Electromagnetic Optimization by Genetic Algorithms

The Simple Genetic Algorithm (SGA) is a classical form of genetic search. Viewing the SGA as a mathematical object, Michael D. Vose provides an introduction to what is known (i.e., proven) about the theory of the SGA. He also makes available algorithms for the computation of mathematical objects related to the SGA. Although he describes the SGA in terms of heuristic search, the book is not about search or optimization per se. Rather, the focus is on the SGA as an evolutionary system. The author intends the book also to serve as an outline for exploring topics in mathematics and computer science in a goal-oriented way.

Advanced Data Mining and Applications

An Application-Oriented Introduction to Essential Optimization Concepts and Best Practices Optimization is an inherent human tendency that gained new life after the advent of calculus; now, as the world grows increasingly reliant on complex systems, optimization has become both more important and more challenging than ever before. Engineering Optimization provides a practically-focused introduction to modern engineering optimization best practices, covering fundamental analytical and numerical techniques throughout each stage of the optimization process. Although essential algorithms are explained in detail, the focus lies more in the human function: how to create an appropriate objective function, choose decision variables, identify and incorporate constraints, define convergence, and other critical issues that define the success or failure of an optimization project. Examples, exercises, and homework throughout reinforce the author’s “do, not study” approach to learning, underscoring the application-oriented discussion that provides a deep, generic understanding of the optimization process that can be applied to any field. Providing excellent reference for students or professionals, Engineering Optimization: Describes and develops a variety of algorithms, including gradient based (such as Newton’s, and Levenberg-Marquardt), direct search (such as Hooke-Jeeves, Leapfrogging, and Particle Swarm), along with surrogate functions for surface characterization Provides guidance on optimizer choice by application, and explains how to determine appropriate optimizer parameter values Details current best practices for critical stages of specifying an optimization procedure, including decision variables, defining constraints, and relationship modeling Provides access to software and Visual Basic macros for Excel on the companion website, along with solutions to examples presented in the book Clear explanations, explicit equation derivations, and practical examples make this book ideal for use as part of a class or self-study, assuming a basic understanding of statistics, calculus, computer programming, and engineering models. Anyone seeking best practices for “making the best choices” will find value in this introductory resource.

Practical Handbook of Genetic Algorithms

A thorough and insightful introduction to using genetic algorithms to optimize electromagnetic systems Genetic Algorithms in Electromagnetics focuses on optimizing the objective function when a computer algorithm, analytical model, or experimental result describes the performance of an electromagnetic system. It offers expert guidance to optimizing electromagnetic systems using genetic algorithms (GA), which have proven to be tenacious in finding optimal results where traditional techniques fail. Genetic Algorithms in Electromagnetics begins with an introduction to optimization and several commonly used numerical optimization routines, and goes on to feature: Introductions to GA in both binary and continuous variable forms, complete with examples of MATLAB(r) commands Two step-by-step examples of optimizing antenna arrays as well as a comprehensive overview of applications of GA to antenna array design problems Coverage of GA as an adaptive algorithm, including adaptive and smart arrays as well as adaptive reflectors and crossed dipoles Explanations of the optimization of several different wire antennas, starting with the famous “crooked monopole” How to optimize horn, reflector, and microstrip patch antennas, which require significantly more computing power than wire antennas Coverage of GA optimization of scattering, including scattering from frequency selective surfaces and electromagnetic band gap materials Ideas on operator and parameter
Introduction to Genetic Algorithms

The last few years have seen important advances in the use of genetic algorithms to address challenging optimization problems in industrial engineering. Genetic Algorithms and Engineering Design is the only book to cover the most recent technologies and their application to manufacturing, presenting a comprehensive and fully up-to-date treatment of genetic algorithms in industrial engineering and operations research. Beginning with a tutorial on genetic algorithm fundamentals and their use in solving constrained and combinatorial optimization problems, the book applies these techniques to problems in specific areas -- sequencing, scheduling and production plans, transportation and vehicle routing, facility layout, location-allocation, and more. Each topic features a clearly written problem description, mathematical model, and summary of conventional heuristic algorithms. All algorithms are explained in intuitive, rather than highly-technical, language and are reinforced with illustrative figures and numerical examples. Written by two internationally acknowledged experts in the field, Genetic Algorithms and Engineering Design features original material on the foundation and application of genetic algorithms, and also standardizes the terms and symbols used in other sources--making this complex subject truly accessible to the beginner as well as to the more advanced reader. Ideal for both self-study and classroom use, this self-contained reference provides indispensable state-of-the-art guidance to professionals and students working in industrial engineering, management science, operations research, computer science, and artificial intelligence. The only comprehensive, state-of-the-art treatment available on the use of genetic algorithms in industrial engineering and operations research.

