

Travelling Salesman Problem With Matlab Programming

This book offers an introduction to the basics of MATLAB programming to scientists and engineers. The author leads with engaging examples to build a working knowledge, specifically geared to those with science and engineering backgrounds. The reader is empowered to model and simulate real systems, as well as present and analyze everyday data sets. In order to achieve those goals, the contents bypass excessive "under the hood" details, and instead gets right down to the essential, practical foundations for successful programming and modeling. Readers will benefit from the following features: Teaches programming to scientists and engineers using a problem-based approach, leading with illustrative and interesting examples. Emphasizes a hands-on approach, with "must know" information and minimal technical details. Utilizes examples from science and engineering to showcase the application of learned concepts on real problems. Showcases modeling of real systems, gradually advancing from simpler to more challenging problems. Highlights the practical uses of data processing and analysis in everyday life.

This book is a collection of accepted papers that

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were presented at the International Conference on Communication and Computing Systems (ICCCS-2016), Dronacharya College of Engineering, Gurgaon, September 9-11, 2016. The purpose of the conference was to provide a platform for interaction between scientists from industry, academia and other areas of society to discuss the current advancements in the field of communication and computing systems. The papers submitted to the proceedings were peer-reviewed by 2-3 expert referees. This volume contains 5 main subject areas: 1. Signal and Image Processing, 2. Communication & Computer Networks, 3. Soft Computing, Intelligent System, Machine Vision and Artificial Neural Network, 4. VLSI & Embedded System, 5. Software Engineering and Emerging Technologies. 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

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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

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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

In modern science and engineering, laboratory experiments are replaced by high fidelity and computationally expensive simulations. Using such simulations reduces costs and shortens development times but introduces new challenges to design optimization process. Examples of such challenges include limited computational resource for simulation runs, complicated response surface of the simulation inputs-outputs, and etc. Under such difficulties, classical optimization and analysis methods may perform poorly. This motivates the application of computational intelligence methods such as

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evolutionary algorithms, neural networks and fuzzy logic, which often perform well in such settings. This is the first book to introduce the emerging field of computational intelligence in expensive optimization problems. Topics covered include: dedicated implementations of evolutionary algorithms, neural networks and fuzzy logic. reduction of expensive evaluations (modelling, variable-fidelity, fitness inheritance), frameworks for optimization (model management, complexity control, model selection), parallelization of algorithms (implementation issues on clusters, grids, parallel machines), incorporation of expert systems and human-system interface, single and multiobjective algorithms, data mining and statistical analysis, analysis of real-world cases (such as multidisciplinary design optimization). The edited book provides both theoretical treatments and real-world insights gained by experience, all contributed by leading researchers in the respective fields. As such, it is a comprehensive reference for researchers, practitioners, and advanced-level students interested in both the theory and practice of using computational intelligence for expensive optimization problems.

*Computational Intelligence in Data Mining
Proceedings of a symposium on the Complexity of
Computer Computations, held March 20 22, 1972,
at the IBM Thomas J. Watson Research Center,*

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Yorktown Heights, New York, and sponsored by the Office of Naval Research, Mathematics Program, IBM World Trade Corporation, and the IBM Research Mathematical Sciences Department Theory and Practice

Handbook of Research on Holistic Optimization Techniques in the Hospitality, Tourism, and Travel Industry

Complexity of Computer Computations

EvoWorkshops 2001: EvoCOP, EvoFlight, EvoIASP, EvoLearn, and EvoSTIM, Como, Italy, April 18-20, 2001 Proceedings

Intelligent Informatics

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

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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.

This book gathers selected high-impact articles from the 1st International Conference on Data Science, Machine Learning & Applications 2019. It highlights the latest developments in the areas of Artificial Intelligence, Machine Learning, Soft Computing, Human-Computer Interaction and various data science & machine learning applications. It brings together scientists and researchers from different universities and industries around the world to showcase a broad

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range of perspectives, practices and technical expertise.

