Intelligent Routines

Solving Mathematical Analysis with Matlab, Mathcad, Mathematica and Maple

Real Analysis is a discipline of intensive study in many institutions of higher education, because it contains useful concepts and fundamental results in the study of mathematics and physics, of the technical disciplines and geometry. This book is the first of its kind that solves mathematical analysis problems with all four related main software Matlab, Mathcad, Mathematica and Maple. Besides the fundamental theoretical notions, the book contains many exercises, solved both mathematically and by computer, using: Matlab 7.9, Mathcad 14, Mathematica 8 or Maple 15 programming languages. The book is divided into nine chapters, which illustrate the application of the mathematical concepts using the computer.

Features

- Solves mathematical analysis problems with all four related main software Matlab, Mathcad, Mathematica and Maple
- Contains many exercises, solved both mathematically and by computer, using: Matlab 7.9, Mathcad 14, Mathematica 8 or Maple 15 programming languages
- Written by leading experts in the field

Contents


Fields of interests

Computational Intelligence; Computational Mathematics and Numerical Analysis; Analysis

Target groups

Research

Product category

Monograph

Due March 2012

- $229.00
ISBN 978-3-642-28474-8

2012. XII, 572 p. (Intelligent Systems Reference Library, Volume 39) Softcover
- $189.00
ISBN 978-3-642-28475-5

Due April 2012

- $49.95
ISBN 978-1-4614-1649-4

Due May 2012

- approx. $189.00

Mobile Phone Security and Forensics

A Practical Approach

Mobile Phone Security and Forensics provides both theoretical and practical background of security and forensics for mobile phones. Security and secrets of mobile phones will be discussed such as software and hardware interception, fraud and other malicious techniques used "against" users will be analyzed. Readers will also learn where forensics data reside in the mobile phone and the network and how to conduct a relevant analysis.

Features

- Discusses the fraudsters’ modus operandi and protection methods
- Presents topics such as roaming, subscription fraud, PRS fraud, Internal fraud, SIM Boxing, Dealer fraud, prepaid fraud, SMS attacks (Spam, Spoofing, Fake, Flooding), and GPRS overbilling
- Covering how to detect attacks and how to protect mobile infrastructures from attacks

Contents

GSM/UMTS theory.- The status of security, a survey.- Threats-Fraud-Dangers.- Attacking the Internet interfaces.- Detecting attacks and protection against mobile infrastructures.- Voice, SMS, IMSI and IMEI interception in GSM.

Fields of interests

Communications Engineering, Networks; Systems and Data Security; Security Science and Technology

Target groups

Research

Product category

Brief

Due April 2012

- $49.95
ISBN 978-1-4614-1649-4

Biomass Conversion

The Interface of Biotechnology, Chemistry and Materials Science

Features

- Gives state-of-the-art of biomass conversion plus future development
- Connects the applications into the fields of biotechnology, microbiology, chemistry, materials science
- Written by international experts

Contents


Fields of interests

Renewable and Green Energy; Biotechnology; Organic Chemistry

Target groups

Research

Product category

Monograph
Saturated Switching Systems

Saturated Switching Systems treats the problem of actuator saturation, inherent in all dynamical systems by using two approaches: positive invariance in which the controller is designed to work within a region of non-saturating linear behaviour; and saturation technique which allows saturation but guarantees asymptotic stability.

Features
- Readers are shown novel means for applying multiple Lyapunov functions and linear matrix integrals to switched systems
- Provides readers with methods for overcoming saturation in the actuators of process, automotive, aerospace and other systems
- Widespread use of MATLAB® modelling examples makes the material easily accessible to students and practitioners

Contents

Fields of interests
Control; Systems Theory; Control; Industrial Chemistry/Chemical Engineering

Target groups
Research

Product category
Monograph

Due March 2012
2012. XII, 283 p. 54 illus., 50 in color. (Lecture Notes in Control and Information Sciences, Volume 426) Softcover
► $159.00
ISBN 978-1-4471-2899-1