Written by internationally recognized experts in the field of genetic algorithms and artificial intelligence, Genetic Algorithms and Engineering Design provides total coverage of current technologies and their application to manufacturing systems. Incorporating original material on the foundation and application of genetic algorithms, this unique resource also standardizes the terms and symbols used in other sources--making this complex subject truly accessible to students as well as experienced professionals. Designed for clarity and ease of use, this self-contained reference: * Provides a comprehensive survey of selection strategies, penalty techniques, and genetic operators used for constrained and combinatorial optimization problems * Shows how to use genetic algorithms to make production schedules, solve facility/location problems, make transportation/vehicle routing plans, enhance system reliability, and much more * Contains detailed numerical examples, plus more than 160 auxiliary figures to make solution procedures transparent and understandable

The Design of Innovation

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)

Hands-On Genetic Algorithms with Python A clear and lucid bottom-up approach to the basic principles of evolutionary algorithms. Evolutionary algorithms (EAs) are a type of artificial intelligence. EAs are motivated by optimization processes that we observe in nature, such as natural selection, species migration, bird swarms, human culture, and ant colonies. This book discusses the theory, history, mathematics, and programming of evolutionary optimization algorithms. Featured algorithms include genetic algorithms, genetic programming, ant colony optimization, particle swarm optimization, differential evolution, biogeography-based optimization, and many others. Evolutionary Optimization Algorithms: Provides a straightforward, bottom-up approach that assists the reader in obtaining a clear— but theoretically rigorous— understanding of evolutionary algorithms, with an emphasis on implementation. GIVES a careful treatment of recently developed EAs—including opposition-based learning, artificial fish swarms, bacterial foraging, and many others— and discusses their similarities and differences from more well-established EAs. Includes chapter-end problems plus a solutions manual available online for instructors. Offers simple examples that provide the reader with an intuitive understanding of the theory. Features source code for the examples available on the author's website. Provides advanced mathematical techniques for analyzing EAs, including Markov modeling and dynamic system modeling. Evolutionary Optimization Algorithms: Biologically Inspired and Population-Based Approaches to Computer Intelligence is an ideal text for advanced undergraduate students, graduate students, and professionals involved in engineering and computer science.

Evolutionary Search and the Job Shop

Artificial Neural Nets and Genetic Algorithms

Authoritative coverage of a revolutionary technique for overcoming problems in electromagnetic design. Genetic algorithms are stochastic search procedures modeled on the Darwinian concepts of natural selection and evolution. The machinery of genetic algorithms utilizes an optimization methodology that allows a global search of the cost surface via statistical random processes dictated by the Darwinian evolutionary concept. These easily programmed and readily implemented procedures robustly locate extrema of highly multimodal functions and therefore are particularly well suited to finding solutions to a broad range of
Electromagnetic optimization problems. Electromagnetic Optimization by Genetic Algorithms is the first book devoted exclusively to the application of genetic algorithms to electromagnetic device design. Compiled by two highly competent and well-respected members of the electromagnetics community, this book describes numerous applications of genetic algorithms to the design and optimization of various low- and high-frequency electromagnetic components. Special features include: * Introduction by David E. Goldberg. "A Meditation on the Application of Genetic Algorithms" * Design of linear and planar arrays using genetic algorithms * Application of genetic algorithms to the design of broadband, wire, and integrated antennas * Genetic algorithm-driven design of dielectric gratings and frequency-selective surfaces * Synthesis of magnetostatic devices using genetic algorithms * Application of genetic algorithms to multiobjective electromagnetic backscattering optimization * A comprehensive list of the up-to-date references applicable to electromagnetic design problems. Supplemented with more than 250 illustrations, Electromagnetic Optimization by Genetic Algorithms is a powerful resource for electrical engineers interested in modern electromagnetic designs and an indispensable reference for university researchers.


Handbook of Genetic Algorithms The book presents a clear understanding of a new type of computation system, the Cellular Neural Network (CNN), which has been successfully applied to the solution of many heavy computation problems, mainly in the fields of image processing and complex partial differential equations. The text describes how CNN will improve the soft-computation toolbox, and examines the many applications of soft computing to complex systems.