This easy-to-follow guide provides academics and industrial engineers with a state-of-the-art numerical approach to the most frequent technical and economical optimization methods. In an engaging manner, it provides the reader with not only a systematic and comprehensive study, but also with necessary and directly implementable code written in the versatile and readily available platform Matlab. The book offers optimization methods for univariate and multivariate constrained or unconstrained functions, general optimization methods and multicriteria optimization methods; provides intuitively, step-by-step explained sample Matlab code, that can be easily adjusted to meet individual requirements; and uses a clear, concise presentation style, which will be suited to readers even without a programming background, as well as to students preparing for examinations in optimization methods.

This book constitutes the thoroughly refereed post-proceedings of three workshops and an industrial track held in conjunction with the 11th Pacific-Asia Conference on Knowledge Discovery and Data Mining, PAKDD 2007, held in Nanjing, China in May 2007. The 62 revised full papers presented together with an overview article to each

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workshop were carefully reviewed and selected from 355 submissions.

A Practical Approach to Metaheuristics using LabVIEW and MATLAB®

Proceedings of the International Conference on Communication and Computing Systems (ICCCS 2016), Gurgaon, India, 9-11 September, 2016
Computational Intelligence in Expensive Optimization Problems

Proceedings of the Fifth International Conference on Soft Computing and Data Mining (SCDM 2022), May 30-31, 2022

Recent Advances in Soft Computing and Data Mining

Lecture Notes in Real-Time Intelligent Systems
Proceedings of the International Conference on ICCIDM 2018

Genetic programming is a new and evolutionary method that has become a novel area of research within artificial intelligence known for automatically generating high-quality solutions to optimization and search problems.

This automatic aspect of the algorithms and the mimicking of natural selection and genetics makes genetic programming an intelligent component of problem solving that is highly regarded for its efficiency and vast capabilities. With the ability to be modified and adapted, easily distributed, and effective in large-scale/wide variety of problems, genetic algorithms and programming can be utilized in many diverse industries.

This multi-industry uses vary from finance and

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economics to business and management all the way to healthcare and the sciences. The use of genetic programming and algorithms goes beyond human capabilities, enhancing the business and processes of various essential industries and improving functionality along the way. The Research Anthology on Multi-Industry Uses of Genetic Programming and Algorithms covers the implementation, tools and technologies, and impact on society that genetic programming and algorithms have had throughout multiple industries. By taking a multi-industry approach, this book covers the fundamentals of genetic programming through its technological benefits and challenges along with the latest advancements and future outlooks for computer science. This book is ideal for academicians, biological engineers, computer programmers, scientists, researchers, and upper-level students seeking the latest research on genetic programming.

Ideal for those in science and industry, this state-of-the-art guide to using MATLAB introduces readers to a wide range of numerical algorithms implemented by this modern and powerful computer software—with full explanations of their fundamental principles and clear visual interpretation of results using MATLAB graphics. Provides clear visual interpretation of results using MATLAB graphics, and discusses the solution of linear equations and eigenvalue problems; methods for solving non-linear equations; numerical integration and differentiation; the solution of initial value and boundary value problems; curve fitting including splines, least squares, and Fourier analysis. Integrates developing

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computer technology through all algorithms and scripts, encourages systematic experimentation, and offers a thorough, hands-on study of MATLAB functions that includes optimization and regression analysis with applications of symbolic methods. For electrical engineers.

Today's highly capitalized societies require maximum benefit with minimum cost. In order to find a low cost design in practice, experienced engineers have traditionally used trial-and-error methods based on their intuitive engineering sense. However, their approaches have not guaranteed optimal or near-optimal designs, which is why researchers have been interested in optimization methods. Mathematically speaking, optimization refers to finding the best vector from a set of feasible alternative vectors. Civil engineering, which includes structural engineering, geotechnical engineering, water resources engineering, environmental engineering, transportation engineering, and construction management, can be an industrial sector which derives great benefit from the optimization because these techniques can Save a lot of costs in public infrastructure construction and management that require enormous budget. Thus, this book intends to show a big picture how the optimization techniques can be applied to various civil engineering problems in 1) construction and project management, 2) structural engineering, 3) water and environmental engineering, and 4) transportation engineering.

