

Metaheuristics Optimization Engineering Modeling Technologies

This book offers a timely review of cutting-edge applications of computational intelligence to business management and financial analysis. It covers a wide range of intelligent and optimization techniques, reporting in detail on their application to real-world problems relating to portfolio management and demand forecasting, decision making, knowledge acquisition, and supply chain scheduling and management.

The digital age is ripe with emerging advances and applications in technological innovations. Mimicking the structure of complex systems in nature can provide new ideas on how to organize mechanical and personal systems. The Handbook of Research on Modeling, Analysis, and Application of Nature-Inspired Metaheuristic Algorithms is an essential scholarly resource on current algorithms that have been inspired by the natural world. Featuring coverage on diverse topics such as cellular automata, simulated annealing, genetic programming, and differential evolution, this reference publication is ideal for scientists, biological engineers, academics, students, and researchers that are interested in discovering what models from nature influence the current technology-centric world.

This book discusses the application of metaheuristic algorithms in a number of important optimization problems in civil engineering. Advances in civil engineering technologies require greater accuracy, efficiency and speed in terms of the analysis and design of the corresponding systems. As such, it is not surprising that novel methods have been developed for the optimal design of real-world systems and models with complex configurations and large numbers of elements. This book is intended for scientists, engineers and students wishing to explore the potential of newly developed metaheuristics in practical problems. It presents concepts that are not only applicable to civil engineering problems, but can also be used for optimizing problems related to mechanical, electrical, and industrial engineering. It is an essential resource for civil, mechanical and electrical engineers who use optimization methods for design, as well as for students and researchers interested in structural optimization.

This book presents efficient metaheuristic algorithms for optimal design of structures. Many of these algorithms are developed by the author and his colleagues, consisting of Democratic Particle Swarm Optimization, Charged System Search, Magnetic Charged System Search, Field of Forces Optimization, Dolphin Echolocation Optimization, Colliding Bodies Optimization, Ray Optimization. These are presented together with algorithms which were developed by other authors and have been successfully applied to various optimization problems. These consist of Particle Swarm Optimization, Big Bang-Big Crunch Algorithm, Cuckoo Search Optimization, Imperialist Competitive Algorithm, and Chaos Embedded Metaheuristic Algorithms. Finally a multi-objective optimization method is presented to solve large-scale structural problems based on the Charged System Search algorithm. The concepts and algorithms presented in this book are not only applicable to optimization of skeletal structures and finite element models, but can equally be utilized for optimal design of other systems such as hydraulic and electrical networks.

In the second edition seven new chapters are added consisting of the new developments in the field of optimization. These chapters consist of the Enhanced Colliding Bodies Optimization, Global Sensitivity Analysis, Tug of War Optimization, Water Evaporation Optimization, Vibrating Particle System Optimization and Cyclical Parthenogenesis Optimization algorithms. A chapter is also devoted to optimal design of large scale structures.

Applications of Computational Intelligence in Business Management

An Introduction with Metaheuristic Applications

17. Optimum Performance-Based Seismic Design of Frames Using Metaheuristic Optimization Algorithms

Engineering Optimization

Proceedings of the 18th International Conference on New Trends in Intelligent Software Methodologies, Tools and Techniques (SoMeT_19)

Nature-Inspired Methods for Metaheuristics Optimization

The book covers cutting-edge and advanced research in modelling and graphics. Gathering high-quality papers presented at the First International Conference on Emerging Technology in Modelling and Graphics, held from 6 to 8 September 2018 in Kolkata, India, it addresses topics including: image processing and analysis, image segmentation, digital geometry for computer imaging, image and security, biometrics, video processing, medical imaging, and virtual and augmented reality.