Genetic Algorithms and Engineering Design The idea of telematics appeared more than a decade ago and it is possible to define it, in a general and simple way, as a communication system for collecting, processing and distributing information. The transport services market is definitely the most important area for telematic applications. Transport-telematics issues constitute a field of knowledge that integrates information technology and telecommunications in applications for managing and controlling traffic in transport systems, stimulating technical and organizational activities that ensure improved effectiveness and safe operation of such systems. Integrated and cooperating telematic applications constitute intelligent transport systems. The basis of such systems is to efficiently collect and process information and to manage its flow within the system. This enables supplying information from almost all areas of transport activities in real time. Intelligent transport—supported by a number of integrated telecommunications, IT measurement and control engineering solutions, and by appropriate tools and software—comprises telematic applications. They have an extensive range of use in many areas of transport, allowing the integration of the means and types of transport, including its infrastructure, business organization and management processes. This monograph is a collection of selected papers presented at the jubilee transport telematics conference, TST 2010, and is the result of the work of many scientists associated with this area of knowledge and who had spent years with the conference.

Evolutionary Multi-Criterion Optimization Artificial neural networks and genetic algorithms both are areas of research which have their origins in mathematical models constructed in order to gain understanding of important natural processes. By focussing on the process models rather than the processes themselves, significant new computational techniques have evolved which have found application in a large number of diverse fields. This diversity is reflected in the topics which are the subjects of contributions to this volume. There are contributions reporting theoretical developments in the design of neural networks, and in the management of their learning. In a number of contributions, applications to speech recognition tasks, control of industrial processes as well as to credit scoring, and so on, are reflected. Regarding genetic algorithms, several methodological papers consider how genetic algorithms can be improved using an experimental approach, as well as by hybridizing with other useful techniques such as tabu search. The closely related area of classifier systems also receives a significant amount of coverage, aiming at better ways for their implementation. Further, while there are many contributions which explore ways in which genetic algorithms can be applied to real problems, nearly all involve some understanding of the context in order to apply the genetic algorithm paradigm more successfully. That this can indeed be done is evidenced by the range of applications covered in this volume.

Meta-heuristic and Evolutionary Algorithms for Engineering Optimization The process of developing predictive models includes many stages. Most resources focus on the modeling algorithms but neglect other critical aspects of the modeling process. This book describes techniques for finding the best representations of predictors for modeling and for nding the best subset of predictors for improving model performance. A variety of example data sets are used to illustrate the techniques along with R programs for reproducing the results.
Evolutionary Optimization Algorithms Genetic algorithms: an overview - Genetic algorithms in problem solving - Genetic algorithms in scientific models - Theoretical foundations of genetic algorithms - Implementing a genetic algorithm.

Engineering Optimization In recent years machine learning has made its way from artificial intelligence into areas of administration, commerce, and industry. Data mining is perhaps the most widely known demonstration of this migration, complemented by less publicized applications of machine learning like adaptive systems in industry, financial prediction, medical diagnosis and the construction of user profiles for Web browsers. This book presents the capabilities of machine learning methods and ideas on how these methods could be used to solve real-world problems. The first ten chapters assess the current state of the art of machine learning, from symbolic concept learning and conceptual clustering to case-based reasoning, neural networks, and genetic algorithms. The second part introduces the reader to innovative applications of ML techniques in fields such as data mining, knowledge discovery, human language technology, user modeling, data analysis, discovery science, agent technology, finance, etc.

Applied Machine Learning The first complete overview of evolutionary computing, the collective name for a range of problem-solving techniques based on principles of biological evolution, such as natural selection and genetic inheritance. The text is aimed directly at lecturers and graduate and undergraduate students. It is also meant for those who wish to apply evolutionary computing to a particular problem or within a given application area. The book contains quick-reference information on the current state-of-the-art in a wide range of related topics, so it is of interest not just to evolutionary computing specialists but to researchers working in other fields.

