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KEY=GENETIC - FRIDA JILLIAN

Genetic Algorithms and Engineering Design

John Wiley & Sons 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

Genetic Algorithms and Engineering Optimization

John Wiley & Sons A comprehensive guide to a powerful new analytical tool by two of its foremost innovators The past decade has witnessed many exciting advances in the use of genetic algorithms (GAs) to solve optimization problems in everything from product design to scheduling and client/server networking. Aided by GAs, analysts and designers now routinely evolve solutions to complex combinatorial and multiobjective optimization problems with an ease and rapidity unthinkable with conventional methods. Despite the continued growth and refinement of this powerful analytical tool, there continues to be a lack of up-to-date guides to contemporary GA optimization principles and practices. Written by two of the world's leading experts in the field, this book fills that gap in the literature. Taking an intuitive approach, Mitsuo Gen and Runwei Cheng employ numerous illustrations and real-world examples to help readers gain a thorough understanding of basic GA concepts--including encoding, adaptation, and genetic optimizations--and to show how GAs can be used to solve an array of constrained, combinatorial, multiobjective, and fuzzy optimization problems. Focusing on problems commonly encountered in industry--especially in manufacturing--Professors Gen and Cheng provide in-depth coverage of advanced GA techniques for:

- * Reliability design
- * Manufacturing cell design
- * Scheduling
- * Advanced transportation problems
- * Network design and routing

Genetic Algorithms and Engineering Optimization is an indispensable working resource for industrial engineers and designers, as well as systems analysts, operations researchers, and management scientists working in manufacturing and related industries. It also makes an excellent primary or supplementary text for advanced courses in industrial engineering, management science, operations research, computer science, and artificial intelligence.

An Application of Genetic Algorithm Optimization in Engineering

Engineering Design Using Genetic Algorithms

Evolutionary Algorithms in Engineering Applications

Springer Science & Business Media *Evolutionary algorithms are general-purpose search procedures based on the mechanisms of natural selection and population genetics. They are appealing because they are simple, easy to interface, and easy to extend. This volume is concerned with applications of evolutionary algorithms and associated strategies in engineering. It will be useful for engineers, designers, developers, and researchers in any scientific discipline interested in the applications of evolutionary algorithms. The volume consists of five parts, each with four or five chapters. The topics are chosen to emphasize application areas in different fields of engineering. Each chapter can be used for self-study or as a reference by practitioners to help them apply evolutionary algorithms to problems in their engineering domains.*

Evolutionary Algorithms for Embedded System Design

Springer Science & Business Media *Evolutionary Algorithms for Embedded System Design describes how Evolutionary Algorithm (EA) concepts can be applied to circuit and system design - an area where time-to-market demands are critical. EAs create an interesting alternative to other approaches since they can be scaled with the problem size and can be easily run on parallel computer systems. This book presents several successful EA techniques and shows how they can be applied at different levels of the design process. Starting on a high-level abstraction, where software components are dominant, several optimization steps are demonstrated, including DSP code optimization and test generation. Throughout the book, EAs are tested on real-world applications and on large problem instances. For each application the main criteria for the successful application in the corresponding domain are discussed. In addition, contributions from leading international researchers provide the reader with a variety of perspectives, including a special focus on the combination of EAs with problem specific heuristics. Evolutionary Algorithms for Embedded System Design is an excellent reference for both practitioners working in the area of circuit and system design and for researchers in the field of evolutionary concepts.*

Integrated Design and Manufacturing in Mechanical Engineering '98

Springer Science & Business Media *This book is devoted to the optimization of product design and manufacturing. It contains selected and carefully composed articles based on presentations given at the IDMME conference, held in Compiègne University of Technology, France, in 1998. The authors are all involved in cutting-edge research in their respective fields of specialization. The integration of manufacturing constraints and their optimization in the design process is becoming more and more widespread in the development of mechanical products or systems. There is a clear industrial need for these kinds of methodologies. Important - but still unsolved - problems are related to the definition of design processes, the choice of optimal manufacturing processes, and their integration through coherent methodologies in adapted environments. The main topics addressed in this book are: analysis and optimization of mechanical parts and products (computational structural mechanics, optimum design of structures, finite element solvers, computer-aided geometry, modeling and synthesis of mechanisms); analysis and optimization for fabrication and manufacturing systems (modeling of forming processes, modeling for control and measurement, tolerancing and assembly in manufacturing, off-line programming and optimal parameters for machining, robotics, welding); methodological aspects of integrated design and manufacturing (new methodologies for design with constraints, communication tools, training applications, computer-aided manufacturing). Apart from giving a thorough theoretical background, a very important theme is the relation between research and industrial applications. The book is of interest for engineers, researchers and PhD students who are involved in the optimization of design and manufacturing processes.*

