Optimization Techniques By Gupta

Mechanical design includes an optimization process in which designers always consider objectives such as strength, deflection, weight, wear, corrosion, etc. depending on the requirements. However, design optimization for a complete mechanical assembly leads to a complicated objective function with a large number of design variables. It is a good practice to apply optimization techniques for individual components or intermediate assemblies than a complete assembly. Analytical or numerical methods for calculating the extreme values of a function may perform well in many practical cases, but may fail in more complex design situations. In real design problems, the number of design parameters can be very large and their influence on the value to be optimized (the goal function) can be very complicated, having nonlinear character. In these complex cases, advanced optimization algorithms offer solutions to the problems, because they find a solution near to the global optimum within reasonable time and computational costs. Mechanical Design Optimization Using Advanced Optimization Techniques presents a comprehensive review on latest research and development trends for design optimization of mechanical elements and devices. Using examples of various mechanical elements and devices, the possibilities for design optimization with advanced optimization techniques are demonstrated. Basic and advanced concepts of traditional and advanced optimization techniques are presented, along with real case studies, results of applications of the proposed techniques, and the best optimization strategies to achieve best performance are highlighted. Furthermore, a novel advanced optimization method named teaching-learning-based optimization (TLBO) is presented in this book and this method shows

better performance with less computational effort for the large scale problems. Mechanical Design Optimization Using Advanced Optimization Techniques is intended for designers, practitioners, managers, institutes involved in design related projects, applied research workers, academics, and graduate students in mechanical and industrial engineering and will be useful to the industrial product designers for realizing a product as it presents new models and optimization techniques to make tasks easier, logical, efficient and effective. .

This volume constitutes the refereed proceedings of the 5th International Conference on Contemporary Computing, IC3 2010, held in Noida, India, in August 2011. The 42 revised full papers presented together with 7 short papers were carefully reviewed and selected from 162 submissions. The papers are organized in topical sections on: algorithm; applications; systems (hardware and software); biomedical informations; poster papers.

When it comes to optimization techniques, in some cases, the available information from real models may not be enough to construct either a probability distribution or a membership function for problem solving. In such cases, there are various theories that can be used to quantify the uncertain aspects. Optimization Techniques for Problem Solving in Uncertainty is a scholarly reference resource that looks at uncertain aspects involved in different disciplines and applications. Featuring coverage on a wide range of topics including uncertain preference, fuzzy multilevel programming, and metaheuristic applications, this book is geared towards engineers, managers, researchers, and post-graduate students seeking emerging research in the field of optimization.

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.

This book provides a platform for exploring nature-inspired optimization techniques in the context of imaging applications. Optimization has become part and parcel of all computational vision applications, and since the amount of data used in these applications is vast, the need for optimization techniques has increased exponentially. These accuracy and complexity are a major area of concern when it comes to practical applications. However, these optimization techniques have not yet been fully explored in the context of imaging applications. By presenting interdisciplinary concepts, ranging from optimization to image processing, the book appeals to a broad readership, while also encouraging budding engineers to pursue and employ innovative nature-inspired techniques for image processing applications.

This book provides a detailed understanding of optimization methods as they are implemented in a variety of manufacturing, fabrication and machining processes. It covers the implementation of statistical methods, multi-criteria decision making methods and evolutionary techniques for single and multi-objective optimization to improve quality, productivity, and sustainability in manufacturing. It reports on the theoretical aspects, special features, recent research and latest development in the field. Optimization of Manufacturing Processes is a

valuable source of information for researchers and practitioners, as it fills the gap where no dedicated book is available on intelligent manufacturing/modeling and optimization in manufacturing. Readers will develop an understanding of the implementation of statistical and evolutionary techniques for modeling and optimization in manufacturing.