This book unfolds ways to transform data into innovative solutions perceived as new remarkable and meaningful

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value. It offers practical views of the concepts and techniques readers need to get the most out of their large-scale research and data mining projects. It strides them through the data-analytical thinking, circumvents the difficulty in deciphering complex data systems and obtaining commercialization value from the data. Also known as data-driven science, soft computing and data mining disciplines cover a broad spectrum, an interdisciplinary field of scientific methods and processes. The book, Recent Advances in Soft Computing and Data Mining, delivers sufficient knowledge to tackle a wide range of issues seen in complex systems. This is done by exploring a vast combination of practices and applications by incorporating these two domains. To thrive in these data-driven ecosystems, researchers, data analysts, and practitioners must choose the best design to approach the problem with the most efficient tools and techniques. To thrive in these data-driven ecosystems, researchers, data analysts, and practitioners must understand the design choice and options of these approaches, thus to better appreciate the concepts, tools, and techniques used.

*Recent Advances on Hybrid Intelligent Systems
Genetic Algorithms and Engineering Design
Selected Papers from ISPR2020, September 24-26,
2020 Online - Turkey*

*Intelligent Systems in Science and Information 2014
Proceedings of the Third International Conference on
Contemporary Issues in Computer and Information
Sciences (CICIS 2012)*

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Operations Research Proceedings 1994

Engineering Optimization

This book constitutes the thoroughly refereed post-conference proceedings of the first International Symposium on Intelligent Informatics (ISI'12) held in Chennai, India during August 4-5, 2012. The 54 revised papers presented were carefully reviewed and selected from 165 initial submissions. The papers are organized in topical sections on data mining, clustering and intelligent information systems, multi agent systems, pattern recognition, signal and image processing and, computer networks and distributed systems. The book is directed to the researchers and scientists engaged in various fields of intelligent informatics.

Intelligent computing refers greatly to artificial intelligence with the aim at making computer to act as a human. This newly developed area of real-time intelligent computing integrates the aspect of dynamic environments with the human intelligence. This book presents a comprehensive practical and easy to read account which describes current state-of-the art in designing and

implementing real-time intelligent computing to robotics, alert systems, IoT, remote access control, multi-agent systems, networking, mobile smart systems, crowd sourcing, broadband systems, cloud computing, streaming data and many other applications areas. The solutions discussed in this book will encourage the researchers and IT professional to put the methods into their practice.

Optimization and evaluation are essential to the operations of several sectors such as the healthcare sector and the agriculture industry.

Improvement of optimizations and evaluation are imperative for industry success and ensures that better services are provided to global consumers across sectors. Interdisciplinary Perspectives on Operations Management and Service Evaluation is a critical scholarly publication that focuses on operations management across several sectors and assessment strategies for the improvement of these industries.

Featuring a range of topics such as fuzzy logic, ecosystem services, and metaheuristics, this book is ideal for

managers, service evaluators, marketers, academicians, business professionals, researchers, practitioners, and students.

This book presents recent advances on hybrid intelligent systems using soft computing techniques for intelligent control and robotics, pattern recognition, time series prediction and optimization of complex problems. Soft Computing (SC) consists of several intelligent computing paradigms, including fuzzy logic, neural networks, and bio-inspired optimization algorithms, which can be used to produce powerful hybrid intelligent systems. The book is organized in five main parts, which contain groups of papers around a similar subject. The first part consists of papers with the main theme of hybrid intelligent systems for control and robotics, which are basically state of the art papers that propose new models and concepts, which can be the basis for achieving intelligent control and mobile robotics. The second part contains papers with the main theme of hybrid intelligent systems for pattern recognition and time series prediction,

which are basically papers using nature-inspired techniques, like evolutionary algorithms, fuzzy logic and neural networks, for achieving efficient pattern recognition or time series prediction. The third part contains papers with the theme of bio-inspired and genetic optimization methods, which basically consider the proposal of new methods and applications of bio-inspired optimization to solve complex optimization of real problems. The fourth part contains papers that deal with the application of intelligent optimization techniques in real world problems in scheduling, planning and manufacturing. The fifth part contains papers with the theme of evolutionary methods and intelligent computing, which are papers considering soft computing methods for applications related to diverse areas, such as natural language processing, recommending systems and optimization.

