Vortex Rings

This book presents a comprehensive coverage of the wide field of vortex rings. The book presents the results of systematic experimental investigations, theoretical foundation, as well as the practical applications of vortex rings, such as the extinction of fires at gushing gas and oil wells. All the basic properties of vortex rings as well as their hydrodynamic structures are presented. Special attention is paid to the formation and motion of turbulent vortex rings.

Features
► Clear and concise introduction to theory and applications of vortex rings
► Presents basic properties of vortex rings as well as their hydrodynamic structure

Contents
Theoretical models of vortex rings.- Hydrodynamic structure of the vortex ring.- Structure and parameters of a family of vortex rings formed on outflow of a submerged jet.- Vortex ring formation.- Motion of turbulent vortex rings.- Practical implementation of vortex rings. Extinction of fires at gushing gas and oil wells.

Fields of interest
Engineering Fluid Dynamics; Fluid- and Aerodynamics; Vibration, Dynamical Systems, Control

Target groups
Engineers, researchers and graduate students in hydrodynamics and turbulence

Type of publication
Monograph

Introduction to Engineering Statistics and Lean Sigma
Statistical Quality Control and Design of Experiments and Systems

Introduction to Engineering Statistics and Lean Sigma builds on the success of its first edition (Introduction to Engineering Statistics and Six Sigma) to reflect the growing importance of the “lean sigma” hybrid.

As well as providing detailed definitions and case studies of all six sigma methods, Introduction to Engineering Statistics and Lean Sigma forms one of few sources on the relationship between operations research techniques and lean sigma. The second edition also greatly expands the discussion of Design For Six Sigma (DFSS), which is critical for many organizations that seek to deliver desirable products which work first time.

The emphasis on lean production, combined with recent methods relating to Design for Six Sigma (DFSS), makes Introduction to Engineering Statistics and Lean Sigma a practical, up-to-date resource for advanced students, educators, and practitioners.

Features
► Second edition of a successful book expands on two major topics of increasing relevance to organizations: lean production and design for six sigma
► Enables readers to identify which six sigma methods are most suitable for particular scenarios

Fields of interest
Engineering Economics, Organization, Logistics, Marketing, Statistics for Business/Economics/ Mathematical Finance/Insurance; Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences

Target groups
Advanced students in engineering, professors at universities, practising engineers

Type of publication
Graduate/Advanced undergraduate textbook

Design Automation for Differential MOS Current-Mode Logic Circuits

Design Automation for Differential MOS Current-Mode Logic Circuits provides a very detailed and comprehensive analysis of fundamental MCML circuits, their design and performance optimization under competing constraints such as output drive capability, power dissipation, noise margin, and silicon area. A systematic methodology is presented to build efficient MCML standard-cell libraries, and a complete top-down design flow is shown to implement complex systems using such building blocks. As such, Design Automation for Differential MOS Current-Mode Logic Circuits presents one of the first-ever top-down design approaches using differential cells, for high performance and low noise operation.

Features
► Text dedicated to detailed analysis and design of MCML circuits
► Specific guidelines for circuit performance optimization
► Systematic development of differential standard cells
► Complete top-down design flow from VHDL description to GDSII

Fields of interest
Circuits and Systems; Logic Design

Target groups
Graduate students and researchers in the domain of high-speed mixed signal IC design for telecommunications application, practicing IC design engineers requiring an in-depth understanding of special design options to overcome noise constraints

Type of publication
Monograph
Manufacturing Simulation with Plant Simulation and SimTalk
Usage and Programming with Examples and Solutions

This book is a systematical introduction to the development of simulation models and the implementation and evaluation of simulation experiments with Plant Simulation. "Manufacturing Simulation with Plant Simulation and SimTalk" is aimed at all users of Plant Simulation looking for an easy entry into the program. A particular focus is on the introduction into the simulation flow language SimTalk and its use in various areas of the simulation. In over 100 examples the author shows, how the modules for simulation models combined, and how to deal with SimTalk complex control and analysis tasks. The contents of the book range from the description of the basic functions of the material flow components to demanding topics such as the realization of a database connection using the ODBC interface or the exchange of data with Microsoft Excel on DDE.