This two-volume set (CCIS 1229 and CCIS 1230) constitutes the refereed proceedings of the 5th International Conference on Recent Developments in Science, Engineering and Technology, REDSET 2019, held in Gurugram, India, in November 2019. The 74 revised full papers presented were carefully reviewed and selected from total 353 submissions. The papers are organized in topical sections on data centric programming; next generation computing; social and web analytics; security in data science analytics; big data analytics. During the past decades scheduling has been among the most studied op- mization problemsanditisstillanactiveareaofresearch!Schedulingappears in many areas of science, engineering and industry and takes di?erent forms depending on the restrictions and optimization criteria of the operating en- ronments [8]. For instance, in optimization and computer science, scheduling has been de?ned as "the allocation of tasks to resources over time in order to achieve optimality in one or more objective criteria in an e?cient way" and in production as "production schedule, i. e. , the planning of the production or the sequence of operations according to which jobs pass through machines and is optimal with respect to certain optimization criteria. " Although there is a standardized form of stating any scheduling problem, namely "e?cient allocation ofn jobs onm machines –which can process no more than one activity at a time– with the objective to optimize some - jective function of the job completion times", scheduling is in fact a family of problems. Indeed, several parameters

intervene in the problem de?nition: (a) job characteristics (preemptive or not, precedence constraints, release dates, etc.); (b) resource environment (single vs. parallel machines, un- lated machines, identical or uniform machines, etc.); (c) optimization criteria (minimize total tardiness, the number of late jobs, makespan, ?owtime, etc. ; maximize resource utilization, etc.); and, (d) scheduling environment (static vs. dynamic,intheformerthenumberofjobstobeconsideredandtheirready times are available while in the later the number of jobs and their charact- istics change over time).

"This publication presents a series of practical applications of different Soft Computing techniques to real-world problems, showing the enormous potential of these techniques in solving problems"--Provided by publisher.

"This book contains the latest research developments in manufacturing technology and its optimization, and demonstrates the fundamentals of new computational approaches and the range of their potential application"--Provided by publisher.

"This work is a comprehensive, four-volume reference addressing major issues, trends, and areas for advancement in information management research, containing chapters investigating human factors in IT management, as well as IT governance, outsourcing, and diffusion"--Provided by publisher.

Electric vehicles/hybrid electric vehicles (EV/HEV) commercialization is still a challenge in industries in terms of performance and cost. The performance along with cost reduction are two tradeoffs which need to be researched to arrive at an optimal solution. This book focuses on the convergence of various technologies involved in EV/HEV. The book brings together the research that is being carried out in the field of EV/HEV whose leading role is by optimization

techniques with artificial intelligence (AI). Other featured research includes green drive schemes which involve the possible renewable energy sources integration to develop eco-friendly green vehicles, as well as Internet of Things (IoT)-based techniques for EV/HEVs. Electric vehicle research involves multi-disciplinary expertise from electrical, electronics, mechanical engineering and computer science. Consequently, this book serves as a point of convergence wherein all these domains are addressed and merged and will serve as a potential resource for industrialists and researchers working in the domain of electric vehicles. This two-volume book presents outcomes of the 7th International Conference on Soft Computing for Problem Solving, SocProS 2017. This conference is a joint technical collaboration between the Soft Computing Research Society, Liverpool Hope University (UK), the Indian Institute of Technology Roorkee, the South Asian University New Delhi and the National Institute of Technology Silchar, and brings together researchers, engineers and practitioners to discuss thought-provoking developments and challenges in order to select potential future directions The book presents the latest advances and innovations in the interdisciplinary areas of soft computing, including original research papers in the areas including, but not limited to, algorithms (artificial immune systems, artificial neural networks, genetic algorithms, genetic programming, and particle swarm optimization) and applications (control systems, data mining and clustering, finance, weather forecasting, game theory, business and forecasting applications). It is a valuable resource for both young and experienced researchers dealing with complex and intricate real-world problems for which finding a solution by traditional methods is a difficult task.
This book bridges the widening gap between two crucial constituents of computational