New Technologies, Development and Application II

Numerical Methods Using Matlab

Programming with MATLAB for Scientists

Artificial Intelligence XXXV

***7th International Conference, ICSI 2016,
Bali, Indonesia, June 25-30, 2016,
Proceedings, Part II***

***Planning and Decision Making for Aerial
Robots***

***38th SGAI International Conference on
Artificial Intelligence, AI 2018,
Cambridge, UK, December 11-13, 2018,
Proceedings***

An insight into the latest results from the world of operations research - a wide-ranging field, as is shown by the book's 24 sections, corresponding to the conference program itself. Although problems of a primarily methodological nature are discussed, the emphasis is placed firmly on practical subjects, such as reports from the fields of healthcare, environmental protection, logistics and traffic engineering. This selection also clearly illustrates the extent to which OR is spreading into and already interwoven in other scientific disciplines.

This book includes high-quality research papers presented at the Second International Conference on Innovative Computing and Communication (ICICC 2019), which is held at the VŠB - Technical University of Ostrava, Czech Republic, on 21–22 March 2019. Introducing the innovative works of scientists, professors, research scholars, students, and industrial experts in the fields of computing and communication, the book promotes the transformation of fundamental research into institutional and industrialized research and the conversion of applied

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exploration into real-time applications.

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.

Comprehensively teaches the fundamentals of supply chain theory This book presents the methodology and foundations of supply chain management and also demonstrates how recent developments build upon classic models. The authors focus on strategic, tactical, and operational aspects of supply chain management and cover a broad range of topics from forecasting, inventory management, and facility location to transportation, process flexibility, and auctions. Key mathematical models for optimizing the design, operation, and evaluation of supply chains are presented as well as models currently emerging from the research frontier. Fundamentals of Supply Chain Theory, Second Edition contains new chapters on transportation (traveling salesman and vehicle routing problems), integrated supply chain models, and applications of supply chain theory. New sections have also been added throughout, on topics including machine learning models for forecasting, conic optimization for facility location, a multi-supplier model for supply

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uncertainty, and a game-theoretic analysis of auctions. The second edition also contains case studies for each chapter that illustrate the real-world implementation of the models presented. This edition also contains nearly 200 new homework problems, over 60 new worked examples, and over 140 new illustrative figures. Plentiful teaching supplements are available, including an Instructor's Manual and PowerPoint slides, as well as MATLAB programming assignments that require students to code algorithms in an effort to provide a deeper understanding of the material. Ideal as a textbook for upper-undergraduate and graduate-level courses in supply chain management in engineering and business schools, *Fundamentals of Supply Chain Theory, Second Edition* will also appeal to anyone interested in quantitative approaches for studying supply chains.

Emerging Technologies in Knowledge Discovery and Data Mining

International Conference on Innovative Computing and Communications

Advances in Swarm Intelligence

A Beginner's Introduction

An Introduction to Theory and Applications with Matlab
Fundamentals of Supply Chain Theory

Offering a wide range of programming examples implemented in MATLAB®, *Computational Intelligence Paradigms: Theory and Applications Using MATLAB®* presents theoretical concepts

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and a general framework for computational intelligence (CI) approaches, including artificial neural networks, fuzzy systems, evolutionary computation, genetic algorithms and programming, and swarm intelligence. It covers numerous intelligent computing methodologies and algorithms used in CI research. The book first focuses on neural networks, including common artificial neural networks; neural networks based on data classification, data association, and data conceptualization; and real-world applications of neural networks. It then discusses fuzzy sets, fuzzy rules, applications of fuzzy systems, and different types of fused neuro-fuzzy systems, before providing MATLAB illustrations of ANFIS, classification and regression trees, fuzzy c-means clustering algorithms, fuzzy ART map, and Takagi-Sugeno inference systems. The authors also describe the history, advantages, and disadvantages of evolutionary computation and include solved MATLAB programs to illustrate the implementation of evolutionary computation in various problems. After exploring the operators and parameters of genetic algorithms, they cover the steps and MATLAB routines of genetic programming. The final chapter introduces swarm intelligence and its applications, particle swarm optimization, and ant colony optimization. Full of worked examples and end-of-chapter questions,

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this comprehensive book explains how to use MATLAB to implement CI techniques for the solution of biological problems. It will help readers with their work on evolution dynamics, self-organization, natural and artificial morphogenesis, emergent collective behaviors, swarm intelligence, evolutionary strategies, genetic programming, and the evolution of social behaviors.

