimization methods, which basically consider the proposal of new methods of optimization to solve complex real world optimization problems. The fifth part contains papers with the theme of evolutionary methods and intelligent computing, which are papers considering soft computing methods for applications related to diverse areas, such as natural language processing, recommending systems and optimization.

**Optimization in Food Engineering** - Ferruh Erdogdu 2008-12-09 While mathematically sophisticated methods can be used to better understand and improve processes, the nonlinear nature of food processing models can make their dynamic optimization a daunting task. With contributions from a virtual who’s who in the food processing industry, Optimization in Food Engineering evaluates the potential uses and limitations of optimization techniques for food processing, including classical methods, artificial intelligence-genetic algorithms, multi-objective optimization procedures, and computational fluid dynamics. The book begins by delineating the fundamentals and methods for analytical and numerical procedures. It then covers optimization techniques and how they specifically apply to food processing. The final section digs deep into fundamental food processes and provides detailed explanation and examples from the most experienced and published authors in the field. This includes a range of processes from optimization strategies for improving the performance of batch reactors to the optimization of conventional thermal processing, microwave heating, freeze drying, spray drying, and refrigeration systems, to structural optimization techniques for developing beverage containers, optimization approaches for impingement processing, and optimal operational planning methodologies. Each chapter presents the required parameters for the given process with the optimization procedure to apply. An increasing part of the food processor’s job is to optimize systems to squeeze more dollars out of overhead to offset rising utility and transportation costs. Logically combining optimization techniques from many sources into a single volume focused on food production processes, this book provides real solutions to increases in energy, healthcare, and product liability costs that impact the bottom line in food production.

**Nonlinear Multiobjective Optimization** - Kaisa Miettinen 2012-12-06 Problems with multiple objectives and criteria are generally known as multiple criteria optimization or multiple criteria decision-making (MCDM) problems. So far, these types of problems have typically been modelled and solved by means of linear programming. However, many real-life phenomena are of a nonlinear nature, which is why we need tools for nonlinear programming capable of handling several conflicting or incommensurable objectives. In this case, methods of traditional single objective optimization and linear programming are not enough; we need new ways of thinking, new concepts, and new methods - nonlinear multiobjective optimization. Nonlinear Multiobjective Optimization provides an extensive, up-to-date, self-contained and consistent survey, review of the literature and of the state of the art on nonlinear (deterministic) multiobjective optimization, its methods, its theory and its background. The amount of literature on multiobjective optimization is immense. The treatment in this book is based on approximately 1500 publications in English printed mainly after the year 1980. Problems related to real-life applications often contain irregularities and nonsmoothnesses. The treatment of nondifferentiable multiobjective optimization in the literature is rather rare. For this reason, this book contains material about the possibilities, background, theory and methods of nondifferentiable multiobjective optimization as well. This book is intended for both researchers and students in the areas of (applied) mathematics, engineering, economics, operations research and management science; it is meant for both professionals and practitioners in many different fields of application. The intention has been to provide a consistent summary that may help in selecting an appropriate method for the problem to be solved. It is hoped the extensive bibliography will be of value to researchers.

**Advances in Evolutionary Algorithms** - Chang Wook Ahn 2007-05-22 Genetic and evolutionary algorithms (GEAs) have often achieved an enviable success in solving optimization problems in a wide range of disciplines. This book provides effective optimization algorithms for solving a broad class of problems quickly, accurately, and reliably by employing evolutionary mechanisms.
Research Anthology on Multi-Industry Uses of Genetic Programming and Algorithms

Management Association, Information Resources 2020-12-05 Genetic programming is a new and evolutionary method that has become a novel area of research within artificial intelligence known for automatically generating high-quality solutions to optimization and search problems. This automatic aspect of the algorithms and the mimicking of natural selection and genetics makes genetic programming an intelligent component of problem solving that is highly regarded for its efficiency and vast capabilities. With the ability to be modified and adapted, easily distributed, and effective in large-scale/wide variety of problems, genetic algorithms and programming can be utilized in many diverse industries. This multi-industry uses vary from finance and economics to business and management all the way to healthcare and the sciences. The use of genetic programming and algorithms goes beyond human capabilities, enhancing the business and processes of various essential industries and improving functionality along the way. The Research Anthology on Multi-Industry Uses of Genetic Programming and Algorithms covers the implementation, tools and technologies, and impact on society that genetic programming and algorithms have had throughout multiple industries. By taking a multi-industry approach, this book covers the fundamentals of genetic programming through its technological benefits and challenges along with the latest advancements and future outlooks for computer science. This book is ideal for academicians, biological engineers, computer programmers, scientists, researchers, and upper-level students seeking the latest research on genetic programming.

Numerical and Evolutionary Optimization

2018-Adriana Lara 2019-11-19 This book was established after the 6th International Workshop on Numerical and Evolutionary Optimization (NEO), representing a collection of papers on the intersection of the two research areas covered at this workshop: numerical optimization and evolutionary search techniques. While focusing on the design of fast and reliable methods lying across these two paradigms, the resulting techniques are strongly applicable to a broad class of real-world problems, such as pattern recognition, routing, energy, lines of production, prediction, and modeling, among others. This volume is intended to serve as a useful reference for mathematicians, engineers, and computer scientists to explore current issues and solutions emerging from these mathematical and computational methods and their applications.

Innovization-Kalyanmoy Deb 2016-06-12 Every designer wants to know what makes a product or process optimal. This book suggests a holistic approach to optimization that involves two steps: find a set of trade-off optimal solutions involving two or more conflicting objectives related to the problem, and then analyze these high-performing solutions to determine solution principles that commonly prevail among these solutions. Since the solutions are optimal, such common principles are likely to exist; and since these principles are common to many solutions they are likely to provide robust, reliable solution principles. The author is one of the leading researchers in multiobjective optimization, and an expert in design methodology. In this book he offers introductions to innovation in design; multiobjective optimization, in particular evolutionary multiobjective optimization (EMO) techniques that find multiple, trade-off, optimal solutions; and knowledge extraction from multivariate data using graphical, regression and clustering techniques. He then introduces his innovization methodology for revealing new, innovative design principles related to decision variables and objectives, and he demonstrates it through engineering case studies, in particular product and process design problems. The book will be of benefit to practitioners, researchers and students engaged with issues of optimal design, in particular in domains such as engineering design, product design, engineering optimization, manufacturing, process design and complex systems. The sample computer code referenced is available from the author’s website.

Data-Driven Evolutionary Optimization

Yaochu Jin 2021-06-28 Intended for researchers and practitioners alike, this book covers carefully selected yet broad topics in optimization, machine learning, and metaheuristics. Written by world-leading academic researchers who are extremely experienced in industrial applications, this self-contained book is the first of its kind that provides comprehensive background knowledge, particularly practical guidelines, and state-of-the-art techniques. New algorithms are carefully explained, further elaborated with pseudocode or
flowcharts, and full working source code is made freely available. This is followed by a presentation of a variety of data-driven single- and multi-objective optimization algorithms that seamlessly integrate modern machine learning such as deep learning and transfer learning with evolutionary and swarm optimization algorithms. Applications of data-driven optimization ranging from aerodynamic design, optimization of industrial processes, to deep neural architecture search are included.