This timely book deals with a current topic, i.e. the applications of metaheuristic algorithms, with a primary focus on optimization problems in civil engineering. The first chapter offers a concise overview of different kinds of metaheuristic algorithms, explaining their advantages in solving complex engineering problems that cannot be effectively tackled by traditional methods, and citing the most important works for further reading. The remaining chapters report on advanced studies on the applications of certain metaheuristic algorithms to specific engineering problems. Genetic algorithm, bat algorithm, cuckoo search, harmony search and simulated annealing are just some of the methods presented and discussed step by step in real-application contexts, in which they are often used in combination with each other. Thanks to its synthetic yet meticulous and practice-oriented approach, the book is a perfect guide for graduate students, researchers and professionals willing to applying metaheuristic algorithms in civil engineering and other related engineering fields, such as mechanical, transport and geotechnical engineering. It is also a valuable aid for both lectures and advanced engineering students.

Due to increasing industry 4.0 practices, massive industrial process data is now available for researchers for modelling and optimization. Artificial Intelligence methods can be applied to the ever-increasing process data to achieve robust control against foreseen and unforeseen system fluctuations. Smart computing techniques, machine learning, deep learning, computer vision, for example, will be inseparable from the highly automated factories of tomorrow. Effective cybersecurity will be a must for all Internet of Things (IoT) enabled work and office spaces.

This book addresses metaheuristics in all aspects of Industry 4.0. It covers metaheuristic applications in IoT, cyber physical systems, control systems, smart computing, artificial intelligence, sensor networks, robotics, cybersecurity, smart factory, predictive analytics and more. Key features: Includes industrial case studies. Includes chapters on cyber physical systems, machine learning, deep learning, cybersecurity, robotics, smart manufacturing and predictive analytics. surveys current trends and challenges in metaheuristics and industry 4.0. Metaheuristic Algorithms in Industry 4.0 provides a guiding light to engineers, researchers, students, faculty and other professionals engaged in exploring and implementing industry 4.0 solutions in various systems and processes.

This book provides both the research and practitioner communities with a comprehensive coverage of the metaheuristic methodologies that have proven to be successful in a wide variety of real-world problem settings. Moreover, it is these metaheuristic strategies that hold particular promise for success in the future. The various chapters serve as stand alone presentations giving both the necessary background underpinnings as well as practical guides for implementation.

Optimization Using Evolutionary Algorithms and Metaheuristics

Theory and Practical Applications

Modeling, Analysis, and Applications in Metaheuristic Computing: Advancements and Trends

Advances in Computational Intelligence and Communication Technology

Handbook of Research on Smart Technology Models for Business and Industry

Networked Digital Technologies

"This book is a collection of the latest developments, models, and applications within the transdisciplinary fields related to metaheuristic computing, providing readers with insight into a wide range of topics such as genetic algorithms, differential evolution, and ant colony optimization"--Provided by publisher.

This volume contains the peer-reviewed proceedings of the International Conference on Modelling and Simulation (MS-17), held in Kolkata, India, 4th-5th November 2017, organized by the Association for the Advancement of Modelling and Simulation Techniques in Enterprises (AMSE, France) in association with the Institution of Engineering Technology (IET, UK), Kolkata Network. The contributions contained here showcase some recent advances in modelling and simulation across various aspects of science and technology. This book brings together articles describing applications of modelling and simulation techniques in fields as diverse as physics, mathematics, electrical engineering, industrial electronics, control, automation, power systems, energy and robotics. It includes a special section on mechanical, fuzzy, optical and opto-electronic control of oscillations. It provides a snapshot of the state of the art in modelling and simulation methods and their applications, and will be of interest to researchers and engineering professionals from industry, academia and research organizations.

"This 10-volume compilation of authoritative, research-based articles contributed by thousands of researchers and experts from all over the world emphasized modern issues and the presentation of potential opportunities, prospective solutions, and future directions in the field of information science and technology"--Provided by publisher.

