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GREER JEFFERSON

Introduction to Genetic Algorithms CRC Press

Swarm intelligence is one of the fastest growing subfields of artificial intelligence and soft computing. This field includes multiple optimization algorithms to solve NP-hard problems for which conventional methods are not effective. It inspires researchers in engineering sciences to learn theories from nature and incorporate them. Swarm Intelligence: Foundation, Principles, and Engineering Applications provides a comprehensive review of new swarm intelligence techniques and offers practical implementation of Particle Swarm Optimization (PSO) with MATLAB code. The book discusses the statistical analysis of swarm optimization techniques so that researchers can analyse their experiment design. It also includes algorithms in social sectors, oil and gas industries, and recent research findings of new optimization algorithms in the field of engineering describing the implementation in machine learning. This book is written for students of engineering, research scientists, and academicians involved in the engineering sciences.

Swarm Intelligence Algorithms IGI Global

This book presents integrated optimization methods and algorithms for power system problems along with their codes in MATLAB. Providing a reliable and secure power and energy system is one of the main challenges of the new era. Due to the nonlinear multi-objective nature of these problems, the traditional methods are not suitable approaches for solving large-scale power system operation dilemmas. The integration of optimization algorithms into power systems has been discussed in several textbooks, but this is the first to include the integration methods and the developed codes. As such, it is a useful resource for undergraduate and graduate students, researchers and engineers trying to solve power and energy optimization problems using modern technical and intelligent systems based on theory and application case studies. It is expected that readers have a basic mathematical background.

Advances in Mechanical and Materials Technology John Wiley & Sons

For many engineering problems we require optimization processes with dynamic adaptation as we aim to establish the dimension of the search space where the optimum solution resides and develop robust techniques to avoid the local optima usually associated with multimodal problems. This book explores multidimensional particle swarm optimization, a technique developed by the authors that addresses these requirements in a well-defined algorithmic approach. After an introduction to the key optimization techniques, the authors introduce their unified framework and demonstrate its advantages in challenging application domains, focusing on the state of the art of multidimensional extensions such as global convergence in particle swarm optimization, dynamic data clustering, evolutionary neural networks, biomedical applications and personalized ECG classification, content-based image classification and retrieval, and evolutionary feature synthesis. The content is characterized by strong practical considerations, and the book is supported with fully documented source code for all applications presented, as well as many sample datasets. The book will be of benefit to researchers and practitioners working in the areas of machine intelligence, signal processing, pattern recognition, and data mining, or using principles from these areas in their application domains. It may also be used as a reference text for graduate courses on swarm optimization, data clustering and classification, content-based multimedia search, and biomedical signal processing applications.

Design and Control Advances in Robotics Springer Science & Business Media

The book presents eight well-known and often used algorithms besides nine newly developed algorithms by the first author and his students in a practical implementation framework. Matlab codes and some benchmark structural optimization problems are provided. The aim is to provide an efficient context for experienced researchers or readers not familiar with theory, applications and computational developments of the considered metaheuristics. The information will also be of interest to readers interested in application of metaheuristics for hard optimization, comparing conceptually different metaheuristics and designing new metaheuristics.

Advanced Computing and Intelligent Engineering Springer

This book presents some recent specialized works of theoretical study in the domain of fuzzy systems. Over eight sections and fifteen chapters, the volume addresses fuzzy systems concepts and promotes them in practical applications in the following thematic areas: fuzzy mathematics, decision making, clustering, adaptive neural fuzzy inference systems, control systems, process monitoring, green infrastructure, and medicine. The studies published in the book develop new theoretical concepts that improve the properties and performances of fuzzy systems. This book is a useful resource for specialists, engineers, professors, and students.

Recent Algorithms and Applications in Swarm Intelligence Research CRC Press

This book discusses comprehensively the advanced manufacturing processes, including illustrative examples of the processes, mathematical modeling, and the need to optimize associated parameter problems. In addition, it describes in detail the cohort intelligence methodology and its variants along with illustrations, to help readers gain a better understanding of the framework. The theoretical and statistical rigor is validated by comparing the solutions with evolutionary algorithms, simulation annealing, response surface methodology, the firefly algorithm, and experimental work. Lastly, the book critically reviews several socio-inspired optimization methods.

Optimization Springer Science & Business Media

Swarm intelligence algorithms are a form of nature-based optimization algorithms. Their main inspiration is the cooperative behavior of animals within specific communities. This can be described as simple behaviors of individuals along with the mechanisms for sharing knowledge between them, resulting in the complex behavior of the entire community. Examples of such behavior can be found in ant colonies, bee swarms, schools of fish or bird flocks. Swarm intelligence algorithms are used to solve difficult optimization problems for which there are no exact solving methods or the use of such methods is impossible, e.g. due to unacceptable computational time. This set comprises two volumes: Swarm Intelligence Algorithms: A Tutorial and Swarm Intelligence Algorithms: Modifications and Applications. The first volume thoroughly presents the basics of 24 algorithms selected from the entire family of swarm intelligence algorithms. It contains a detailed explanation of how each algorithm works, along with relevant program codes in Matlab and the C ++ programming language, as well as numerical examples illustrating step-by-step how individual algorithms work. The second volume describes selected modifications of these algorithms and presents their practical applications. This book presents 24 swarm algorithms together with their modifications and practical applications. Each chapter is devoted to one algorithm. It contains a short description along with a pseudo-code showing the various stages of its operation. In addition, each chapter contains a description of selected modifications of the algorithm and shows how it can be used to solve a selected practical problem.