Volume is indexed by Thomson Reuters CPCI-S (WoS). This special collection of over 292 peer-reviewed papers reflects the success of a high-level international forum for scientists, engineers, and educators which was aimed at presenting a state-of-the-art appreciation of measuring technology and mechatronics, automation research and their applications in diverse fields. The application of holistic optimization methods in the tourism, travel, and hospitality industry has improved customer service and business strategies within the field. By utilizing new technologies and optimization techniques, it is becoming easier to troubleshoot problematic areas within the travel industry. The Handbook of Research on Holistic Optimization Techniques in the Hospitality, Tourism, and Travel Industry features innovative technologies being utilized in the management of hotels and tourist attractions. Highlighting empirical research on the optimization of the travel and hospitality industry through the use of

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algorithms and information technology, this book is a critical reference source for managers, decision makers, executives, tourists, agents, researchers, economists, and hotel staff members. The Symposium on the Complexity of Computer Computations was held at the IBM Thomas J. Watson Research Center in Yorktown Heights, New York, March 20-22, 1972. These Proceedings contain all papers presented at the Symposium together with a transcript of the concluding panel discussion and a comprehensive bibliography of the field. The Symposium dealt with complexity studies closely related to how computations are actually performed on computers. Although this area of study has not yet found an appropriate or generally accepted name, the area is recognizable by the significant commonality in problems, approaches, and motivations. The area can be described and delineated by examples such as the following. (1) Determining lower bounds on the number of operations or steps required for computational solutions of specific problems such as matrix and polynomial calculations, sorting and other combinatorial problems, iterative computations, solving equations, and computer resource allocation. (2) Developing improved algorithms for the solution of such problems which provide good upper bounds on the number of required operations, along with experimental and

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v vi PREFACE theoretical evidence concerning the efficiency and numerical accuracy of those algorithms. (3) Studying the effects on the efficiency of computation brought about by variations in sequencing and the introduction of parallelism.

Introduction to Genetic Algorithms

5th International Conference, ICIRA 2012,
Montreal, Canada, October 3-5, 2012,

Proceedings, Part I

ICDSMLA 2019

Theory & Applications using MATLAB

Selected Papers of the International Conference
on Operations Research, Berlin, August 30 -
September 2, 1994

Proceedings of the 1st International Conference on
Data Science, Machine Learning and Applications
Communication and Computing Systems

Handbook of Discrete and Combinatorial

Mathematics provides a comprehensive reference volume for mathematicians, computer scientists, engineers, as well as students and reference librarians. The material is presented so that key information can be located and used quickly and easily. Each chapter includes a glossary. Individual topics are covered in sections and subsections within chapters, each of which is organized into clearly identifiable parts: definitions, facts, and examples.

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Examples are provided to illustrate some of the key definitions, facts, and algorithms. Some curious and entertaining facts and puzzles are also included. Readers will also find an extensive collection of biographies. This second edition is a major revision. It includes extensive additions and updates. Since the first edition appeared in 1999, many new discoveries have been made and new areas have grown in importance, which are covered in this edition.

The book *Intelligent Systems in Science and Information 2014* is the carefully edited collection of 25 extended chapters from selected papers in the field of Computational Intelligence that , which received highly recommended feedback during the Science and Information Conference (SAI) 2014 review process. All chapters have gone through substantial extension and consolidation and were subject to another round of rigorous review and additional modification and represent the state of the art of the cutting-edge research and technologies in the related areas.

This book presents the proceedings from the International Symposium for Production Research 2020. The cross-disciplinary papers presented draw on research from academics

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and practitioners from industrial engineering, management engineering, operational research, and production/operational management. It explores topics including: · computer-aided manufacturing; Industry 4.0 applications; simulation and modeling big data and analytics; flexible manufacturing systems; decision analysis quality management industrial robotics in production systems information technologies in production management; and optimization techniques. Presenting real-life applications, case studies, and mathematical models, this book is of interest to researchers, academics, and practitioners in the field of production and operation engineering.