This book features selected contributions in the areas of modeling, simulation, and optimization. The contributors discuss requirements in problem solving for modeling, simulation, and optimization. Modeling, simulation, and optimization have increased in demand in exponential ways and how potential solutions might be reached. They describe how new technologies in computing and engineering have reduced the dimension of data coverage worldwide, and how recent inventions in information and communication technology (ICT) have inched towards reducing the gaps and coverage of domains globally. The chapters cover how the digging of information in a large data and soft-computing techniques have contributed to a strength in prediction and analysis, for decision making in computer science, technology, management, social computing, green computing, and telecom. The book provides an insightful reference to the researchers in the fields of engineering and computer science. Researchers, academics, and professionals will benefit from this volume. Features selected expanded papers in modeling, simulation, and optimization from COMPSE 2016; Includes research into soft computing and its application in engineering and technology; Presents contributions from global experts in academia and industry in modeling, simulation, and optimization.

Wireless Network Design

Advances in Metaheuristics

Mathematical Modelling and Optimization of Engineering Problems

Proceedings of the International Conference on Modelling and Simulation (MS-17)

Emerging Technology in Modelling and Graphics

Computational Management

Advances in machine learning techniques and ever-increasing computing power has helped create a new generation of hardware and software technologies with practical applications for nearly every industry. As the progress has, in turn, excited the interest of venture investors, technology firms, and a growing number of clients, implementing intelligent automation in both physical and information systems has become a must in business. Handbook of Research on Smart Technology Models for Business and Industry is an essential reference source that discusses relevant abstract frameworks and the latest experimental research findings in theory, mathematical models, software applications, and prototypes in the area of smart technologies. Featuring research on topics such as digital security, renewable energy, and intelligence management, this book is ideally designed for machine learning specialists, industrial experts, data scientists, researchers, academicians, students, and business professionals seeking coverage on current smart technology models.

This book presents essential concepts of traditional Flower Pollination Algorithm (FPA) and its recent variants and also its application to find optimal solution for a variety of real-world engineering and medical problems. Swarm intelligence-based meta-heuristic algorithms are extensively implemented to solve a variety of real-world optimization problems due to its adaptability and robustness. FPA is one of the most successful swarm intelligence procedures developed in 2012 and extensively used in various optimization tasks for more than a decade. The mathematical model of FPA is quite straightforward and easy to understand and enhance, compared to other swarm approaches. Hence, FPA has attracted attention of researchers, who are working to find the optimal solutions in variety of domains, such as N-dimensional numerical optimization, constrained/unconstrained optimization, and linear/nonlinear optimization problems. Along with the traditional bat algorithm, the enhanced versions of FPA are also considered to solve a variety of optimization problems in science, engineering, and medical applications.

Developments in metaheuristics continue to advance computation beyond its traditional methods. With groundwork built on multidisciplinary research findings; metaheuristics, algorithms, and optimization approaches uses memory manipulations in order to take full advantage of strategic level problem solving. Trends in Developing Metaheuristics, Algorithms, and Optimization Approaches provides insight on the latest advances and analysis of technologies in metaheuristics computing. Offering widespread coverage on topics such as genetic algorithms, differential evolution, and ant colony optimization, this book aims to be a forum researchers, practitioners, and students who wish to learn and apply metaheuristic computing.

The use of artificial intelligence, especially in the field of optimization is increasing day by day. The purpose of this book is to explore the possibility of using different kinds of optimization algorithms to advance and enhance the tools used for computer and electrical engineering purposes.

Techniques and Algorithms Inspired by Nature

Advances in Metaheuristic Algorithms for Optimal Design of Structures

Modelling and Simulation in Science, Technology and Engineering Mathematics

Metaheuristic Applications in Structures and Infrastructures

Metaheuristics

Third International Conference, NDT 2011, Macau, China, July 11-13, 2011, Proceedings

This book presents recent developments in modelling and optimization of engineering systems and the use of advanced mathematical methods for solving complex real-world problems. It provides recent theoretical developments and new techniques based on control, optimization theory, mathematical modeling and fractional calculus that can be used to model and understand complex behavior in natural phenomena including latest technologies such as additive manufacturing. Specific topics covered in detail include combinatorial optimization, flow and heat transfer, mathematical modelling, energy storage and management policy, artificial intelligence, optimal control, modelling and optimization of manufacturing systems.