Digital Geometry Algorithms

Theoretical Foundations and Applications to Computational Imaging

Contents
Preface.- List of Contributors.- Part I General.- 1 Digital Geometry in Image-Based Metrology; Alfred M. Bruckstein.- 2 Provably Robust Simplification of Component Trees of Multidimensional Images; Gabor T. Herman, T. Yung Kong, and Lucas M. Oliveira.- Part II Topology: Transformations.- 3 Discrete Topological Transformations for Image Processing; Michel Couprie and Gilles Bertrand.- 4 Modeling and Manipulating Cell Complexes in Two, Three and Higher Dimensions; Lidija Comi and Leila De Floriani.- 5 Binarization of Gray-Level Images Based on Skeleton Region Growing; Xiang Bai, Quannan Li, Tianyang Ma, Wenyu Liu, and Longjun Yan Latecki.- 6 Topology Preserving Parallel 3D Thinning Algorithms; Kalmán Palágyi, Gábor Németh, and Péter Kardos.- 7 Separable Distance Transformation and its Applications; David Coeurjolly and Antoine Vacavant.- 8 Separability and Tight Enclosure of Point Sets; Peter Veelaert.- Part III Image and Shape Analysis.- Digital Straightness, Circularity, and their Applications to Image Analysis; Partha Bhowmick and Bhargab B. Bhattacharya.- 10 Shape Analysis with Geometric Primitives; Fabien Feschet.- 11 Shape from Silhouettes in Discrete Space; Atsushi Imiya and Kosuke Sato.- 12 Combinatorial Maps for 2D and 3D Image Segmentation; Guillaume Damiand and Alexandr Dupas. [...]
Mechanics of Failure
Mechanisms in Structures

Features
► Modern introduction to damage mechanisms and structural failure ► Written by experienced ► Well-known specialists in the field

Contents

Fields of interests
Continuum Mechanics and Mechanics of Materials; Mechanical Engineering

Target groups
Research

Product category
Monograph

Advanced Query Processing
Volume 1: Issues and Trends

This research book presents key developments, directions, and challenges concerning advanced query processing for both traditional and non-traditional data. A special emphasis is devoted to approximation and adaptivity issues as well as to the integration of heterogeneous data sources. The book will prove useful as a reference book for senior undergraduate or graduate courses on advanced data management issues, which have a special focus on query processing and data integration. It is aimed for technologists, managers, and developers who want to know more about emerging trends in advanced query processing.

Features
► Contains the latest research on data mining research and its applications to intelligent query processing ► The state of the art of data mining for intelligent query processing is presented in a handbook style ► Written by leading experts in this field

Contents
From the content: Advanced Query Processing: An Introduction.- On Skyline Queries and how to Choose from Pareto Sets.- Processing Framework for Ranking and Skyline Queries.- Preference-Based Query Personalization.- Approximate Queries for Spatial Data.- Approximate XML Query Processing.- Progressive and Approximate Join Algorithms on Data Streams.

Fields of interests
Computational Intelligence; Artificial Intelligence (incl. Robotics); Data Mining and Knowledge Discovery

Target groups
Research

Product category
Monograph

Signal Conditioning

"Signal Conditioning" is a comprehensive introduction to electronic signal processing. The book presents the mathematical basics including the implications of various transformed domain representations in signal synthesis and analysis in an understandable and lucid fashion and illustrates the theory through many applications and examples from communication systems. The ease to learn is supported by well-chosen exercises which give readers the flavor of the subject. Supplementary electronic material is available on http://extras.springer.com including MATLAB codes illuminating applications in the domain of one dimensional electrical signal processing, image processing, and speech processing.

Features
► Presents the mathematical basics in an understandable and lucid fashion illustrates the theory through many applications ► Includes many examples and well-chosen exercises ► Extra electronic material available on the web

Contents

Fields of interests
Signal, Image and Speech Processing; Communications Engineering, Networks

Target groups
Research

Product category
Professional book
Turbulent Impinging Jets into Porous Materials

This short book deals with the mathematical modeling of jets impinging porous media. It starts with a short introduction to models describing turbulences in porous media as well as turbulent heat transfer. In its main part, the book presents the heat transfer of impinging jets using a local and a non-local thermal equilibrium approach.

Feature
▶ Deals with the mathematical modeling of jets impinging porous media

Contents

Fields of interests
Engineering Fluid Dynamics; Engineering Thermodynamics, Heat and Mass Transfer; Characterization and Evaluation of Materials

Target groups
Research

Product category
Brief

Due March 2012
2012. VIII, 96 p. 47 illus., 17 in color. (SpringerBriefs in Applied Sciences and Technology, 20) Softcover
▶ $49.95
ISBN 978-3-642-28275-1

Foundations of Micropolar Mechanics

This book presents the basics of micropolar continuum including short but comprehensive introduction of stress and strain measures, derivation of motion equations. This part of the book demonstrates the difference between Cosserat and the classic theory. The second part considers more specific problems related to the constitutive modeling, i.e. constitutive inequalities, symmetry groups, variational formulations, and some more.

Feature
▶ Presents the basics of micropolar continuum including short but comprehensive introduction of stress and strain measures

Contents
Basics of Micropolar Continuum.- Specific Problems.

Fields of interests
Continuum Mechanics and Mechanics of Materials; Mechanics; Field Theory and Polynomials

Target groups
Research

Product category
Brief

Due April 2012
▶ $49.95
ISBN 978-3-642-28352-9

Proceedings of the 2011 2nd International Congress on Computer Applications and Computational Science

Volume 1

The latest inventions in computer technology influence most of human daily activities.