This book features papers focusing on the implementation of new and future technologies, which were presented at the International Conference on New Technologies, Development and Application, held at the Academy of Science and Arts of Bosnia and Herzegovina in Sarajevo on 27th – 29th June 2019. It covers a wide range of future technologies and technical disciplines, including complex systems such as Industry 4.0; robotics; mechatronics systems; automation; manufacturing; cyber-physical and autonomous systems; sensors; networks; control, energy, automotive and biological systems; vehicular networking and connected

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vehicles; effectiveness and logistics systems, smart grids, as well as nonlinear, power, social and economic systems. We are currently experiencing the Fourth Industrial Revolution “ Industry 4.0 ” , and its implementation will improve many aspects of human life in all segments, and lead to changes in business paradigms and production models. Further, new business methods are emerging, transforming production systems, transport, delivery, and consumption, which need to be monitored and implemented by every company involved in the global market.

Applications of Evolutionary Computing
20th International Conference on Hybrid Intelligent Systems (HIS 2020), December 14-16, 2020

Hybrid Intelligent Systems
Interdisciplinary Perspectives on Operations Management and Service Evaluation
Digital Conversion on the Way to Industry 4.0
A Tutorial

Computational Intelligence Paradigms

This book highlights the recent research on hybrid intelligent systems and their various practical applications. It presents 58 selected papers from the 20th International Conference on Hybrid Intelligent

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Systems (HIS 2020) and 20 papers from the 12th World Congress on Nature and Biologically Inspired Computing (NaBIC 2020), which was held online, from December 14 to 16, 2020. A premier conference in the field of artificial intelligence, HIS - NaBIC 2020 brought together researchers, engineers and practitioners whose work involves intelligent systems, network security and their applications in industry. Including contributions by authors from 25 countries, the book offers a valuable reference guide for all researchers, students and practitioners in the fields of science and engineering.

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

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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 book thoroughly presents the basics of 24 algorithms selected from the entire family of swarm intelligence algorithms. Each chapter deals with a different algorithm describing it in detail and showing how it works in the form of a pseudo-code. In addition, the source code is provided for each algorithm in Matlab and in the C++ programming language. In order to better understand how each swarm intelligence algorithm works, a simple numerical example is included in each chapter, which guides the reader step by step through the individual stages of the algorithm, showing all necessary calculations. This book can provide the basics for understanding how swarm intelligence algorithms work, and aid readers in programming these algorithms on their own to solve various computational problems. This book should also be useful for undergraduate

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and postgraduate students studying nature-based optimization algorithms, and can be a helpful tool for learning the basics of these algorithms efficiently and quickly. In addition, it can be a useful source of knowledge for scientists working in the field of artificial intelligence, as well as for engineers interested in using this type of algorithms in their work. If the reader already has basic knowledge of swarm intelligence algorithms, we recommend the book: "Swarm Intelligence Algorithms: Modifications and Applications" (Edited by A. Slowik, CRC Press, 2020), which describes selected modifications of these algorithms and presents their practical applications. This book provides a highly accessible introduction to evolutionary computation. It details basic concepts, highlights several applications of evolutionary computation, and includes solved problems using MATLAB software and C/C++. This book also outlines some ideas on when genetic algorithms and genetic programming should be used. The most difficult part of using a genetic algorithm is how to encode the

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population, and the author discusses various ways to do this.

This two-volume set LNCS 9712 and LNCS 9713 constitutes the refereed proceedings of the 7th International Conference on Swarm Intelligence, ICSI 2016, held in Bali, Indonesia, in June 2016. The 130 revised regular papers presented were carefully reviewed and selected from 231 submissions. The papers are organized in 22 cohesive sections covering major topics of swarm intelligence and related areas such as trend and models of swarm intelligence research; novel swarm-based optimization algorithms; swarming behaviour; some swarm intelligence algorithms and their applications; hybrid search optimization; particle swarm optimization; PSO applications; ant colony optimization; brain storm optimization; fireworks algorithms; multi-objective optimization; large-scale global optimization; biometrics; scheduling and planning; machine learning methods; clustering algorithm; classification; image classification and encryption; data mining; sensor networks and social networks; neural