Features
► Excellent, understandable introductory book for engineers, programmers, practitioners and newcomers
► Learn Plant Simulation programming in an enjoyable and powerful way
► Presents a variety of examples and solutions for model building
► Written by a practitioner for Plant Simulation program users

Fields of interest
Industrial and Production Engineering; Production/Logistics; Computer-Aided Engineering (CAD, CAE) and Design

Target groups
Researchers, engineers, practitioners, students using plant simulation in engineering and computer science, practising engineers/scientists in simulation, planning and computer aided engineering

Type of publication
Professional book

Smart Cameras

A smart camera is an integrated machine vision system which, in addition to image capture, includes a processor, which can extract information from images without need for an external processing unit, and interface devices used to make results available to other devices. This book provides content on smart cameras for an interdisciplinary audience of professionals and students in embedded systems, image processing, and computer technology. It serves as a self-contained, single-source reference for material otherwise found only in sources such as conference proceedings, journal articles, or product data sheets. Coverage includes the 50 year chronology of smart cameras, their technical evolution, the state-of-the-art, and numerous applications, such as surveillance and monitoring, robotics, and transportation.

Features
► Provides content on smart cameras for interdisciplinary audience (embedded systems; image processing; camera technology) of professionals and students
► Offers self-contained, single-source reference for content otherwise found only in disparate sources
► Covers history, state-of-the-art, and numerous applications, e.g., surveillance and monitoring, robotics, and transportation

From the contents

Fields of interest
Signal, Image and Speech Processing; Computer Imaging, Vision, Pattern Recognition and Graphics; Circuits and Systems

Target groups
Professionals in the fields of circuits and systems and signal processing

Type of publication
Professional book

Plates and FEM
Surprises and Pitfalls

The book aims to be the bridge between commercially available FEM packages and consulting structural engineers. Elastic plate analysis results must be translated to economic cross-section dimensions and reinforcement ratios, which raises difficulties. This is becoming increasingly more important since easy-to-use powerful programs are offered, for which the average structural engineer is not well-equipped. To be clear, the book is not a text on Finite Element Method, but it supports structural engineers in handling output of such software.

Features
► Handling stress singularities in stretched and bended plates
► Mesh design recommendations
► Understanding the difference between Kirchhoff and Mindlin plate theory
► Determination of shear rigidity of complex orthotropic plate cross-sections
► Economic reinforcement on basis of linear-elastic FEM analysis
► Prevention of glaring mistakes in calculating torsion rigidity of orthotropic plates

Fields of interest
Structural Mechanics; Building Construction, HVAC, Refrigeration; Continuum Mechanics and Mechanics of Materials

Target groups
Structural engineers in consulting engineering firms

Type of publication
Graduate/Advanced undergraduate textbook
Recent Advances in Mechatronics

Mechatronics is a synergic discipline integrating precise mechanics, electrotechnics, electronics and IT technologies. The main goal of mechatronical approach to design of complex products is to achieve new quality of their utility value at reasonable price. Successful accomplishment of this task would not be possible without application of advanced software and hardware tools for simulation of design, technologies and production control and also for simulation of behavior of these products in order to provide the highest possible level of spatial and functional integration of the final product.

This book brings a review of the current state of the art in mechatronics, as presented at the 8th International Conference Mechatronics 2009, organized by the Brno Technical University, Faculty of Mechanical Engineering, Czech Republic.

The specific topics of the conference are Modelling and Simulation, Metrology & Diagnostics, Sensors & Photonics, Control & Robotics, MEMS Design & Mechatronic Products, Production Machines and Biomechanics. The selected contributions provide an insight into the current development of these scientific disciplines, present the new results of research and development and indicate the trends of development in the interdisciplinary field of mechatronic systems.

Features

- Proceedings of 8th International Symposium Mechatronics held Nov 18-20 2009 in Warsaw, Poland

Fields of interest

Control, Robotics, Mechatronics; Artificial Intelligence (incl. Robotics); Machinery and Machine Elements

Target groups

Researchers, engineers, graduate students in automatic control, robotics, mechatronics

Type of publication

Contributed volume

Evolutionary Design of Intelligent Systems in Modeling, Simulation and Control

The editors describe in this book, new methods for evolutionary design of intelligent systems using soft computing and their applications in modeling, simulation and control. Soft Computing (SC) consists of several intelligent computing paradigms, including fuzzy logic, neural networks, and evolutionary algorithms, which can be used to produce powerful hybrid intelligent systems. The book is organized in four main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of evolutionary design of fuzzy systems in intelligent control, which consists of papers that propose new methods for designing and optimizing intelligent controllers for different applications. The second part contains papers with the main theme of evolutionary design of intelligent systems for pattern recognition applications, which are basically papers using evolutionary algorithms for optimizing modular neural networks with fuzzy systems for response integration, for achieving pattern recognition in different applications. The third part contains papers with the themes of models for learning and social simulation, which are papers that apply intelligent systems to the problems of designing learning objects and social agents. The fourth part contains papers that deal with intelligent systems in robotics applications and hardware implementations.