Multiple Criteria Genetic Algorithms in Engineering Design and Operation

Genetic Algorithms: For Vlsi Design, Layout & Test Automation

Pearson Education India *Genetic Algorithms mimic the natural process of evolution, helping engineers optimize their designs by using the principle of "survival of the fittest". VLSI is especially suited to benefit from genetic algorithms- and this comprehensive book shows how to get the best results. You will discover how genetic algorithms work and how you can use them in a wide variety of VLSI design, layout and test automation tasks.*

The Design of Innovation

Lessons from and for Competent Genetic Algorithms

Springer Science & Business Media 7 69 6 A DESIGN APPROACH TO PROBLEM DIFFICULTY 71 1 Design and Problem Difficulty 71 2 Three Misconceptions 72 3 Hard Problems Exist 76 4 The 3-Way Decomposition and Its Core 77 The Core of Intra-BB Difficulty: Deception 5 77 6 The Core of Inter-BB Difficulty: Scaling 83 7 The Core of Extra-BB Difficulty: Noise 88 Crosstalk: All Roads Lead to the Core 8 89 9 From Multimodality to Hierarchy 93 10 Summary 100 7 ENSURING BUILDING BLOCK SUPPLY 101 1 Past Work 101 2 Facetwise Supply Model I: One BB 102 Facetwise Supply Model II: Partition Success 103 3 4 Population Size for BB Supply 104 Summary 5 106 8 ENSURING BUILDING BLOCK GROWTH 109 1 The Schema Theorem: BB Growth Bound 109 2 Schema Growth Somewhat More Generally 111 3 Designing for BB Market Share Growth 112 4 Selection Pressure for Early Success 114 5 Designing for Late in the Day 116 The Schema Theorem Works 6 118 A Demonstration of Selection Stall 7 119 Summary 122 8 9 MAKING TIME FOR BUILDING BLOCKS 125 1 Analysis of Selection Alone: Takeover Time 126 2 Drift: When Selection Chooses for No Reason 129 3 Convergence Times with Multiple BBs 132 4 A Time-Scales Derivation of Critical Locus 142 5 A Little Model of Noise-Induced Run Elongation 143 6 From Alleles to Building Blocks 147 7 Summary 148 10 DECIDING WELL 151 1 Why is Decision Making a Problem? 151

Assembly Line Design

The Balancing of Mixed-Model Hybrid Assembly Lines with Genetic Algorithms

Springer Science & Business Media Efficient assembly line design is a problem of considerable industrial importance. Assembly Line Design will be bought by technical personnel working in design, planning and production departments in industry as well as managers in industry who want to learn more about concurrent engineering. This book will also be purchased by researchers and postgraduate students in mechanical, manufacturing or micro-engineering.

Emergent Computing Methods in Engineering Design

Applications of Genetic Algorithms and Neural Networks

Springer Science & Business Media The papers in this book show the tremendous potential of emerging computing paradigms such as genetic algorithms, evolutionary computing, and neural networks for solving problems of engineering design.

Adaptive Computing in Design and Manufacture

The Integration of Evolutionary and Adaptive Computing Technologies with Product/System Design and Realisation

Springer Science & Business Media The third evolutionary / adaptive computing conference organised by the Plymouth Engineering Design Centre (PEDC) at the University of Plymouth again explores the utility of various adaptive search algorithms and complementary computational intelligence techniques within the engineering design and manufacturing domains. The intention is to investigate strategies and techniques that are of benefit not only as component / system optimisers but also as exploratory design tools capable of supporting the differing requirements of conceptual, embodiment and detailed design whilst taking into account the many manufacturing criteria influencing design direction. Interest in the integration of adaptive computing technologies with engineering has been rapidly increasing in recent years as practical examples illustrating their potential relating to system performance and design process efficiency have become more apparent. This is in addition to the realisation of significant commercial benefits from the application of evolutionary planning and scheduling strategies. The development of this conference series from annual PEDC one day workshops to the biennial 'Adaptive Computing in Engineering Design and Control' conference and this year's event reflects this growth in both academic and industrial interest. The name change to include manufacture relates to a desire to increase cover of integrated product development aspects, facility layout and scheduling in addition to process / machine control.