This book features high-quality papers presented at the International Conference on Computational Intelligence and Communication Technology (CICT 2019) organized by ABES Engineering College, Ghaziabad, India, and held from February 22 to 23, 2019. It includes the latest advances and research findings in fields of computational science and communication such as communication & networking, web & informatics, hardware and software designs, distributed & parallel processing, advanced software engineering, advanced database management systems and bioinformatics. As such, it is of interest to research scholars, students, and engineers around the globe.

HANDBOOK OF INTELLIGENT COMPUTING AND OPTIMIZATION FOR SUSTAINABLE DEVELOPMENT This book provides a comprehensive overview of the latest breakthroughs and recent progress in sustainable intelligent computing technologies, applications, and optimization techniques across various industries. Optimization has received enormous attention along with the rapidly increasing use of communication technology and the development of user-friendly software and artificial intelligence. In almost all human activities, there is a desire to deliver the highest possible results with the least amount of effort. Moreover, optimization is a very well-known area with a vast number of applications, from route finding problems to medical treatment, construction, finance, accounting, engineering, and maintenance schedules in plants. As far as optimization of real-world problems is concerned, understanding the nature of the problem and grouping it in a proper class may help the designer employ proper techniques which can solve the problem efficiently. Many intelligent optimization techniques can find optimal solutions without the use of objective function and are less prone to local conditions. The 41 chapters comprising the Handbook of Intelligent Computing and Optimization for Sustainable Development by subject specialists, represent diverse disciplines such as mathematics and computer science, electrical and electronics engineering, neuroscience and cognitive sciences, medicine, and social sciences, and provide the reader with an integrated understanding of the importance that intelligent computing has in the sustainable development of current societies. It discusses the emerging research exploring the theoretical and practical aspects of successfully implementing new and innovative intelligent techniques in a variety of sectors, including IoT, manufacturing, optimization, and healthcare. Audience It is a pivotal reference source for IT specialists, industry professionals, managers, executives, researchers, scientists, and engineers seeking current research in emerging perspectives in the field of artificial intelligence in the areas of Internet of Things, renewable energy, optimization, and smart cities.

This textbook provides a comprehensive introduction to nature-inspired metaheuristic methods for search and optimization, including the latest trends in evolutionary algorithms and other forms of natural computing. Over 100 different types of these methods are discussed in detail. The authors emphasize non-standard optimization problems and utilize a natural approach to the topic, moving from basic notions to more complex ones. An introductory chapter covers the necessary biological and mathematical backgrounds for understanding the main material. Subsequent chapters then explore almost all of the major metaheuristics for search and optimization created based on natural phenomena, including simulated annealing, recurrent neural networks, genetic algorithms and biometric programming, differential evolution, memetic algorithms, particle swarm optimization, artificial immune systems, ant colony optimization, tabu search and scatter search, bee and bacteria foraging algorithms, harmony search, biomolecular computing, quantum computing, and many others. General topics on dynamic, multimodal, constrained, and multiobjective optimizations are also described. Each chapter includes detailed flowcharts that illustrate specific algorithms and exercises that reinforce important topics. Introduced in the appendix are some benchmarks for the evaluation of metaheuristics. Search and Optimization by Metaheuristics is intended primarily as a textbook for graduate and advanced undergraduate students specializing in engineering and computer science. It will also serve as a valuable resource for scientists and researchers working in these areas, as well as those who are interested in search and optimization methods.