Metaheuristic and Evolutionary Computation: Algorithms and Applications Cambridge University Press

Choose the Correct Solution Method for Your Optimization Problem Optimization: Algorithms and Applications presents a variety of solution techniques for optimization problems, emphasizing concepts rather than rigorous mathematical details and proofs. The book covers both gradient and stochastic methods as solution techniques for unconstrained and constrained optimization problems. It discusses the conjugate gradient method, Broyden-Fletcher-Goldfarb-Shanno algorithm, Powell method, penalty function, augmented Lagrange multiplier method, sequential quadratic programming, method of feasible directions, genetic algorithms, particle swarm optimization (PSO), simulated annealing, ant colony optimization, and tabu search methods. The author shows how to solve non-convex multi-objective optimization problems using simple modifications of the basic PSO code. The book also introduces multidisciplinary design optimization (MDO) architectures-one of the first optimization books to do so-and develops software codes for the simplex method and affine-scaling interior point method for solving linear programming problems. In addition, it examines Gomory's cutting plane method, the branch-and-bound method, and Balas' algorithm for integer programming problems. The author follows a step-by-step approach to developing the MATLAB ® codes from the algorithms. He then applies the codes to solve both standard functions taken from the literature and real-world applications, including a complex trajectory design problem of a robot, a portfolio optimization problem, and a multi-objective shape optimization problem of a reentry body. This hands-on approach improves your understanding and confidence in handling different solution methods. The MATLAB codes are available on the book's CRC Press web page.

Geophysical Inversion Theory and Global Optimization Methods Springer Nature

"This book presents the most recent and established developments of Particle swarm optimization (PSO) within a unified framework by noted researchers in the field"--Provided by publisher.

Smart Computing Springer

Optimization and decision making are integral parts of any manufacturing process and management system. The objective of this book is to demonstrate the confluence of theory and applications of various types of multi-criteria decision making and optimization techniques with reference to textile manufacturing and management. Divided into twelve chapters, it discusses various multi-criteria decision-making methods such as AHP, TOPSIS, ELECTRE, and optimization techniques like linear programming, fuzzy linear programming, quadratic programming, in textile domain. Multi-objective optimization problems have been dealt with two approaches, namely desirability function and evolutionary algorithm. Key Features Exclusive title covering textiles and soft computing fields including optimization and decision making Discusses concepts of traditional and non-traditional optimization methods with textile examples Explores pertinent single-objective and multi-objective optimizations Provides MATLAB coding in the Appendix to solve various types of multi-criteria decision making and optimization problems Includes examples and case studies related to textile engineering and management

Artificial Intelligence for Solar Photovoltaic Systems BoD – Books on Demand

This book constitutes the refereed proceedings of the Third International Conference on Swarm, Evolutionary, and Memetic Computing, SEMCCO 2012, held in Bhubaneswar, India, in December 2012. The 96 revised full papers presented were carefully reviewed and selected from 310 initial submissions. The papers cover a wide range of topics in swarm, evolutionary, memetic and other intelligent computing algorithms and their real world applications in problems selected from diverse domains of science and engineering.

Swarm Intelligence Cambridge University Press

This book addresses optimization in robotics, in terms of both the configuration space and the metal structure of the robot arm itself; and discusses, describes and builds different types of heuristics and algorithms in MATLAB. In addition, the book includes a wealth of examples and exercises. In particular, it enables the reader to write a MATLAB code for all the related problems in robotics. The book also offers detailed descriptions of and builds from scratch several types of optimization algorithms using MATLAB and simplified methods, especially for inverse problems and avoiding

singularities. Each chapter features examples and exercises to enhance the reader's comprehension. Accordingly, the book offers the reader a better understanding of robot analysis from an optimization standpoint.

A Practical Approach to Metaheuristics using LabVIEW and MATLAB® IGI Global

Ocean Energy Modeling and Simulation with Big Data: Computational Intelligence for System Optimization and Grid Integration offers the fundamental and practical aspects of big data solutions applied to ocean and offshore energy systems. The book explores techniques for assessment of tidal, wave and offshore wind energy systems. It presents the use of data mining software to simulate systems and Hadoop technology to evaluate control systems. The use of Map Reduce algorithms in systems optimization is examined, along with the application of NoSQL in systems management.

Actual data collection through web-based applications and social networks is discussed, along with practical applications of recommendations.