Information Technology in Control Engineering

Genetic Algorithms for Design and Parallel Processing for Implementation

Evolutionary Design and Manufacture

Selected Papers from ACDM '00

Springer Science & Business Media *The fourth evolutionary/adaptive computing conference at the University of Plymouth again explores the utility of various evolutionary/adaptive search algorithms and complementary computational intelligence techniques within design and manufacturing. The content of the following chapters represents a selection of the diverse set of papers presented at the conference that relate to both engineering design and also to more general design areas. This expansion has been the result of a conscious effort to recognise generic problem areas and complementary research across a wide range of design and manufacture activity. There has been a major increase in both research into and utilisation of evolutionary and adaptive systems within the last two years. This is reflected in the establishment of major annual joint US genetic and evolutionary computing conferences and the introduction of a large number of events relating to the application of these technologies in specific fields. The Plymouth conference remains a long-standing, event both as ACDM and as the earlier ACEDC series. The conference maintains its policy of single stream presentation and associated poster and demonstrator sessions. The event retains the support of several UK Engineering Institutions and is now recognised by the International Society for Genetic and Evolutionary Computation as a mainstream event. It continues to attract an international audience of leading researchers and practitioners in the field.*

Cost Optimization of Structures

Fuzzy Logic, Genetic Algorithms, and Parallel Computing

John Wiley & Sons *While the weight of a structure constitutes a significant part of the cost, a minimum weight design is not necessarily the minimum cost design. Little attention in structural optimization has been paid to the cost optimization problem, particularly of realistic three-dimensional structures. Cost optimization is becoming a priority in all civil engineering projects, and the concept of Life-Cycle Costing is penetrating design, manufacturing and construction organizations. In this groundbreaking book the authors present novel computational models for cost optimization of large scale, realistic structures, subjected to the actual constraints of commonly used design codes. As the first book on the subject this book: Contains detailed step-by-step algorithms Focuses on novel computing techniques such as genetic algorithms, fuzzy logic, and parallel computing Covers both Allowable Stress Design (ASD) and Load and Resistance Factor Design (LRFD) codes Includes realistic design examples covering large-scale, high-rise building structures Presents computational models that enable substantial cost savings in the design of structures Fully automated structural design and cost optimization is where large-scale design technology is heading, thus Cost Optimization of Structures: Fuzzy Logic, Genetic Algorithms, and Parallel Computing will be of great interest to civil and structural engineers, mechanical engineers, structural design software developers, and architectural engineers involved in the design of structures and life-cycle cost optimisation. It is also a pioneering text for graduate students and researchers working in building design and structural optimization.*

Topology Design of Structures

Springer Science & Business Media *Proceedings of the NATO Advanced Research Workshop, Sesimbra, Portugal, June 20-26, 1992*

Genetic Algorithms in Engineering Systems

IET *The contributions presented in this book are extended version of commissioned papers from some of the highest quality contributions to the conference. Chosen for their experience in the field, the authors are drawn from academia and industry worldwide. The chapters cover the main fields of work as well as presenting tutorial material in this important subject, which is currently receiving considerable attention from engineers.*

Computer Aided Molecular Design

Theory and Practice

Elsevier *CAMD or Computer Aided Molecular Design refers to the design of molecules with desirable properties. That is, through CAMD, one determines molecules that match a specified set of (target) properties. CAMD as a technique has a very large potential as in principle, all kinds of chemical, bio-chemical and material products can be designed through this technique. This book mainly deals with macroscopic properties and therefore does not cover molecular design of large, complex chemicals such as drugs. While books have been written on computer aided molecular design relating to drugs and large complex chemicals, a book on systematic formulation of CAMD problems and solutions, with emphasis on theory and practice, which helps one to learn, understand and apply the technique is currently unavailable. · This title brings together the theoretical aspects related to Computer Aided Molecular Design,*

the different techniques that have been developed and the different applications that have been reported. · Contributing authors are among the leading researchers and users of CAMD · First book available giving a systematic formulation of CAMD problems and solutions

OPTIMIZATION FOR ENGINEERING DESIGN

Algorithms and Examples

PHI Learning Pvt. Ltd. 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.