Trends in Developing Metaheuristics, Algorithms, and Optimization Approaches

Local Search for Planning and Scheduling

Advancing Technology Industrialization Through Intelligent Software Methodologies, Tools and Techniques

Water Management and Sustainability in Asia

Applications of Flower Pollination Algorithm and its Variants

Handbook of Research on Novel Soft Computing Intelligent Algorithms

Overview of optimization -- Introduction to meta-heuristic and evolutionary algorithms -- Pattern search (PS) -- Genetic algorithm (GA) -- Simulated annealing (SA) -- Tabu search (TS) -- Ant colony optimization (ACO) -- Particle swarm optimization (PSO) -- Differential evolution (DE) -- Harmony search (HS) -- Shuffled frog-leaping algorithm (SFLA) -- Honey-bee mating optimization (HBMO) -- Invasive weed optimization (IWO) -- Central force optimization (CFO) -- Biogeography-based optimization (BBO) -- Firefly algorithm (FA) -- Gravity search algorithm (GSA) -- Bat algorithm (BA) -- Plant propagation algorithm (PPA) -- Water cycle algorithm (WCA) -- Symbiotic organisms search (SOS) -- Comprehensive evolutionary algorithm (CEA)

Software has become ever more crucial as an enabler, from daily routines to important national decisions. But from time to time, as society adapts to frequent and rapid changes in technology, software development fails to come up to expectations due to issues with efficiency, reliability and security, and with the robustness of methodologies, tools and techniques not keeping pace with the rapidly evolving market. This book presents the proceedings of SoMeT_19, the 18th International Conference on New Trends in Intelligent Software Methodologies, Tools and Techniques, held in Kuching, Malaysia, from 23–25 September 2019. The book explores new trends and theories that highlight the direction and development of software methodologies, tools and techniques, and aims to capture the essence of a new state of the art in software science and its supporting technology, and to identify the challenges that such a technology will have to master. The book also investigates other comparable theories and practices in software science, including emerging technologies, from their computational foundations in terms of models, methodologies, and tools. The 56 papers included here are divided into 5 chapters: Intelligent software systems design and techniques in software engineering; Machine learning techniques for software systems; Requirements engineering, software design and development techniques; Software methodologies, tools and techniques for industry; and Knowledge science and intelligent computing. This comprehensive overview of information systems and research projects will be invaluable to all those whose work involves the assessment and solution of real-world software problems.

The disciplines of science and engineering rely heavily on the forecasting of prospective constraints for concepts that have not yet been proven to exist, especially in areas such as artificial intelligence. Obtaining quality solutions to the problems presented becomes increasingly difficult due to the number of steps required to sift through the possible solutions, and the ability to solve such problems relies on the recognition of patterns and the categorization of data into specific sets. Predictive modeling and optimization methods allow unknown events to be categorized based on statistics and classifiers input by researchers. The Handbook of Research on Predictive Modeling and Optimization Methods in Science and Engineering is a critical reference source that provides comprehensive information on the use of optimization techniques and predictive models to

solve real-life engineering and science problems. Through discussions on techniques such as robust design optimization, water level prediction, and the prediction of human actions, this publication identifies solutions to developing problems and new solutions for existing problems, making this publication a valuable resource for engineers, researchers, graduate students, and other professionals.

This book surveys state-of-the-art optimization modeling for design, analysis, and management of wireless networks, such as cellular and wireless local area networks (LANs), and the services they deliver. The past two decades have seen a tremendous growth in the deployment and use of wireless networks. The current-generation wireless systems can provide mobile users with high-speed data services at rates substantially higher than those of the previous generation. As a result, the demand for mobile information services with high reliability, fast response times, and ubiquitous connectivity continues to increase rapidly. The optimization of system performance has become critically important both in terms of practical utility and commercial viability, and presents a rich area for research. In the editors' previous work on traditional wired networks, we have observed that designing low cost, survivable telecommunication networks involves extremely complicated processes. Commercial products available to help with this task typically have been based on simulation and/or proprietary heuristics. As demonstrated in this book, however, mathematical programming deserves a prominent place in the designer's toolkit. Convenient modeling languages and powerful optimization solvers have greatly facilitated the implementation of mathematical programming theory into the practice of commercial network design. These points are equally relevant and applicable in today's world of wireless network technology and design. But there are new issues as well: many wireless network design decisions, such as routing and facility/element location, must be dealt with in innovative ways that are unique and distinct from wired (fiber optic) networks. The book specifically treats the recent research and the use of modeling languages and network optimization techniques that are playing particularly important and distinctive roles in the wireless domain.