intelligence: the rapidly advancing technologies of machine learning in the digital information age, and the relatively slow-moving field of general-purpose search and optimization algorithms. With this in mind, the book serves to offer a data-driven view of optimization, through the framework of memetic computation (MC). The authors provide a summary of the complete timeline of research activities in MC – beginning with the initiation of memes as local search heuristics hybridized with evolutionary algorithms, to their modern interpretation as computationally encoded building blocks of problem-solving knowledge that can be learned from one task and adaptively transmitted to another. In the light of recent research advances, the authors emphasize the further development of MC as a simultaneous problem learning and optimization paradigm with the potential to showcase human-like problem-solving prowess; that is, by equipping optimization engines to acquire increasing levels of intelligence over time through embedded memes learned independently or via interactions. In other words, the adaptive utilization of available knowledge memes makes it possible for optimization engines to tailor custom search behaviors on the fly – thereby paving the way to general-purpose problem-solving ability (or artificial general intelligence). In this regard, the book explores some of the latest concepts from the optimization literature, including, the sequential transfer of knowledge across problems, multitasking, and large-scale (high dimensional) search, systematically discussing associated algorithmic developments that align with the general theme of memetics. The presented ideas are intended to be accessible to a wide audience of scientific researchers, engineers, students, and optimization practitioners who are familiar with the commonly used terminologies of evolutionary computation. A full appreciation of the mathematical formalizations and algorithmic contributions requires an elementary background

in probability, statistics, and the concepts of machine learning. A prior knowledge of surrogate-assisted/Bayesian optimization techniques is useful, but not essential.

This book presents fundamental concepts of optimization problems and its real-world applications in various fields. The core concepts of optimization, formulations and solution procedures of various real-world problems are provided in an easy-to-read manner. The unique feature of this book is that it presents unified knowledge of the modelling of real-world decision-making problems and provides the solution procedure using the appropriate optimization techniques. The book will help students, researchers, and faculty members to understand the need for optimization techniques for obtaining optimal solution for the decision-making problems. It provides a sound knowledge of modelling of real-world problems using optimization techniques. It is a valuable compendium of several optimization techniques for solving real-world application problems using optimization software LINGO. The book is useful for academicians, practitioners, students and researchers in the field of OR. It is written in simple language with a detailed explanation of the core concepts of optimization techniques. Readers of this book will understand the formulation of real-world problems and their solution procedures obtained using the appropriate optimization techniques.

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. Several exercises are included at the end of many chapters.

Special features of the book 1. A very comprehensive and accessible approach in the

presentation of the material. 2. A variety of solved examples to illustrate the theoretical results. 3. A large number of unsolved exercises for the students are given for practice at the end of each section. 4. Solution to each unsolved examples are given at the end of each exercise. Optimization Techniques In Operation ResearchI. K. International Pvt Ltd
The International Conference on Industrial Engineering and Engineering Management is sponsored by the Chinese Industrial Engineering Institution, CMES, which is the only national-level academic society for Industrial Engineering. The conference is held annually as the major event in this arena. Being the largest and the most authoritative international academic conference held in China, it provides an academic platform for experts and entrepreneurs in the areas of international industrial engineering and management to exchange their research findings. Many experts in various fields from China and around the world gather together at the conference to review, exchange, summarize and promote their achievements in the fields of industrial engineering and engineering management. For example, some experts pay special attention to the current state of the application of related techniques in China as well as their future prospects, such as green product design, quality control and management, supply chain and logistics management to address the need for, amongst other things low-carbon, energy-saving and emission-reduction. They also offer opinions on the outlook for the development of related techniques. The proceedings offers impressive methods and concrete applications for experts from colleges and universities, research institutions and enterprises who are engaged in theoretical research into industrial engineering and engineering management and its applications. As all the papers are of great value from both an academic and a practical point of view, they also provide research data for international scholars who are investigating

Chinese style enterprises and engineering management.

The book provides a platform for dealing with the flaws and failings of the soft computing paradigm through different manifestations. The different chapters highlight the necessity of the hybrid soft computing methodology in general with emphasis on several application perspectives in particular. Typical examples include (a) Study of Economic Load Dispatch by Various Hybrid Optimization Techniques, (b) An Application of Color Magnetic Resonance Brain Image Segmentation by Para Optimus LG Activation Function, (c) Hybrid Rough-PSO Approach in Remote Sensing Imagery Analysis, (d) A Study and Analysis of Hybrid Intelligent Techniques for Breast Cancer Detection using Breast Thermograms, and (e) Hybridization of 2D-3D Images for Human Face Recognition. The elaborate findings of the chapters enhance the exhibition of the hybrid soft computing paradigm in the field of intelligent computing.