Soft Computing A comprehensive introduction to optimization with a focus on practical algorithms for the design of engineering systems. This book offers a comprehensive introduction to optimization with a focus on practical algorithms. The book approaches optimization from an engineering perspective, where the objective is to design a system that optimizes a set of metrics subject to constraints. Readers will learn about computational approaches for a range of challenges, including searching high-dimensional spaces, handling problems where there are multiple competing objectives, and accommodating uncertainty in the metrics. Figures, examples, and exercises convey the intuition behind the mathematical approaches. The text provides concrete implementations in the Julia programming language. Topics covered include derivatives and their generalization to multiple dimensions; local descent and first- and second-order methods that inform local descent; stochastic methods, which introduce randomness into the optimization process; linear constrained optimization, when both the objective function and the constraints are linear; surrogate models, probabilistic surrogate models, and using probabilistic surrogate models to guide optimization; optimization under uncertainty; uncertainty propagation; expression optimization; and multidisciplinary design optimization. Appendices offer an introduction to the Julia language, test functions for evaluating algorithm performance, and mathematical concepts used in the derivation and analysis of the optimization methods discussed in the text. The book can be used by advanced undergraduates and graduate students in mathematics, statistics, computer science, any engineering field, (including electrical engineering and aerospace engineering), and operations research, and as a reference for professionals.

Algorithms for Optimization

Nature-Inspired Optimization Algorithms Nature-Inspired Optimization Algorithms provides a systematic introduction to all major nature-inspired algorithms for optimization. The book’s unified approach, balancing algorithm introduction, theoretical background and practical implementation, complements extensive literature with well-chosen case studies to illustrate how these algorithms work. Topics include particle swarm optimization, ant and bee algorithms, simulated annealing, cuckoo search, firefly algorithm, bat algorithm, flower algorithm, harmony search, algorithm analysis, constraint handling, hybrid methods, parameter tuning and control, as well as multi-objective optimization. This book can serve as an introductory book for graduates, doctoral students and lecturers in computer science, engineering and natural sciences. It can also serve a source of inspiration for new applications. Researchers and engineers as well as experienced experts will also find it a handy reference. Discusses and summarizes the latest developments in nature-inspired algorithms with comprehensive, timely literature Provides a theoretical understanding as well as practical implementation hints Provides a step-by-step introduction to each algorithm

The Simple Genetic Algorithm This work gives a concise introduction to four important optimization techniques, presenting a range of applications drawn from electrical, manufacturing, mechanical, and systems engineering—such as the design of microstrip antennas, digital FIR filters, and fuzzy logic controllers. The book also contains the C programs used to implement the main techniques for those wishing to experiment with them.

Transport Systems Telematics Practical Handbook of Genetic Algorithms, Volume 3: Complex Coding Systems contains computer-code examples for the development of genetic algorithm systems - compiling them from an array of practitioners in the field. Each contribution of this singular resource includes: unique code segments
Genetic Algorithms + Data Structures = Evolution Programs

Fundamentals of the New Artificial Intelligence This book offers a basic introduction to genetic algorithms. It provides a detailed explanation of genetic algorithm concepts and examines numerous genetic algorithm optimization problems. In addition, the book presents implementation of optimization problems using C and C++ as well as simulated solutions for genetic algorithm problems using MATLAB 7.0. It also includes application case studies on genetic algorithms in emerging fields.


Adaptation in Natural and Artificial Systems The six-volume set LNCS 8579-8584 constitutes the refereed proceedings of the 14th International Conference on Computational Science and Its Applications, ICCSA 2014, held in Guimarães, Portugal, in June/July 2014. The 347 revised papers presented in 30 workshops and a special track were carefully reviewed and selected from 1167. The 289 papers presented in the workshops cover various areas in computational science ranging from computational science technologies to specific areas of computational science such as computational geometry and security.

Proceedings of the First International Conference on Genetic Algorithms and their Applications This text covers all the fundamentals and presents basic theoretical concepts and a wide range of techniques (algorithms) applicable to challenges in our day-to-day lives. The book recognizes that most of the ideas behind machine learning are simple and straightforward. It provides a platform for hands-on experience through self-study machine learning projects. Datasets for some benchmark applications have been explained to encourage the use of algorithms covered in this book. This is a comprehensive text book on machine learning for undergraduates in computer science and all engineering degree programs. Post graduates and research scholars will find it a useful initial exposure to the subject, before they go for highly theoretical depth in the specific areas of their research. For engineers, scientists, business managers and other practitioners, the book will help build the foundations of machine learning.