Soft Computing in Engineering Design and Manufacturing

Springer Science & Business Media Soft Computing has emerged as an important approach towards achieving intelligent computational paradigms where key elements are learning from experience in the presence of uncertainties, fuzzy belief functions, and evolution of the computing strategies of the learning agent itself. Fuzzy, neural and evolutionary computing are the three major themes of soft computing. The book presents original research papers dealing with the theory of soft computing and its applications in engineering design and manufacturing. The methodologies have been applied to a large variety of real life problems. Application of soft computing has provided the opportunity to integrate human like 'vagueness' and real life 'uncertainty' to an otherwise 'hard' computer programme. Now, a computer programme can learn, adapt, and evolve using soft computing. The book identifies the strengths and limitations of soft computing techniques, particularly with reference to their engineering applications. The applications range from design optimisation to scheduling and image analysis. Goal optimisation with incomplete information and under uncertainty is the key to solving real-life problems in design and manufacturing. Soft computing techniques presented in this book address these issues. Computational complexity and efficient implementation of these techniques are also major concerns for realising useful industrial applications of soft computing. The different parts in the book also address these issues. The book contains 9 parts, 8 of which are based on papers from the 2nd On-line World Conference on Soft Computing in Engineering Design and Manufacture (WSC2),.

The Design of Innovation

Lessons from and for Competent Genetic Algorithms by David E. Goldberg

Springer Science & Business Media The Design of Innovation illustrates how to design and implement competent genetic algorithms- genetic algorithms that solve hard problems quickly, reliably, and accurately- and how the invention of competent genetic algorithms amounts to the creation of an effective computational theory of human innovation. For the specialist in genetic algorithms and evolutionary computation, this book combines over two decades of hard-won research results in a single volume to provide a comprehensive step-by-step guide to designing genetic algorithms that scale well with problem size and difficulty. For the innovation researcher - whether from the social and behavioral sciences, the natural sciences, the humanities, or the arts - this unique book gives a consistent and valuable mathematical and computational viewpoint for understanding certain aspects of human innovation. For all readers, The Design of Innovation provides an entrance into the world of competent genetic algorithms and innovation through a methodology of invention borrowed from the Wright brothers. Combining careful decomposition, cost-effective, little analytical models, and careful design, the road to competence is paved with easily understood examples, simulations, and results from the literature.

Genetic Algorithm Based Optimization in Engineering Design Using Fuzzy Constraints and Fitness Functions Information and Management Engineering

International Conference, ICCIC 2011, held in Wuhan, China, September 17-18, 2011. Proceedings, Part V

Springer This six-volume-set (CCIS 231, 232, 233, 234, 235, 236) constitutes the refereed proceedings of the International Conference on Computing, Information and Control, ICCIC 2011, held in Wuhan, China, in September 2011. The papers are organized in two volumes on Innovative Computing and Information (CCIS 231 and 232), two volumes on Computing and Intelligent Systems (CCIS 233 and 234), and in two volumes on Information and Management Engineering (CCIS 235 and 236).