In a context of global competition, the optimization of logistics systems is inescapable. Logistics Systems: Design and Optimization falls within this perspective and presents twelve chapters that well illustrate the variety and the complexity of logistics activities. Each chapter is written by recognized researchers who have been commissioned to survey a specific topic or emerging area of logistics. The first chapter, by Riopel, Langevin, and Campbell, develops a framework for the entire book. It classifies logistics decisions and highlights the relevant linkages to logistics decisions. The intricacy of these linkages demonstrates how thoroughly the decisions are interrelated and underscores the complexity of managing logistics activities. Each of the chapters focus on quantitative methods for the design and optimization of logistics systems.

"This anthology combines 15 years of microstrip antenna technology research into one

significant volume and includes a special introductory tutorial by the co-editors. Covering theory, design and modeling techniques and methods, this source book is an excellent reference tool for engineers who want to become more familiar with microstrip antennas and microwave systems. Proven antenna designs, novel solutions to practical design problemsand relevant papers describing the theory of operation and analysis of microstrip antennas are contained within this convenient reference."

This book presents selected papers from the 4th International Conference on Micro-Electronics and Telecommunication Engineering, held at SRM Institute of Science and Technology, Ghaziabad, India, during 26-7 September 2020. It covers a wide variety of topics in micro-electronics and telecommunication engineering, including micro-electronic engineering, computational remote sensing, computer science and intelligent systems, signal and image processing, and information and communication technology.

The book presents recently developed efficient metaheuristic optimization algorithms and their applications for solving various optimization problems in civil engineering. The concepts can also be used for optimizing problems in mechanical and electrical engineering.

The book presents a collection of peer-reviewed articles from the International Conference on Advances and Applications of Artificial Intelligence and Machine Learning - ICAAAIML 2020. The book covers research in the areas of artificial intelligence, machine learning, and deep learning applications in healthcare, agriculture, business and security. This volume contains research papers from academicians, researchers as well as students. There are also papers on core

concepts of computer networks, intelligent system design and deployment, real-time systems, wireless sensor network, sensors and sensor nodes, software engineering, and image processing. This book will be a valuable resource for students, academics and practitioners in industry working on AI applications. For reasons both financial and environmental, there is a perpetual need to optimize the design and operating conditions of industrial process systems in order to improve their performance, energy efficiency, profitability, safety and reliability. However, with most chemical engineering application problems having many variables with complex inter-relationships, meeting these optimization objectives can be challenging. This is where Multi-Objective Optimization (MOO) is useful to find the optimal trade-offs among two or more conflicting objectives. This book provides an overview of the recent developments and applications of MOO for modeling, design and operation of chemical, petrochemical, pharmaceutical, energy and related processes. It then covers important theoretical and computational developments as well as specific applications such as metabolic reaction networks, chromatographic systems, CO_2 emissions targeting for petroleum refining units, ecodesign of chemical processes, ethanol purification and cumene process design. Multi-Objective Optimization in Chemical Engineering: Developments and Applications is an invaluable resource

for researchers and graduate students in chemical engineering as well as industrial practitioners and engineers involved in process design, modeling and optimization.

This book "optimization theory" covers the basic techniques of operations research needed in arriving at an effective decision in areas of management, finance, production, marketing, personnel, transportation, public health, military, planning and agriculture, etc. The persons connected with management and business executives, are therefore, supposed to have a good knowledge of the techniques of optimization theory. It is intendent that this book provides a sound basic knowledge on techniques of operations research.

This book proposes novel memory hierarchies and software optimization techniques for the optimal utilization of memory hierarchies. It presents a wide range of optimizations, progressively increasing in the complexity of analysis and of memory hierarchies. The final chapter covers optimization techniques for applications consisting of multiple processes found in most modern embedded devices.

This book sheds light on the development of traditional and advanced optimization methods. Their use in various tradition and non-tradition manufacturing and machining processes for an improved manufacturability is

reported. This includes key elements of implementing conventional statistical methods, multi-objective and multi-criteria decision-making methods and evolution of single and multi-target optimization techniques using soft computing to enhance production performance, efficiency and sustainability in manufacturing. The latest research in this area as well as possible avenues of future research are also highlighted.