Features
▶ Latest research on Computer Applications and Computational Science
▶ Results of the 2nd International Congress on Computer Applications and Computational Science (CACS 2011), held on 15-17 November 2011, Bali Dynasty Resort, Bali, Indonesia
▶ Written by leading experts in the field

Contents

Fields of interests
Computational Intelligence; Computer Applications

Target groups
Research

Product category
Monograph

Due March 2012
2012. XII, 474 p. (Advances in Intelligent and Soft Computing, Volume 144) Softcover
▶ $259.00
ISBN 978-3-642-28313-0
Proceedings of the 2011 2nd International Congress on Computer Applications and Computational Science

Volume 1

The latest inventions in computer technology influence most of human daily activities. In the near future, there is tendency that all of aspect of human life will be dependent on computer applications.

Contents


Fields of interests
Computational Intelligence; Computer Applications

Target groups
Research

Product category
Monograph

Due March 2012

2012. XII, 512 p. (Advances in Intelligent and Soft Computing, Volume 145) Softcover
► $259.00
ISBN 978-3-642-28307-9

G. Halevi, Technion, Tel Aviv, Israel

All-Embracing Manufacturing

All-embracing manufacturing is a system that aims to dissolve the complexity of the manufacturing process and restore the inherent simplicity. It claims that production is very simple and flexible by nature. However, the complexity is a result of the production system approach which makes it rigid and therefore complex.

Features
► Introduces simplicity to the manufacturing process
► Guides the reader step by step by clear definition of objectives, algorithms and examples
► Allows the reader to write his own production planning software

Contents


Fields of interests
Industrial and Production Engineering; Computer-Aided Engineering (CAD, CAE) and Design; Management of Computing and Information Systems

Target groups
Research

Product category
Monograph

Due March 2012

2012. XVI, 184 p. 34 illus., 1 in color. (Intelligent Systems, Control and Automation: Science and Engineering, Volume 59) Hardcover
► $129.00
ISBN 978-3-642-28447-2

Z. Gong, Nanjing University of Information Science and Technology, China; Y. Lin, Slippery Rock University, PA, USA; T. Yao, Nanjing University of Information Science and Technology, China

Uncertain Fuzzy Preference Relations and Their Applications

On the basis of fuzzy sets and some of their relevant generalizations, this book systematically presents the fundamental principles and applications of group decision making under different scenarios of preference relations.

Features
► This book systematically presents the fundamental principles and applications of group decision making under different scenarios of preference relations
► This book addresses post-graduate and graduate students, as well as scholars and researchers in both management and information science
► Written by leading experts in the field

Fields of interests
Computational Intelligence; Applications of Computational Intelligence; Computer Applications

Target groups
Research

Product category
Monograph

Due March 2012

► $129.00
ISBN 978-3-642-28447-2

Z. Gong, Nanjing University of Information Science and Technology, China; Y. Lin, Slippery Rock University, PA, USA; T. Yao, Nanjing University of Information Science and Technology, China

Uncertain Fuzzy Preference Relations and Their Applications

On the basis of fuzzy sets and some of their relevant generalizations, this book systematically presents the fundamental principles and applications of group decision making under different scenarios of preference relations.

Features
► This book systematically presents the fundamental principles and applications of group decision making under different scenarios of preference relations
► This book addresses post-graduate and graduate students, as well as scholars and researchers in both management and information science
► Written by leading experts in the field

Fields of interests
Computational Intelligence; Applications of Computational Intelligence; Computer Applications

Target groups
Research

Product category
Monograph
Materials for Nuclear Plants
From Safe Design to Residual Life Assessments

The clamor for non-carbon dioxide emitting energy production has directly impacted on the development of nuclear energy. As new nuclear plants are built, plans and designs are continually being developed to manage the range of challenging requirements and problems that nuclear plants face especially when managing the greatly increased operating temperatures, irradiation doses and extended design life spans. Materials for Nuclear Plants: From Safe Design to Residual Life Assessments provides a comprehensive treatment of the structural materials for nuclear power plants with emphasis on advanced design concepts. Materials for Nuclear Plants: From Safe Design to Residual Life Assessments approaches structural materials with a systemic approach.