Designing Evolutionary Algorithms for Dynamic Environments

Springer Science & Business Media Details robustness, stability, and performance of Evolutionary Algorithms in dynamic environments

Research Anthology on Multi-industry Uses of Genetic Programming and Algorithms

"This book of research chapters explores the technology, uses, and implementation of genetic programming and algorithms across multiple industries creating a fundamental understanding of this technology, and how genetic programming and algorithms are implemented in fields such as healthcare, engineering, social sciences, computer science and more"--

An Introduction to Genetic Algorithms

MIT Press Genetic algorithms have been used in science and engineering as adaptive algorithms for solving practical problems and as computational models of natural evolutionary systems. This brief, accessible introduction describes some of the most interesting research in the field and also enables readers to implement and experiment with genetic algorithms on their own. It focuses in depth on a small set of important and interesting topics—particularly in machine learning, scientific modeling, and artificial life—and reviews a broad span of research, including the work of Mitchell and her colleagues. The descriptions of applications and modeling projects stretch beyond the strict boundaries of computer science to include dynamical systems theory, game theory, molecular biology, ecology, evolutionary biology, and population genetics, underscoring the exciting "general purpose" nature of genetic algorithms as search methods that can be employed across disciplines. *An Introduction to Genetic Algorithms* is accessible to students and researchers in any scientific discipline. It includes many thought and computer exercises that build on and reinforce the reader's understanding of the text. The first chapter introduces genetic algorithms and their terminology and describes two provocative applications in detail. The second and third chapters look at the use of genetic algorithms in machine learning (computer programs, data analysis and prediction, neural networks) and in scientific models (interactions among learning, evolution, and culture; sexual selection; ecosystems; evolutionary activity). Several approaches to the theory of genetic algorithms are discussed in depth in the fourth chapter. The fifth chapter takes up implementation, and the last chapter poses some currently unanswered questions and surveys prospects for the future of evolutionary computation.

Advances on Mechanics, Design Engineering and Manufacturing II

Proceedings of the International Joint Conference on Mechanics, Design Engineering & Advanced Manufacturing (JCM 2018)

Springer This book contains the papers presented at the International Joint Conference on Mechanics, Design Engineering and Advanced Manufacturing (JCM 2018), held on 20-22 June 2018 in Cartagena, Spain. It reports on cutting-edge topics in product design and manufacturing, such as industrial methods for integrated product and process design; innovative design; and computer-aided

design. Further topics covered include virtual simulation and reverse engineering; additive manufacturing; product manufacturing; engineering methods in medicine and education; representation techniques; and nautical, aeronautics and aerospace design and modeling. The book is divided into six main sections, reflecting the focus and primary themes of the conference. The contributions presented here will not only provide researchers, engineers and experts in a range of industrial engineering subfields with extensive information to support their daily work; they are also intended to stimulate new research directions, advanced applications of the methods discussed, and future interdisciplinary collaborations.

Study on Adaptive Hybrid Genetic Algorithm and Its Applications to Engineering Design Problems

Genetic Algorithms in Electromagnetics

John Wiley & Sons 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 selection for a GA Detailed explanations of particle swarm optimization and multiple objective optimization An appendix of MATLAB code for experimentation

Design Point Adaptation Using Genetic Algorithms

Advances in Soft Computing

Engineering Design and Manufacturing

Springer Science & Business Media Soft computing embraces methodologies for the development of intelligent systems that have been successfully applied to a large number of real-world problems. This collection of keynote papers, presented at the 7th On-line World Conference on Soft Computing in Engineering Design and Manufacturing, provides a comprehensive overview of recent advances in fuzzy, neural and evolutionary computing techniques and applications in engineering design and manufacturing. Features: - New and highly advanced research results at the forefront of soft computing in engineering design and manufacturing. - Keynote papers by world-renowned researchers in the field. - A good overview of current soft computing research around the world. A collection of methodologies aimed at researchers and professional design and manufacturing engineers who develop and apply intelligent systems in computer engineering.

Evolutionary Electronics

Automatic Design of Electronic Circuits and Systems by Genetic Algorithms

CRC Press From the explosion of interest, research, and applications of evolutionary computation a new field emerges-evolutionary electronics. Focused on applying evolutionary computation concepts and techniques to the domain of electronics, many researchers now see it as holding the greatest potential for overcoming the drawbacks of conventional design techniques. *Evolutionary Electronics: Automatic Design of Electronic Circuits and Systems by Genetic Algorithms* formally introduces and defines this area of research, presents its main challenges in electronic design, and explores emerging technologies. It describes the evolutionary computation paradigm and its primary algorithms, and explores topics of current interest, such as multi-objective optimization. The authors examine numerous evolutionary electronics applications, draw conclusions about those applications, and sketch the future of evolutionary computation and its applications in electronics. In coming years, the appearance of more and more advanced technologies will increase the complexity of optimization and synthesis problems, and evolutionary electronics will almost certainly become a key to solving those problems. *Evolutionary Electronics* is your key to discovering and unlocking the potential of this promising new field.