Contents

1. Computational Intelligence-Based Hybrid Intelligent Systems
2. Hybrid Artificial Neural Networks
3. Hierarchical Structure-Based Hybrid Intelligent Systems
4. Hierarchical Neural Trees

Target groups

Researchers, engineers, graduate students in computational intelligence, computer science

Type of publication

Monograph

Due November 2009

2010. Approx. 400 p. (Studies in Computational Intelligence, Volume 257) Hardcover

Engineering

Due January 2010

Algorithmic Foundation of Robotics VIII
Selected Contributions of the Eight International Workshop on the Algorithmic Foundations of Robotics

Algorithms are a fundamental component of robotic systems: they control or reason about motion and perception in the physical world. They receive input from noisy sensors, consider geometric and physical constraints, and operate on the world through imprecise actuators. The design and analysis of robot algorithms therefore raises a unique combination of questions in control theory, computational and differential geometry, and computer science. The Workshop on the Algorithmic Foundations of Robotics (WAFR) is a single-track workshop with submitted and invited papers on advances on algorithmic problems in robotics. This book includes selected contributions from WAFR 2008, to be held in Guanajuato, México, December 7-9, 2008. This biannual workshop is a highly selective meeting of leading researchers in the field of algorithmic issues related to robotics and automation.

Features
► Consists of selected contributions to the highly competitive meeting on the algorithmic foundations of robotics WAFR

Fields of interest
Control, Robotics, Mechatronics; Artificial Intelligence (incl. Robotics); Machinery and Machine Elements

Target groups
Researchers, students and professionals in robotics, engineering and computer science

Type of publication
Monograph

Photonic Microresonator Research and Applications

The technology surrounding the design and fabrication of optical microresonators has matured to a point where there is a need for commercialization. Consequently, there is a need for device research involving more advanced architectures and more esoteric operating principles. Photonic Microresonator Research and Applications explores advances in the fabrication process that enable nanometer waveguide separations, exceptionally smooth surfaces essential to reach Q factors in the order of 106–108 and high index contrast materials.

Features
► Shows how to design and fabricate microresonators
► Discusses microresonators in photonic crystals, microsphere circuits, and sensors, and provides application oriented examples
► Covers the latest in photonic microresonator research with contributions from the leading researchers

From the contents
Fundamental principles of operation and notes on fabrication.- Analytical methods and computational aspects related to microring and microdisk resonator circuits.- Polarization conversion and polarization control in couplers and microresonators.- Series and parallel coupled add/drop filters and extension of the FSR.- Advanced microring photonic filter design and dispersion compensation.- Band limited microresonator reflectors and mirror structures.- Periodic structures with/without embedded defects; delay lines, standing wave resonators and slow wave structures.

Fields of interest
Electronics and Microelectronics, Instrumentation; Laser Technology, Photonics; Optics, Optoelectronics, Plasmonics and Optical Devices

Target groups
Practicing engineers and academic researchers

Type of publication
Monograph

Photonic Microresonator Research and Applications

Computational Modeling in Biomechanics

Availability of advanced computational technology has fundamentally altered the investigative paradigm in the field of biomechanics. Armed with sophisticated computational tools, researchers are seeking answers to fundamental questions by exploring complex biomechanical phenomena at the molecular, cellular, tissue and organ levels. The computational armamentarium includes such diverse tools as the ab initio quantum mechanical and molecular dynamics methods at the atomistic scales and the finite element, boundary element, meshfree as well as immersed boundary and lattice-Boltzmann methods at the continuum scales. Multiscale methods that link various scales are also being developed. While most applications require forward analysis, e.g., finding deformations and stresses as a result of loading, others involve determination of constitutive parameters based on tissue imaging and inverse analysis.