Features
- Examples and solutions help the reader learn quickly
- Includes information on current nuclear power plants to ensure readers’ knowledge is up-to-date
- Shows how to model simple system dynamics problems

Contents

Fields of interests
Nuclear Engineering; Tribology, Corrosion and Coatings; Operating Procedures, Materials Treatment

Target groups
Research

Product category
Monograph

due April 2012

2012. XXVII, 565 p. 357 illus. Hardcover
► $229.00
ISBN 978-1-4471-2914-1

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Theory of Parallel Mechanisms

Contents
Part I Screw Theory - Chapter 1 Basics of Screw Theory - Introduction - 1.1 Equation of a Line - 1.2 Mutual Moment of Two Lines - 1.3 Line Vectors and Screws - 1.3.1 The line vector - 1.3.2 The screw - 1.4 Screw Algebra - 1.4.1 Screw Sum - 1.4.2 Product of a vector and a screw - 1.4.3 Reciprocal Product - 1.5 Instantaneous Kinematics of a Rigid Body - 1.5.1 Instantaneous Rotation - 1.5.2 Instantaneous Translation - 1.5.3 Instantaneous Screw Motion - 1.6 Statics of a Rigid Body - 1.6.1 A Force Acting on a Body - 1.6.2 A Couple Acting on a Body - 1.6.3 A Twist Acting on a Body - References - Chapter 2 Dependency and Reciprocity of Screws - 2.1 Concept of Screw Systems - 2.2 Second-order screw system - 2.2.1 Linear combination of two screws - 2.2.2 Special two-screw system - 2.3 Third-order screw system - 2.3.1 Principal screws - 2.3.2 Special three-screw systems - 2.4 Grassmann line geometry - 2.5 Screw dependency in different geometrical spaces - 2.5.1 Basic concepts - 2.5.2 Different geometrical spaces - 2.6 Reciprocal screws - 2.6.1 Concept of a reciprocal screw - 2.6.2 Dualism in the physical meaning of reciprocal screws - 2.7 Reciprocal screw system - 2.8 Reciprocal screw and constrained motion - 2.8.1 Three skew lines in space - 2.8.2 Three lines parallel to a plane without a common normal - 2.8.3 Three non-concurrent coplanar lines - 2.8.4 Three coplanar and concurrent line vectors - 2.8.5 Three line vectors concurrent in space - 2.8.6 Three line vectors parallel in space - References, ...

Fields of interests
Machinery and Machine Elements; Structural Mechanics; Control, Robotics, Mechatronics

Target groups
Research

Product category
Monograph

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Partial Reconfiguration on FPGAs
Architectures, Tools and Applications

This is the first book to focus on designing run-time reconfigurable systems on FPGAs, in order to gain resource and power efficiency, as well as to improve speed. Case studies in partial reconfiguration guide readers through the FPGA jungle, straight toward a working system. The discussion of partial reconfiguration is comprehensive and practical, with models introduced together with methods to implement efficiently the corresponding systems.

Features
- Provides comprehensive overview of state-of-the-art partial run-time reconfiguration techniques, including architectures, methods, and tools
- Focuses on real applications that will benefit from partial reconfiguration
- Describes methods and tools to implement efficient, reconfigurable systems that can substantially improve cost, power consumption, or speed (throughput/latency)
- Includes practical use-cases that act as design patterns for a wide range of applications

Contents

Fields of interests
Circuits and Systems; Electronics and Microelectronics, Instrumentation; Processor Architectures

Target groups
Research

Product category
Monograph

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due May 2012

2012. IX, 322 p. 145 illus., 81 in color. (Lecture Notes in Electrical Engineering, Volume 153) Hardcover
► $179.00
Tree Climbing Robot
Design, Kinematics and Motion Planning

Climbing robot is a challenging research topic that has gained much attention from researchers. Most of the robots reported in the literature are designed to climb on manmade structures, but seldom robots are designed for climbing natural environments such as trees. Trees and manmade structures are very different in nature. It brings different aspects of technical challenges to the robot design. In this book, you can find a collection of the cutting edge technologies in the field of tree-climbing robot and the ways that animals climb. It provides a valuable reference for robot designers to select appropriate climbing methods in designing tree-climbing robots for specific purposes. Based on the study, a novel bio-inspired tree-climbing robot with several breakthrough performances has been developed and presented in this book. It is capable of performing various actions that is impossible in the state-of-the-art tree-climbing robots, such as moving between trunk and branches.

Features
- First book specifically focusing on tree climbing robots
- Systematic monograph with competitive literature review presenting a detailed design of a novel tree climbing robot
- Written by leading experts in the field

Contents

Fields of interests
Robotics and Automation; Engineering Design

Target groups
Research

Product category
Monograph

Cross Disciplinary Biometric Systems

Cross disciplinary biometric systems help boost the performance of the conventional systems. Not only is the recognition accuracy significantly improved, but also the robustness of the systems is greatly enhanced in the challenging environments, such as varying illumination conditions. By leveraging the cross disciplinary technologies, face recognition systems, fingerprint recognition systems, iris recognition systems, as well as image search systems all benefit in terms of recognition performance. Take face recognition for an example, which is not only the most natural way human beings recognize the identity of each other, but also the least privacy-intrusive means because people show their face publicly every day.