Search and Optimization by Metaheuristics

Handbook of Research on Emergent Applications of Optimization Algorithms

Nature-inspired Methods for Metaheuristics Optimization

Encyclopedia of Information Science and Technology, Third Edition

From Design to Implementation

This book engages in an ongoing topic, such as the implementation of nature-inspired metaheuristic algorithms, with a main concentration on optimization problems in different fields of engineering optimization applications. The chapters of the book provide concise overviews of various nature-inspired metaheuristic algorithms, defining their profits in obtaining the optimal solutions of tiresome engineering design problems that cannot be efficiently resolved via conventional mathematical-based techniques. Thus, the chapters report on advanced studies on the applications of not only the traditional, but also the contemporary certain nature-inspired metaheuristic algorithms to specific engineering optimization problems with single and multi-objectives. Harmony search, artificial bee colony, teaching learning-based optimization, electrostatic discharge, grasshopper, backtracking search, and interactive search are just some of the methods exhibited and consulted step by step in application contexts. The book is a perfect guide for graduate students, researchers, academicians, and professionals willing to use metaheuristic algorithms in engineering optimization applications.

Metaheuristic optimization is a higher-level procedure or heuristic designed to find, generate, or select a heuristic (partial search algorithm) that may provide a sufficiently good solution to an optimization problem, especially with incomplete or imperfect information or limited computation capacity. This is usually applied when two or more objectives are to be optimized simultaneously. This book is presented with two major objectives. Firstly, it features chapters by eminent researchers in the field providing the readers about the current status of the subject. Secondly, algorithm-based optimization or advanced optimization techniques, which are applied to mostly non-engineering problems, are applied to engineering problems. This book will also serve as an aid to both research and industry. Usage of these methodologies would enable the improvement in engineering and manufacturing technology and support an organization in this era of low product life cycle. Features: Covers the application of recent and new algorithms Focuses on the development aspects such as including surrogate modeling, parallelization, game theory, and hybridization Presents the advances of engineering applications for both single-objective and multi-objective optimization problems Offers recent developments from a variety of engineering fields Discusses Optimization using Evolutionary Algorithms and Metaheuristics applications in engineering

An accessible introduction to metaheuristics and optimization, featuring powerful and modern algorithms for application across engineering and the sciences From engineering and computer science to economics and management science, optimization is a core component for problem solving. Highlighting the latest developments that have evolved in recent years, *Engineering Optimization: An Introduction with Metaheuristic Applications* outlines popular metaheuristic algorithms and equips readers with the skills needed to apply these techniques to their own optimization problems. With insightful examples from various fields of study, the author highlights key concepts and techniques for the successful application of commonly-used metaheuristic algorithms, including simulated annealing, particle swarm optimization, harmony search, and genetic algorithms. The author introduces all major metaheuristic algorithms and their applications in optimization through a presentation that is organized into three succinct parts: Foundations of Optimization and Algorithms provides a brief introduction to the underlying nature of optimization and the common approaches to optimization problems, random number generation, the Monte Carlo method, and the Markov chain Monte Carlo method Metaheuristic Algorithms presents common metaheuristic algorithms in detail, including genetic algorithms, simulated annealing, ant algorithms, bee algorithms, particle swarm optimization, firefly algorithms, and harmony search Applications outlines a wide range of applications that use metaheuristic algorithms to solve challenging optimization problems with detailed implementation while also introducing various modifications used for multi-objective optimization Throughout the book, the author presents worked-out examples and real-world applications that illustrate the modern relevance of the topic. A detailed appendix features important and popular algorithms using MATLAB® and Octave software packages, and a related FTP site houses MATLAB code and programs for easy implementation of the discussed techniques. In addition, references to the current literature enable readers to investigate individual algorithms and methods in greater detail. *Engineering Optimization: An Introduction with Metaheuristic Applications* is an excellent book for courses on optimization and computer simulation at the upper-undergraduate and graduate levels. It is also a valuable reference for researchers and practitioners working in the fields of mathematics, engineering, computer science, operations research, and management science who use metaheuristic algorithms to solve problems in their everyday work.