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networks; swarm intelligence in management decision making and operations research; robot control; swarm robotics; intelligent energy and communications systems; and intelligent and interactive and tutoring systems. Cellular Neural Networks, Multi-scroll Chaos and Synchronization PAKDD 2007 International Workshops, Nanjing, China, May 22-25, 2007, Revised Selected Papers Practical Optimization with MATLAB Measuring Technology and Mechatronics Automation Intelligent Robotics and Applications Research Anthology on Multi-Industry Uses of Genetic Programming and Algorithms Optimization in Civil & Environmental Engineering

This book provides an introduction to the emerging field of planning and decision making for aerial robots. An aerial robot is the ultimate form of Unmanned Aerial Vehicle, an aircraft endowed with built-in intelligence, requiring no direct human control and able to perform a specific task. It must be able to fly within a partially structured environment, to react and adapt to changing environmental conditions and to accommodate for the uncertainty that exists in the physical world. An aerial robot can be termed as a physical agent that exists and flies in the real 3D world,

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can sense its environment and act on it to achieve specific goals. So throughout this book, an aerial robot will also be termed as an agent. Fundamental problems in aerial robotics include the tasks of spatial motion, spatial sensing and spatial reasoning. Reasoning in complex environments represents a difficult problem. The issues specific to spatial reasoning are planning and decision making. Planning deals with the trajectory algorithmic development based on the available information, while decision making determines priorities and evaluates potential environmental uncertainties. The issues specific to planning and decision making for aerial robots in their environment are examined in this book and categorized as follows: motion planning, deterministic decision making, decision making under uncertainty and finally multi-robot planning. A variety of techniques are presented in this book, and a number of relevant case studies are examined. The topics considered in this book are multidisciplinary in nature and lie at the intersection of Robotics, Control Theory, Operational Research and Artificial Intelligence.

This proceeding discuss the latest solutions, scientific findings and methods for solving intriguing problems in the fields of data mining, computational intelligence, big data analytics, and soft computing. This gathers outstanding papers from the fifth International Conference on “Computational Intelligence in Data Mining” (ICCIDM), and offer a “sneak preview” of the strengths and weaknesses of trending applications, together with exciting advances in computational intelligence, data mining, and related fields. For engineering applications that are based on nonlinear phenomena, novel information processing systems require new methodologies and design principles. This perspective is the basis of the three cornerstones of this book: cellular neural networks, chaos and synchronization. Cellular neural

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networks and their universal machine implementations offer a well-established platform for processing spatial-temporal patterns and wave computing. Multi-scroll circuits are generalizations to the original Chua's circuit, leading to chip implementable circuits with increasingly complex attractors. Several applications make use of synchronization techniques for nonlinear systems. A systematic overview is given for Lur'e representable systems with global synchronization criteria for master-slave and mutual synchronization, robust synchronization, HV synchronization, time-delayed systems and impulsive synchronization.

This book constitutes the refereed proceedings of five application-oriented workshops held concurrently as EvoWorkshops 2001 in Como, Italy in April 2001. The 52 revised full papers presented were carefully reviewed and selected out of 75 submissions. The papers are organized in topical sections on graph problems, Knapsack problems, ant algorithms, assignment problems, evolutionary algorithms analysis, permutative problems, aeronautics, image analysis and signal processing, evolutionary learning, and evolutionary scheduling and timetabling.

Proceedings of the International Symposium on Intelligent Informatics ISI'12 Held at August 4-5 2012, Chennai, India
Proceedings of ICICC 2019, Volume 1

Evolutionary Intelligence

Swarm Intelligence Algorithms

Handbook of Discrete and Combinatorial Mathematics

The three volume set LNAI 7506, LNAI 7507 and LNAI 7508 constitutes the refereed proceedings of the 5th International Conference on Intelligent Robotics and Applications, ICIRA 2012, held in Montreal,

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Canada, in October 2012. The 197 revised full papers presented were thoroughly reviewed and selected from 271 submissions. They present the state-of-the-art developments in robotics, automation and mechatronics. This volume covers the topics of adaptive control systems; automotive systems; estimation and identification; intelligent visual systems; application of differential geometry in robotic mechanisms; unmanned systems technologies and applications; new development on health management, fault diagnosis, and fault-tolerant control; biomechatronics; intelligent control of mechanical and mechatronic systems.

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