Features
- Latest research in Cross Disciplinary Biometric Systems
- Includes applications to face recognition, iris recognition and fingerprint recognition
- Written by leading experts in the field

Contents

Fields of interests
Computational Intelligence; Biometrics; Pattern Recognition

Target groups
Research

Product category
Monograph

Advanced Dynamics

Advanced Dynamics: Analytical and Numerical Calculations with MATLAB

Advanced Dynamics: Analytical and Numerical Calculations with MATLAB provides a thorough, rigorous presentation of kinematics and dynamics while using MATLAB as an integrated tool to solve problems. Topics presented are explained thoroughly and directly, allowing fundamental principles to emerge through applications from areas such as multibody systems, robotics, spacecraft and design of complex mechanical devices. This book differs from others in that it uses symbolic MATLAB for both theory and applications. Special attention is given to solutions that are solved analytically and numerically using MATLAB. The illustrations and figures generated with MATLAB reinforce visual learning while an abundance of examples offer additional support.

Features
- Provides solutions both analytically and numerically using MATLAB
- Illustrations and graphs generated with MATLAB reinforce visual learning for students as they study
- Covers Modern technical advancements in areas like multibody systems, robotics, spacecraft, control and design of complex mechanical devices and mechanisms
- Includes a comprehensive solutions manual

Contents
Vector Algebra.- Centroids and Moments of Inertia.- Kinematics of a Particle.- Dynamics of a Particle.- Kinematics of Rigid Bodies.- Dynamics of Rigid Bodies.- Analytical Dynamics.

Fields of interests
Theoretical and Applied Mechanics; Control, Robotics, Mechatronics; Mechanical Engineering

Target groups
Graduate

Product category
Graduate/Advanced undergraduate textbook
Biological Information: New Perspectives

In the spring of 2011, a diverse group of scientists gathered at Cornell University to discuss their research into the nature and origin of biological information. This symposium brought together experts in information theory, computer science, numerical simulation, thermodynamics, evolutionary theory, whole organism biology, developmental biology, molecular biology, genetics, physics, biophysics, mathematics, and linguistics. This volume presents new research by those invited to speak at the conference. The contributors to this volume use their wide-ranging expertise in the area of biological information to bring fresh insights into the explanatory difficulties that biological information raises.

Features
- Presents new perspectives regarding the nature and origin of biological information
- Demonstrates how our traditional ideas about biological information are collapsing under the weight of new evidence
- Written by leading experts in the field

Contents
Dynamics of Charged Particulate Systems.

Field of interests
Computational Intelligence; Artificial Intelligence (incl. Robotics); Bioinformatics

Target groups
Research

Product category
Monograph

Due March 2012
2012. XII, 549 p. (Intelligent Systems Reference Library, Volume 38) Hardcover
$179.00
ISBN 978-3-642-28453-3

Lithium-Ion Batteries Hazard and Use Assessment

Lithium-Ion Batteries Hazard and Use Assessment examines the usage of lithium-ion batteries and cells within consumer, industrial and transportation products, and analyzes the potential hazards associated with their prolonged use. This book also surveys the applicable codes and standards for lithium-ion technology. Lithium-Ion Batteries Hazard and Use Assessment is designed for practitioners as a reference guide for lithium-ion batteries and cells. Researchers working in a related field will also find the book valuable.

Contents
Introduction to Lithium-Ion Cells and Batteries.

Field of interests
Energy Technology; Renewable and Green Energy; Energy Economics

Target groups
Professional/practitioner

Product category
Brief

Due March 2012
2011 copyright
$39.95
ISBN 978-1-4614-3485-6
A. Paipetis, University of Ioannina, Greece; V. Kostopoulos, University of Patras, Greece (Eds.)

**Carbon Nanotube Enhanced Aerospace Composite Materials**

A New Generation of Multifunctional Hybrid Structural Composites

**Contents**


**Fields of interests**

Theoretical and Applied Mechanics; Nanotechnology, Ceramics, Glass, Composites, Natural Materials

**Target groups**

Research

**Product category**

Contributed volume

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M. Patan, The University of Zielona Góra, Poland

**Optimal Sensor Networks Scheduling in Identification of Distributed Parameter Systems**

Sensor networks have recently come into prominence because they hold the potential to revolutionize a wide spectrum of both civilian and military applications. An ingenious characteristic of sensor networks is the distributed nature of data acquisition. Therefore they seem to be ideally prepared for the task of monitoring processes with spatio-temporal dynamics which constitute one of most general and important classes of systems in modelling of the real-world phenomena.