Advances in Metaheuristics: Applications in Engineering Systems provides details on current approaches utilized in engineering optimization. It gives a comprehensive background on metaheuristic applications, focusing on main engineering sectors such as energy, process, and materials. It discusses topics such as algorithmic enhancements and performance measurement approaches, and provides insights into the implementation of metaheuristic strategies to multi-objective optimization problems. With this book, readers can learn to solve real-world engineering optimization problems effectively using the appropriate techniques from emerging fields including evolutionary and swarm intelligence, mathematical programming, and multi-objective optimization. The ten chapters of this book are divided into three parts. The first part discusses three industrial applications in the energy sector. The second focusses on process optimization and considers three engineering applications: optimization of a three-phase separator, process plant, and a pre-treatment process. The third and final part of this book covers industrial applications in material engineering, with a particular focus on sand mould-systems. It also includes discussions on the potential improvement of algorithmic characteristics via strategic algorithmic enhancements. This book helps fill the existing gap in literature on the implementation of metaheuristics in engineering applications and real-world engineering systems. It will be an important resource for engineers and decision-makers selecting and implementing metaheuristics to solve specific engineering problems.

Interfaces in Computer Science and Operations Research

Proceedings of CICT 2019

Optimization Models and Solution Procedures

Proceedings of IEM Graph 2018

Meta-heuristic and Evolutionary Algorithms for Engineering Optimization

Handbook of Research on Predictive Modeling and Optimization Methods in Science and Engineering

The disciplines of computer science and operations research (OR) have been linked since their origins, each contributing to the dramatic advances of the other. This work explores the connections between these key technologies: how high-performance computing methods have led to advances in OR deployment, and how OR has contributed to the design and development of advanced systems. The collected writings-from researchers and practitioners in Computer Science, Operations Research, Management Science, and Artificial Intelligence-were among those delivered at the Fifth INFORMS Computer Science Technical Section Conference in Dallas, Texas, January 8-10, 1996. The articles advance both theory and practice. Presented are new approaches to complex problems based on: metaheuristics (neural networks, genetic algorithms, and Tabu Search), optimization and mathematical programming, stochastic methods, constraint programming, and logical analysis. These advanced methodologies are applied to new applications in such areas as: telecom munications network design, financial engineering, manufacturing, project management, and forecasting, airline and machine scheduling, vehicle routing, modeling and decision support systems. Featured is a remarkable paper by keynote speaker Fred Glover, creator of the Tabu Search family of metaheuristics. In it he develops the principles of memory-based heuristic methods, contrasts them with the popular genetic algorithms and simulated annealing, provides a sweeping survey of application vignettes, and points to promising avenues for future research.

Optimization techniques have developed into a significant area concerning industrial, economics, business, and financial systems. With the development of engineering and financial systems, modern optimization has played an important role in service-centered operations and as such has attracted more attention to this field. Meta-heuristic hybrid optimization is a newly development mathematical framework based optimization technique. Designed by logicians, engineers, analysts, and many more, this technique aims to study the complexity of algorithms and problems. Meta-Heuristics Optimization Algorithms in Engineering, Business, Economics, and Finance explores the emerging study of meta-heuristics optimization algorithms and methods and their role in innovated real world practical applications. This book is a collection of research on the areas of meta-heuristics optimization algorithms in engineering, business, economics, and finance and aims to be a comprehensive reference for decision makers, managers, engineers, researchers, scientists, financiers, and economists as well as industrialists.