Advances in Metaheuristics for Hard Optimization Genetic algorithms are founded upon the principle of evolution, i.e., survival of the fittest. Hence evolution programming techniques, based on genetic algorithms, are applicable to many hard optimization problems, such as optimization of functions with linear and nonlinear constraints, the traveling salesman problem, and problems of scheduling, partitioning, and control. The importance of these techniques is still growing, since evolution programs are parallel in nature, and parallelism is one of the most promising directions in computer science. The book is self-contained and the only prerequisite is basic undergraduate mathematics. This third edition has been substantially revised and extended by three new chapters and by additional appendices containing working material to cover recent developments and a change in the perception of evolutionary computation.

Machine Learning and Its Applications Computer solutions to many difficult problems in science and engineering require the use of automatic search methods that consider a large number of possible solutions to the given problems. This book describes recent advances in the theory and practice of one such search method, called Genetic Algorithms. Genetic algorithms are evolutionary search techniques based on principles derived from natural population genetics, and are currently being applied to a variety of difficult problems in science, engineering, and artificial intelligence.

Cellular Genetic Algorithms * 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
OPTIMIZATION FOR ENGINEERING DESIGN Production scheduling dictates highly constrained mathematical models with complex and often contradicting objectives. Evolutionary algorithms can be formulated almost independently of the detailed shaping of the problems under consideration. As one would expect, a weak formulation of the problem in the algorithm comes along with a quite inefficient search. This book discusses the suitability of genetic algorithms for production scheduling and presents an approach which produces results comparable with those of more tailored optimization techniques.

Industrial Applications of Genetic Algorithms The book covers the most essential and widely employed material in each area, particularly the material important for real-world applications. Our goal is not to cover every latest progress in the fields, nor to discuss every detail of various techniques that have been developed. New sections/subsections added in this edition are: Simulated Annealing (Section 3.7), Boltzmann Machines (Section 3.8) and Extended Fuzzy if-then Rules Tables (Sub-section 5.5.3). Also, numerous changes and typographical corrections have been made throughout the manuscript. The Preface to the first edition follows. General scope of the book Artificial intelligence (AI) as a field has undergone rapid growth in diversification and practicality. For the past few decades, the repertoire of AI techniques has evolved and expanded. Scores of newer fields have been added to the traditional symbolic AI. Symbolic AI covers areas such as knowledge-based systems, logical reasoning, symbolic machine learning, search techniques, and natural language processing. The newer fields include neural networks, genetic algorithms or evolutionary computing, fuzzy systems, rough set theory, and chaotic systems.

Feature Engineering and Selection Explore the ever-growing world of genetic algorithms to solve search, optimization, and AI-related tasks, and improve machine learning models using Python libraries such as DEAP, scikit-learn, and NumPy Key Features Explore the ins and outs of genetic algorithms with this fast-paced guide Implement tasks such as feature selection, search optimization, and cluster analysis using Python Solve combinatorial problems, optimize functions, and enhance the performance of artificial intelligence applications Book Description Genetic algorithms are a family of search, optimization, and learning algorithms inspired by the principles of natural evolution. By imitating the evolutionary process, genetic algorithms can overcome hurdles encountered in traditional search algorithms and provide high-quality solutions for a variety of problems. This book will help you get to grips with a powerful yet simple approach to applying genetic algorithms to a wide range of tasks using Python, covering the latest developments in artificial intelligence. After introducing you to genetic algorithms and their principles of operation, you’ll understand how they differ from traditional algorithms and what types of problems they can solve. You’ll then discover how they can be applied to search and optimization problems, such as planning, scheduling, gaming, and analytics. As you advance, you’ll also learn how to use genetic algorithms to improve your machine learning and deep learning models, solve reinforcement learning tasks, and perform image reconstruction. Finally, you’ll cover several related technologies that can open up new possibilities for future applications. By the end of this book, you’ll have hands-on experience of applying genetic algorithms in artificial intelligence as well as in numerous other domains. What you will learn Understand how to use state-of-the-art Python tools to create genetic algorithm-based applications Use genetic algorithms to optimize functions and solve planning and scheduling problems Enhance the performance of machine learning models and optimize deep learning network architecture Apply genetic algorithms to reinforcement learning tasks using OpenAI Gym Explore how images can be reconstructed using a set of semi-transparent shapes Discover other bio-inspired techniques, such as genetic programming and particle swarm optimization Who this book is for This book is for software developers, data scientists, and AI enthusiasts who want to use genetic algorithms to carry out intelligent tasks in their applications. Working knowledge of Python and basic knowledge of mathematics and computer science will help you get the most out of this book.