**Features**

- Presents a comprehensive treatment of sensor scheduling problems in the context of sensor networks
- Demonstrates many original solutions dedicated to the networks with scanning and mobile sensor nodes
- Offers numerous effective algorithms for sensor scheduling and trajectory planning
- Contains various numerical examples related to engineering applications

**Contents**


**Fields of interests**

Control, Systems Theory, Control

**Target groups**

Research

**Product category**

Monograph

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Due May 2012


➤ approx. $179.00

ISBN 978-94-007-4245-1

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Due March 2012

2012. XII, 266 p. (Lecture Notes in Control and Information Sciences, Volume 425) Softcover

➤ $109.00

ISBN 978-3-642-28229-4

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New Series

**Topics in Intelligent Engineering and Informatics**

Series editors: I. J. Rudas, J. Fodor

This book series is devoted to the publication of high-level books that contribute to topic areas related to intelligent engineering and informatics. This includes advanced textbooks, monographs, state-of-the-art research surveys, as well as edited volumes with coherently integrated and well-balanced contributions within the main subject. The main aim is to provide a unique forum to publish books on mathematical models and computing methods for complex engineering problems that require some aspects of intelligence that include learning, adaptability, improving efficiency, and management of uncertain and imprecise information. Intelligent engineering systems try to replicate fundamental abilities of humans and nature in order to achieve sufficient progress in solving complex problems. In an ideal case multi-disciplinary applications of different modern engineering fields can result in synergetic effects. Informatics and computer modeling are the underlying tools that play a major role at any stages of developing intelligent systems. Soft computing, as a collection of techniques exploiting approximation and tolerance for imprecision and uncertainty in traditionally intractable problems, has become very effective and popular especially because of the synergy derived from its components. The integration of constituent technologies provides complementary methods that allow developing flexible computing tools and solving complex engineering problems in intelligent ways.

Fields of interests
Computational Intelligence; Artificial Intelligence (incl. Robotics)

Target groups
Research

Product category
Monograph

Due March 2012
2012. XII, 352 p. (Topics in Intelligent Engineering and Informatics, Volume 1) Hardcover
► $179.00
ISBN 978-3-642-28304-8

Continuous-Time Low-Pass Filters for Integrated Wideband Radio Receivers
This book presents a new filter design approach and concentrates on the circuit techniques that can be utilized when designing continuous-time low-pass filters in modern ultra-deep-submicron CMOS technologies for integrated wideband radio receivers. Coverage includes system-level issues related to the design and implementation of a complete single-chip radio receiver and related to the design and implementation of a filter circuit as a part of a complete single-chip radio receiver.

Features
► Presents a new filter design approach, emphasizing low-voltage circuit solutions that can be implemented in modern, ultra-deep-submicron CMOS technologies
► Includes filter circuit implementations designed as a part of a single-chip radio receiver in modern 1.2V 0.13um and 65nm CMOS
► Describes design and implementation of a continuous-time low-pass filter for a multicarrier WCDMA base-station
► Emphasizes system-level considerations throughout

Contents
Introduction. - Overview of Analog Baseband Filters in Radio Receivers. - Integrated Continuous-time Low-pass Filters. - Prototype and Synthesis of Active Filters. - Opamp-RC Filters for Multicarrier WCDMA Base-station Receivers. - Gm-C Filters for CMOS Direct-conversion Receivers. - Experimental CMOS gm-C Filter Circuits. - Conclusions.

Fields of interests
Circuits and Systems; Electronics and Microelectronics, Instrumentation; Signal, Image and Speech Processing

Target groups
Professional/practitioner

Product category
Monograph

Due March 2012
► $129.00
ISBN 978-1-4614-3365-1

Robust SRAM Designs and Analysis
This book provides a guide to Static Random Access Memory (SRAM) bitcell design and analysis to meet the nano-regime challenges for CMOS devices and emerging devices, such as Tunnel FETs. Since process variability is an ongoing challenge in large memory arrays, this book highlights the most popular SRAM bitcell topologies (benchmark circuits) that mitigate variability, along with exhaustive analysis. Experimental simulation setups are also included, which cover nano-regime challenges such as process variation, leakage and NBTI for SRAM design and analysis. Emphasis is placed throughout the book on the various trade-offs for achieving a best SRAM bitcell design.