Optimization Using Evolutionary Algorithms and MetaheuristicsApplications in EngineeringCRC Press

Modern optimization approaches have attracted an increasing number of scientists, decision makers, and researchers. As new issues in this field emerge, different optimization methodologies must be developed and implemented. The Handbook of Research on Emergent Applications of Optimization Algorithms is an authoritative reference source for the latest scholarly research on modern optimization techniques for solving complex problems of global optimization and their applications in economics and engineering. Featuring coverage on a broad range of topics and perspectives such as hybrid systems, non-cooperative games, and cryptography, this publication is ideally designed for students, researchers, and engineers interested in emerging developments in optimization algorithms.

Handbook of Intelligent Computing and Optimization for Sustainable Development

Metaheuristic Optimization Algorithms in Civil Engineering: New Applications

Modeling, Simulation, and Optimization

Applications in Engineering Systems

Handbook of Research on Modeling, Analysis, and Application of Nature-Inspired Metaheuristic Algorithms

Advances in Metaheuristics, Optimization, and Stochastic Modeling Technologies

Water Management and Sustainability in Asia covers topics related to water resources management, including multi- and interdisciplinary research on flood, soil infiltration, contaminants, sediment, water quality, hydrological modelling, and water resources systems.

This book constitutes the proceedings of the Third International Conference on Networked Digital Technologies, held in Macau, China, in July 2011. The 41 revised papers presented were carefully reviewed and selected from 127 submissions. The papers are organized in topical sections on information security, networks, information management, multimedia, human computer interaction and simulation, e-learning and e-government, Web services/semantics, user centric information system/intelligent computing, and data mining.

This book gathers together a set of chapters covering recent development in optimization methods that are inspired by nature. The first group of chapters describes in detail different meta-heuristic algorithms, and shows their applicability using some test or real-world problems. The second part of the book is especially focused on advanced applications and case studies. They span different engineering fields, including mechanical, electrical and civil engineering, and earth/environmental science, and covers topics such as robotics, water management, process optimization, among others. The book covers both basic concepts and advanced issues, offering a timely introduction to nature-inspired optimization method for newcomers and students, and a source of inspiration as well as important practical insights to engineers and researchers.

"This book explores emerging technologies and best practices designed to effectively address concerns inherent in properly optimizing advanced systems, demonstrating applications in areas such as bio-engineering, space exploration, industrial informatics, information security, and nuclear and renewable energies"--Provided by publisher.

ECAI 2000 Workshop, Berlin, Germany, August 21, 2000. Revised Papers

Metaheuristics and Optimization in Civil Engineering

Meta-Heuristics Optimization Algorithms in Engineering, Business, Economics, and Finance

Metaheuristic Algorithms in Industry 4.0

Handbook of Metaheuristics

Metaheuristics and Optimization in Computer and Electrical Engineering

A unified view of metaheuristics This book provides a complete background on metaheuristics and shows readers how to design and implement efficient algorithms to solve complex optimization problems across a diverse range of applications, from networking and bioinformatics

presents the main design questions for all families of metaheuristics and clearly illustrates how to implement the algorithms under a software framework to reuse both the design and code. Throughout the book, the key search components of metaheuristics are considered as a

local search, tabu search, simulated annealing, evolutionary algorithms, particle swarm optimization, scatter search, ant colonies, bee colonies, artificial immune systems) for optimization problems Designing efficient metaheuristics for multi-objective optimization problems Design

metaheuristics Implementing metaheuristics on sequential and parallel machines Using many case studies and treating design and implementation independently, this book gives readers the skills necessary to solve large-scale optimization problems quickly and efficiently. It is a v

researchers from diverse areas dealing with optimization or machine learning; and graduate students in computer science, operations research, control, engineering, business and management, and applied mathematics.

This book constitutes the thoroughly refereed post-proceedings of the International Workshop on Local Search for Planning and Scheduling, held at a satellite workshop of ECAI 2000 in Berlin, Germany in August 2000.The nine revised full papers presented together with an invit

two rounds of reviewing and improvement. The papers are organized in topical sections on combinatorial optimization, planning with resources, and related approaches.

Algorithms and Applications in Science and Engineering

Applications in Engineering

Nature-Inspired Metaheuristic Algorithms for Engineering Optimization Applications

Advancements and Trends