Introduces computational methods for processing and analyzing data to predict ocean energy system production, assess their efficiency, and ensure their reliable connection to power grids Covers data processing solutions like Hadoop, NoSQL, Map Reduce and Lambda, discussing their applications in ocean energy for system design and optimization Provides practical exercises that demonstrate the concepts explored in each chapter

Stochastic Global Optimization Methods and Applications to Chemical, Biochemical, Pharmaceutical and Environmental Processes

Springer Nature

Metaheuristic optimization has become a prime alternative for solving complex optimization problems in several areas. Hence, practitioners and researchers have been paying extensive attention to those metaheuristic algorithms that are mainly based on natural phenomena. However, when those algorithms are implemented, there are not enough books that deal with theoretical and experimental problems in a friendly manner so this book presents a novel structure that includes a complete description of the most important metaheuristic optimization algorithms as well as a new proposal of a new metaheuristic optimization named earthquake optimization. This book also has several practical exercises and a toolbox for MATLAB® and a toolkit for LabVIEW are integrated as complementary material for this book. These toolkits allow readers to move from a simulation environment to an experimentation one very fast. This book is suitable for researchers, students, and professionals in several areas, such as

economics, architecture, computer science, electrical engineering, and control systems. The unique features of this book are as follows: Developed for researchers, undergraduate and graduate students, and practitioners A friendly description of the main metaheuristic optimization algorithms

Theoretical and practical optimization examples A new earthquake optimization algorithm Updated state-of-the-art and research optimization projects

The authors are multidisciplinary/interdisciplinary lecturers and researchers who have written a structure-friendly learning methodology to understand each metaheuristic optimization algorithm presented in this book.

Fuzzy Systems BoD – Books on Demand

* This book deals with the fundamentals of genetic algorithms and their applications in a variety of different areas of engineering and science * Most significant update to the second edition is the MATLAB codes that accompany the text * Provides a thorough discussion of hybrid genetic algorithms * Features more examples than first edition

Advanced Optimization and Decision-Making Techniques in Textile Manufacturing Walter de Gruyter GmbH & Co KG

Choose the Correct Solution Method for Your Optimization Problem Optimization: Algorithms and Applications presents a variety of solution techniques

for optimization problems, emphasizing concepts rather than rigorous mathematical details and proofs. The book covers both gradient and stochastic methods as solution techniques for unconstrained and co

Search and Optimization by Metaheuristics Springer

This book presents select papers from the International Conference on Energy, Material Sciences and Mechanical Engineering (EMSME) - 2020. The book covers the three core areas of energy, material sciences and mechanical engineering. The topics covered include non-conventional energy resources, energy harvesting, polymers, composites, 2D materials, systems engineering, materials engineering, micro-machining, renewable energy, industrial engineering and additive manufacturing. This book will be useful to researchers and professionals working in the areas of mechanical and industrial engineering, materials applications, and energy technology.

Introduction to Intelligent Systems, Control, and Machine Learning using MATLAB IGI Global

Advancements in the nature-inspired swarm intelligence algorithms continue to be useful in solving complicated problems in nonlinear, non-differentiable, and un-continuous functions as well as being applied to solve real-world applications. Recent Algorithms and Applications in Swarm Intelligence Research highlights the current research on swarm intelligence algorithms and its applications. Including research and survey and application papers, this book serves as a platform for students and scholars interested in achieving their studies on swarm intelligence algorithms and their applications.

Proceedings of the Second International Conference on Computational Intelligence and Informatics Springer Nature

The volume contains 69 high quality papers presented at International Conference on Computational Intelligence and Informatics (ICCI 2017). The conference was held during 25-27, September, 2017 at Department of Computer Science and Engineering, JNTUHCEH, Hyderabad, Telangana, India.

This volume contains papers mainly focused on data mining, wireless sensor networks, parallel computing, image processing, network security, MANETS, natural language processing, and internet of things.

Particle Swarm Optimization and Intelligence: Advances and Applications Springer Nature

Stochastic global optimization methods and applications to chemical, biochemical, pharmaceutical and environmental processes presents various algorithms that include the genetic algorithm, simulated annealing, differential evolution, ant colony optimization, tabu search, particle swarm optimization, artificial bee colony optimization, and cuckoo search algorithm. The design and analysis of these algorithms is studied by applying them to solve various base case and complex optimization problems concerning chemical, biochemical, pharmaceutical, and environmental engineering processes. Design and implementation of various classical and advanced optimization strategies to solve a wide variety of optimization problems makes this book beneficial to graduate students, researchers, and practicing engineers working in multiple domains. This book mainly focuses on stochastic, evolutionary, and artificial intelligence optimization algorithms with a special emphasis on their design, analysis, and implementation to solve complex optimization problems and includes a number of real applications concerning chemical, biochemical, pharmaceutical, and environmental engineering processes. Presents various classical, stochastic, evolutionary, and artificial intelligence optimization algorithms for the benefit of the audience in different domains Outlines design, analysis, and implementation of optimization strategies to solve complex optimization problems of different domains Highlights numerous real applications concerning chemical, biochemical, pharmaceutical, and environmental engineering processes