Features
► Provides a complete and concise introduction to SRAM bitcell design and analysis
► Offers techniques to face nano-regime challenges such as process variation, leakage and NBTI for SRAM design and analysis
► Includes simulation set-ups for extracting different design metrics for CMOS technology and emerging devices
► Emphasizes different trade-offs for achieving the best possible SRAM bitcell design

Contents

Fields of interests
Circuits and Systems; Electronics and Microelectronics, Instrumentation; Nanotechnology and Microengineering

Target groups
Research

Product category
Monograph

Due May 2012
2012. CCXXXVI, 10 p. 134 illus., 25 in color. Hardcover
► $129.00
ISBN 978-1-4614-0817-6

Due March 2012
► $129.00
ISBN 978-1-4614-3365-1
Contents

Fields of interests
Complexity; Cosmology; Developmental Biology

Target groups
Research

Product category
Contributed volume

Due March 2012
2012. Approx. 420 p. (Springer Series in Geomechanics and Geoengineering) Hardcover
 ► $179.00
ISBN 978-3-642-28462-5

Due May 2012
2012. IV, 309 p. 207 illus. Hardcover
 ► $129.00
ISBN 978-1-4614-1382-0

Integrated Circuits for Analog Signal Processing
E. Tlelo-Cuautle, INAOE, Puebla, Mexico (Ed.)

Contents

Fields of interests
Circuits and Systems; Electronics and Microelectronics; Instrumentation; Signal, Image and Speech Processing

Target groups
Professional/practitioner

Product category
Monograph

Due May 2012
 ► $209.00
ISBN 978-94-007-4155-3

Due March 2012
2012. Approx. 420 p. (Springer Series in Geomechanics and Geoengineering) Hardcover
 ► $179.00
ISBN 978-3-642-28462-5

Continuous and Discontinuous Modelling of Fracture in Concrete Using FEM
J. Tejchman, J. Bobiński, Gdansk University of Technology, Poland

The book analyzes a quasi-static fracture process in concrete and reinforced concrete by means of constitutive models formulated within continuum mechanics. A continuous and discontinuous modelling approach was used. Using a continuous approach, numerical analyses were performed using a finite element method and four different enhanced continuum models: isotropic elasto-plastic, isotropic damage and anisotropic smeared crack one. The models were equipped with a characteristic length of micro-structure by means of a non-local and a second-gradient theory. So they could properly describe the formation of localized zones with a certain thickness and spacing and a related deterministic size effect. Using a discontinuous FE approach, numerical results of cracks using a cohesive crack model and XFEM were presented which were also properly regularized. Finite element analyses were performed with concrete elements under monotonic uniaxial compression, uniaxial tension, bending and shear-extension.

Features
► Analyzes a quasi-static fracture process in concrete and reinforced concrete ► Presents a continuous and discontinuous finite elements modelling approach ► Written by leading experts in the field

Contents

Fields of interests
Computational Intelligence; Artificial Intelligence (incl. Robotics)

Target groups
Research

Product category
Monograph
Towards Estimating Entrainment Fraction for Dust Layers

Towards Estimating Entrainment Fraction for Dust Layers closely examines the factors that can affect the assessment of a dust hazard, and outlines a new strawman method designed to help practitioners estimate the fraction of the dust accumulations that can become airborne. This book also aims to provide aid in the removal of aerodynamic disturbances of dust particles or agglomerates from layers or piles of cohesive and non-cohesive dusts. Towards Estimating Entrainment Fraction for Dust Layers is designed for practitioners as a reference guide for improving dust hazard assessment. Researchers working in a related field will also find the book valuable.

Feature
► None

Contents

Fields of interests
Quality Control, Reliability, Safety and Risk; Facility Management; Industrial and Production Engineering

Target groups
Professional/practitioner

Product category
Brief

T. Villa, Universita’ di Udine, Italy; N. Yevtushenko, Tomsk State University, Russia; R. K. Brayton, A. Mishchenko, UC Berkeley, CA, USA; A. Petrenko, CRIM, Montreal, Canada; A. Sangiovanni-Vincentelli, UC Berkeley, CA, USA

The Unknown Component Problem

Theory and Applications

Features
► Provides a complete account by a unified mathematical model of a synthesis problem that appears in different areas of computer science and design of electronic systems
► Presents different types of mathematical models that can be used to specify the components of a system
► Casts the problem of computing the unknown component in the common frame of solving equations over languages and automata

Contents

Fields of interests
Circuits and Systems; Logic Design; Electrical Engineering

Target groups
Research

Product category
Monograph
Search and Classification Using Multiple Autonomous Vehicles

Decision-Making and Sensor Management

Search and Classification Using Multiple Autonomous Vehicles provides a comprehensive study of decision-making strategies for domain search and object classification using multiple autonomous vehicles (MAV) under both deterministic and probabilistic frameworks. It serves as a first discussion of the problem of effective resource allocation using MAV with sensing limitations, i.e., for search and classification missions over large-scale domains, or when there are far more objects to be found and classified than there are autonomous vehicles available.