Control, Optimization, and Smart Structures

High-Performance Bridges and Buildings of the Future

John Wiley & Sons A futuristic guide to smart structure technology Through the use of active controllers, a structure can modify its behavior during dynamic loading such as impact, wind, or earthquake loading. Such structures with self-modification capability are called adaptive or smart structures. Smart structure technology prevents loss of life and damage to structures during natural disasters. This cross-disciplinary book features computational models and algorithms for active control of a new generation of large adaptive structures subjected to various types of dynamic loading. An important focus of the book is the optimization of both the structure and control systems in order to minimize costs.

Adaptive Computing in Design and Manufacture V

Springer Science & Business Media The Adaptive Computing in Design and Manufacture Conference series is now in its tenth year and has become a well-established, application-oriented meeting recognised by several UK Engineering Institutions and the International Society of Genetic and Evolutionary Computing. The main theme of the conference again relates to the integration of evolutionary and adaptive computing technologies with design and manufacturing processes whilst also taking into account complementary advanced computing technologies. Evolutionary and adaptive computing techniques continue to increase their penetration of industrial and commercial practice as their powerful search, exploration and optimisation capabilities become ever more apparent. The last two years have seen a very significant increase in the development of commercial software tools utilising adaptive computing technologies and the emergence of related commercial research and consultancy organisations supporting the introduction of best practice in terms of industrial utilisation. Adaptive Computing in Design and Manufacture V is comprised of selected papers that cover a diverse set of industrial application areas including: engineering design and design environments, manufacturing process design, scheduling and control, electronic circuit design, fault detection. Various aspects of search and optimisation such as multi-objective and constrained optimisation are also investigated in the context of integration with industrial processes. In addition to evolutionary computing techniques, both neural-net and agent-based technologies play a role in a number of contributions. This collection of papers will be of particular interest to both industrial researchers and practitioners in addition to the academic research communities of engineering, operational research and computer science.

An Investigation on Genetic Algorithm and Distributed Design Optimization

Adaptive Computing in Design and Manufacture VI

Springer Science & Business Media Demand for this book will come from academics and practitioners in soft computing, engineering design and manufacturing who are desirous of keeping abreast of a very fast-moving subject but who are unable to travel to the conference.

Genetic Algorithms in Engineering and Computer Science

John Wiley & Son Limited Genetic Algorithms in Engineering and Computer Science Edited by G. Winter University of Las Palmas, Canary Islands, Spain J. Périaux Dassault Aviation, Saint Cloud, France M. Galán P. Cuesta University of Las Palmas, Canary Islands, Spain This attractive book alerts us to the existence of evolution based software — Genetic Algorithms and Evolution Strategies—used for the study of complex systems and difficult optimization problems unresolved until now. Evolution algorithms are artificial intelligence techniques which mimic nature according to the "survival of the fittest" (Darwin's principle). They randomly encode physical (quantitative or qualitative) variables via digital DNA inside computers and are known for their robustness to better explore large search spaces and find near-global optima than traditional optimization methods. The objectives of this volume are two-fold: to present a compendium of state-of-the-art lectures delivered by recognized experts in the field on theoretical, numerical and applied aspects of Genetic Algorithms for the computational treatment of continuous, discrete and combinatorial optimization problems. to provide a bridge between Artificial Intelligence and Scientific Computing in order to increase the performance of evolution programs for solving real life problems. Fluid dynamics, structure mechanics, electromagnetics, automation control, resource optimization, image processing and economics are the featured multi-disciplinary areas among others in Engineering and Applied Sciences where evolution works impressively well. This volume is aimed at graduate students, applied mathematicians, computer scientists, researchers and engineers who face challenging design optimization problems in Industry. They will enjoy implementing new programs using these evolution techniques which have been experimented with by Nature for 3.5 billion years.

Applying Genetic Algorithms to the Design of Laminate Layups

Practical Genetic Algorithms

John Wiley & Sons * 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