An Introduction to Genetic Algorithms The Fourth International Conference on Advanced Data Mining and Applications (ADMA 2008) will be held in Chengdu, China, followed by the last three successful ADMA conferences (2005 in Wu Han, 2006 in Xian, and 2007 Harbin). Our major goal of ADMA is to bring together the experts on data mining in the world, and to provide a leading international forum for the dissemination of original research results in data mining, including applications, algorithms, software and systems, and different disciplines with potential applications of data mining. This goal has been partially achieved in a very short time despite the young age of the conference, thanks to the rigorous review process insisted upon, the outstanding list of internationally renowned keynote speakers and the excellent program each year. ADMA is ranked higher than, or very similar to, other data mining conferences (such as PAKDD, PKDD, and SDM) in early 2008 by an independent source: cs-conference-ranking. org. This year we had the pleasure and honor to host illustrious keynote speakers. Our distinguished keynote speakers are Prof. Qiang Yang and Prof. Jiming Liu. Prof. Yang is a tenured Professor and postgraduate studies coordinator at Computer Science and Engineering Department of Hong Kong University of Science and Technology. He is also a member of AAAI, ACM, a senior member of the IEEE, and he is also an as- ciate editor for the IEEE TKDE and IEEE Intelligent Systems, KAIS and WI Journals.
Genetic Algorithms This book constitutes the refereed proceedings of the First International Conference on Multi-Criterion Optimization, EMO 2001, held in Zurich, Switzerland in March 2001. The 45 revised full papers presented were carefully reviewed and selected from a total of 87 submissions. Also included are two tutorial surveys and two invited papers. The book is organized in topical sections on algorithm improvements, performance assessment and comparison, constraint handling and problem decomposition, uncertainty and noise, hybrid and alternative methods, scheduling, and applications of multi-objective optimization in a variety of fields.

Introduction to Evolutionary Computing This well-received book, now in its second edition, continues to provide a number of optimization algorithms which are commonly used in computer-aided engineering design. The book begins with simple single-variable optimization techniques, and then goes on to give unconstrained and constrained optimization techniques in a step-by-step format so that they can be coded in any user-specific computer language. In addition to classical optimization methods, the book also discusses Genetic Algorithms and Simulated Annealing, which are widely used in engineering design problems because of their ability to find global optimum solutions. The second edition adds several new topics of optimization such as design and manufacturing, data fitting and regression, inverse problems, scheduling and routing, data mining, intelligent system design, Lagrangian duality theory, and quadratic programming and its extension to sequential quadratic programming. It also extensively revises the linear programming algorithms section in the Appendix. This edition also includes more number of exercise problems. The book is suitable for senior undergraduate/postgraduate students of mechanical, production and chemical engineering. Students in other branches of engineering offering optimization courses as well as designers and decision-makers will also find the book useful. Key Features Algorithms are presented in a step-by-step format to facilitate coding in a computer language. Sample computer programs in FORTRAN are appended for better comprehension. Worked-out examples are illustrated for easy understanding. The same example problems are solved with most algorithms for a comparative evaluation of the algorithms.

Hands-On Genetic Algorithms with Python

Computational Science and Its Applications - ICCSA 2014 Genetic algorithms (GAs) are computer-based search techniques patterned after the genetic mechanisms of biological organisms that have adapted and flourished in changing, highly competitive environments for millions of years. GAs have been successfully applied to problems in a variety of studies, and their popularity continues to increase because of their effectiveness, applicability, and ease of use. Industrial Applications of Genetic Algorithms shows how GAs have made the leap form their origins in the laboratory to the practicing engineer’s toolbox. Each chapter in the book describes a project completed by a graduate student at the University of Alabama.

Intelligent Optimisation Techniques Many advances have recently been made in metaheuristic methods, from theory to applications. The editors, both leading experts in this field, have assembled a team of researchers to contribute 21 chapters organized into parts on simulated annealing, tabu search, ant colony algorithms, general purpose studies of evolutionary algorithms, applications of evolutionary algorithms, and metaheuristics.

Genetic Algorithms in Search, Optimization, and Machine Learning Cellular Genetic Algorithms defines a new class of optimization algorithms based on the concepts of structured populations and Genetic Algorithms (GAs). The authors explain and demonstrate the validity of these cellular genetic algorithms throughout the book with equal and parallel emphasis on both theory and practice. This book is a key source for studying and designing cellular GAs, as well as a self-contained primary reference book for these algorithms.

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