Features
- Shows the reader how to undertake effective resource allocation in multiple-vehicle systems with sensing limitations and in large-scale mission domains
- Detailed analysis, simulation and results demonstrate algorithm implementation in a manner that readers can easily replicate and develop further
- Treats both deterministic and probabilistic approaches to domain search and object classification in a comprehensive and well-referenced style so that readers can select the more appropriate approach

Contents

Fields of interests
Control; Systems Theory; Control; Robotics and Automation

Target groups
Research

Product category
Monograph

Due May 2012

A. M. Yaglom, Formerly of MIT, Cambridge, MA, USA
U. Frisch, CNRS, Laboration Cassippee, Observatoire de la Côte d’Azur, Nice, France (Ed.)

Hydrodynamic Instability and Transition to Turbulence

This book is a complete revision of the part of Monin & Yaglom’s famous two-volume work “Statistical Fluid Mechanics: Mechanics of Turbulence” that deals with the theory of laminar-flow instability and transition to turbulence. It includes the considerable advances in the subject that have been made in the last 15 years or so. It is intended as a textbook for advanced graduate courses and as a reference for research students and professional research workers. The first two Chapters are an introduction to the mathematics, and the experimental results, for the instability of laminar (or inviscid) flows to infinitesimal (in practice “small”) disturbances.

Features
- Review of fluid flows and the work of the late Professor A. Yaglom
- Detailed analysis, simulation and results demonstrate algorithm implementation in a manner that readers can easily replicate and develop further
- Treats both deterministic and probabilistic approaches to domain search and object classification in a comprehensive and well-referenced style so that readers can select the more appropriate approach

Contents
Foreword by Uriel Frisch.- In Memory of Akiva M. Yaglom: Obituary by Peter Bradshaw.- The equations of fluid dynamics and some of their consequences.- Basic experimental facts and introduction to linear stability theory.- More about linear stability theory.- Studies of the initial-value problem.- Stability to finite disturbances: energy method and Landau’s equation.- Further weakly-nonlinear approaches to laminar-flow stability: Blasius boundary layer flow as a paradigm.

Fields of interests
Engineering Fluid Dynamics; Fluid- and Aerodynamics

Target groups
Research

Product category
Monograph

Due May 2012

S. Hays, J. Robert, C. A. Miller, Arizona State University, Tempe, AZ, USA; I. Bennett, Consortium for Science, Policy, & Outcomes, Tempe, AZ, USA (Eds.)

Nanotechnology, the Brain, and the Future

Contents
Flexible AC Transmission Systems: Modelling and Control

Features
- Presents advanced modeling, analysis and control techniques of FACTS
- Covers comprehensively a range of power system control problems
- Is timely and of great value to power engineering engineers and students for modeling, simulation and control design of FACTS

Contents

Fields of interests
Power Electronics, Electrical Machines and Networks; Energy Technology; Control, Robotics, Mechatronics

Target groups
Professional/practitioner

Product category
Monograph

Dynamics of Charged Particulate Systems
Modeling, Theory and Computation

The objective of this monograph is to provide a concise introduction to the dynamics of systems comprised of charged small-scale particles. Flowing, small-scale particles (“particulates”) are ubiquitous in industrial processes and in the natural sciences. Applications include electrostatic copiers, inkjet printers, powder coating machines, etc., and a variety of manufacturing processes. Due to their small-scale size, external electromagnetic fields can be utilized to manipulate and control charged particulates in industrial processes in order to achieve results that are not possible by purely mechanical means alone. A unique feature of small-scale particulate flows is that they exhibit a strong sensitivity to interparticle near-field forces, leading to nonstandard particulate dynamics, agglomeration and cluster formation, which can strongly affect manufactured product quality.

Features
- Latest research on Dynamics of Charged Particulate Systems
- Presents Modeling, Theory and Computation
- Written by a leading expert in the field

Contents

Fields of interests
Theoretical and Applied Mechanics; Vibration, Dynamical Systems, Control

Target groups
Research

Product category
Brief

Electromagnetic Properties of Multiphase Dielectrics
A Primer on Modeling, Theory and Computation

Recently, several applications, primarily driven by microtechnology, have emerged where the use of materials with tailored electromagnetic (dielectric) properties is necessary for a successful overall design. The “tailored” aggregate properties are achieved by combining an easily moldable base matrix with particles having dielectric properties that are chosen to deliver (desired) effective properties. In many cases, the analysis of such materials requires the simulation of the macroscopic and microscopic electromagnetic response, as well as its resulting coupled thermal response, which can be important to determine possible failures in “hot spots.” This necessitates a stress analysis.

Features
- Recent research on Electromagnetic Properties of Multiphase Dielectrics
- A Primer on Modeling, Theory and Computation
- Written by a leading expert in the field

Contents

Fields of interests
Theoretical and Applied Mechanics; Continuum Mechanics and Mechanics of Materials

Target groups
Research

Product category
Monograph