This book focuses on source-to-source code transformations that remove addressing-related overhead present in most multimedia or signal processing application programs. This approach is complementary to existing compiler technology. What is particularly attractive about the transformation flow pre sented here is that its behavior is nearly independent of the target processor platform and the underlying compiler. Hence, the different source code trans formations developed here lead to impressive performance improvements on most existing processor architecture styles, ranging from RISCs like ARM7 or MIPS over Superscalars like Intel-Pentium, PowerPC, DEC-Alpha, Sun and HP, to VLIW DSPs like TI C6x and Philips TriMedia. The source code did not have to be modified between processors to obtain these results. Apart from the performance improvements, the estimated energy is also significantly reduced for a given application run. These results were not obtained for academic codes but

for realistic and rep resentative applications, all selected from the multimedia domain. That shows the industrial relevance and importance of this research. At the same time, the scientific novelty and quality of the contributions have lead to several excellent papers that have been published in internationally renowned conferences like e. g. DATE. This book is hence of interest for academic researchers, both because of the overall description of the methodology and related work context and for the detailed descriptions of the compilation techniques and algorithms.

"This book provides insight into the latest findings concerning data warehousing, data mining, and their applications in everyday human activities"--Provided by publisher.

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. Exchange of information and innovative ideas are necessary to accelerate the development of technology. With advent of technology, intelligent and soft computing techniques came into existence with a wide scope of implementation in engineering sciences. Keeping this ideology in preference, this book includes the insights that reflect the 'Advances in Computer and Computational Sciences' from upcoming researchers and leading academicians across the globe. It contains high-quality peer-reviewed papers of 'International Conference on Computer, Communication and Computational Sciences (ICCCCS 2016), held during 12-13 August, 2016 in Ajmer, India. These papers are arranged in the form of chapters. The content of the book is divided into two volumes that cover variety of topics such as intelligent hardware and software design, advanced

communications, power and energy optimization, intelligent techniques used in internet of things, intelligent image processing, advanced software engineering, evolutionary and soft computing, security and many more. This book helps the perspective readers' from computer industry and academia to derive the advances of next generation computer and communication technology and shape them into real life applications.

Presently, general-purpose optimization techniques such as Simulated Annealing, and Genetic Algorithms, have become standard optimization techniques. Concerted research efforts have been made recently in order to invent novel optimization techniques for solving real life problems, which have the attributes of memory update and population-based search solutions. The book describes a variety of these novel optimization techniques which in most cases outperform the standard optimization techniques in many application areas. New Optimization Techniques in Engineering reports applications and results of the novel optimization techniques considering a multitude of practical problems in the different engineering disciplines – presenting both the background of the subject area and the techniques for solving the problems.

ACTIVE ELECTRICAL DISTRIBUTION NETWORK Discover the major issues, solutions, techniques, and applications of active electrical distribution networks

with this edited resource Active Electrical Distribution Network: A Smart Approach delivers a comprehensive and insightful guide dedicated to addressing the major issues affecting an often-overlooked sector of the electrical industry: electrical distribution. The book discusses in detail a variety of challenges facing the smart electrical distribution network and presents a detailed framework to address these challenges with renewable energy integration. The book offers readers fulsome analyses of active distribution networks for smart grids, as well as active control approached for distributed generation, electric vehicle technology, smart metering systems, smart monitoring devices, smart management systems, and various storage systems. It provides a treatment of the analysis, modeling, and implementation of active electrical distribution systems and an exploration of the ways professionals and researchers from academia and industry attempt to meet the significant challenges facing them. From smart home energy management systems to approaches for the reconfiguration of active distribution networks with renewable energy integration, readers will also enjoy: A thorough introduction to electrical distribution networks, including conventional and smart networks An exploration of various existing issues related to the electrical distribution network An examination of the importance of harmonics mitigation in smart distribution networks, including

active filters A treatment of reactive power compensation under smart distribution networks, including techniques like capacitor banks and smart devices An analysis of smart distribution network reliability assessment and enhancement Perfect for professionals, scientists, technologists, developers, designers, and researchers in smart grid technologies, security, and information technology, Active Electrical Distribution Network: A Smart Approach will also earn a place in the libraries of policy and administration professionals, as well as those involved with electric utilities, electric policy development, and regulating authorities. Talks about the applications of management science to: Multi-Criteria Decision Making, Operations and Supply Chain Management, Productivity Management (DEA), and Financial Management. This book provides an overview of some of the most essential aspects of the discipline. It is suitable for persons interested in management or management science.

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