Features
► Covers state-of-the-art computational modeling approaches in various areas of biomechanics including cardiovascular, musculoskeletal, soft tissue and biomolecular biomechanics
► Discusses various modern computational methods at the continuum level including finite element, boundary element, meshfree, lattice Boltzmann and immersed boundary methods

Fields of interest
Biomedical Engineering; Computational Science and Engineering; Appl. Mathematics/Computational Methods of Engineering

Target groups
Researchers, graduate students and advanced undergraduate students in engineering, biology, applied mathematics and physics working in the field of biomechanics and mechanobiology

Type of publication
Contributed volume

Photonic Microresonator Research and Applications

G. S. Chirikjian, H. Choset, M. Morales, T. Murphey (Eds.)
Simulation Methods for Reliability and Availability of Complex Systems

Simulation Methods for Reliability and Availability of Complex Systems discusses the use of computer simulation-based techniques and algorithms to determine reliability and availability (R and A) levels in complex systems. The book: shares theoretical or applied models and decision support systems that make use of simulation to estimate and to improve system R and A levels, forecasts emerging technologies and trends in the use of computer simulation for R and A and proposes hybrid approaches to the development of efficient methodologies designed to solve R and A-related problems in real-life systems.

Dealing with practical issues, Simulation Methods for Reliability and Availability of Complex Systems is designed to support managers and system engineers in the improvement of R and A, as well as providing a thorough exploration of the techniques and algorithms available for researchers, and for advanced undergraduate and postgraduate students.

Features
- Discusses the use of computer simulation-based techniques and algorithms to determine reliability and/or availability levels in complex systems and to support the improvement of these levels both at the design stage and during the system operating stage.

Fields of interest
Quality Control, Reliability, Safety and Risk; Simulation and Modeling; Computer-Aided Engineering (CAD, CAE) and Design

Target groups
Advanced undergraduate and postgraduate students in industrial engineering, operations research and computer sciences, managers and system engineers involved in R and A scenarios, researchers involved in determining and improving real systems R and A levels.

Applied Probability and Stochastic Processes

This book presents applied probability and stochastic processes in an elementary but mathematically precise manner, with numerous examples and exercises to illustrate the range of engineering and science applications of the concepts. The book is designed to give the reader an intuitive understanding of probabilistic reasoning, in addition to an understanding of mathematical concepts and principles. The initial chapters present a summary of probability and statistics and then Poisson processes, Markov chains, Markov processes and queuing processes are introduced. Advanced topics include simulation, inventory theory, replacement theory, Markov decision theory, and the use of matrix geometric procedures in the analysis of queues. Included in the second edition are appendices at the end of several chapters giving suggestions for the use of Excel in solving the problems of the chapter. Students will have access to the answers of odd numbered problems and instructors will be provided with a full solutions manual and Excel files when needed for homework.

Features
- Gives the reader an intuitive understanding of probabilistic reasoning as well as an understanding of mathematical concepts.
- Presents stochastic process in an elementary but mathematically precise manner.

Fields of interest
Engineering Economics, Organization, Logistics, Marketing; Production/Logistics; Simulation and Modeling

Target groups
Scientists in industrial engineering, systems engineers, computer scientists, managers and system engineers involved in R and A scenarios, researchers involved in determining and improving real systems R and A levels.

CMOS Capacitive Sensors for Lab-on-Chip Applications

A Multidisciplinary Approach

The main components of CMOS capacitive biosensors including sensing electrodes, bio-functionalized sensing layer, interface circuitry and microfluidic packaging are very briefly explained in chapters 2-6 after a brief introduction on CMOS based LoCs in Chapter 1. CMOS Capacitive Sensors for Lab-on-Chip Applications is written in a simple pedagogical way. It emphasises practical aspects of fully integrated CMOS biosensors rather than mathematical calculations and theoretical details. By using CMOS Capacitive Sensors for Lab-on-Chip Applications, the reader will have circuit design methodologies, main important biological capacitive interfaces and the required microfluidic fabrication procedures to create capacitive biosensor through standard CMOS process.

Features
- This unique multidisciplinary book describes all the required components for the design of a CMOS capacitive biosensor.
- Offers an extensive recent review of literature on using CMOS processes for Lab-on-Chip applications.
- Emphasis on practical aspects of fully integrated capacitive biosensors.

Fields of interest
Circuits and Systems; Biomedical Engineering; Biotechnology

Target groups
Graduate/undergraduate students in microelectronic engineering, researchers/designers in CMOS integrated circuitries for emerging technologies and industrial research and development on integrated biosensors.

Type of publication
Monograph

Due November 2009

Originally published by PWS Publishing/Thomson Publishing, USA.

Due December 2009

2010. Approx. 400 p. 150 illus. Hardcover

Engineering
The Internet of Things
20th Tyrrhenian Workshop on Digital Communications

Many challenging issues still need to be addressed and both technological and social nodes untied before the Internet of the Things idea being widely accepted. Central issues are: making a full interoperability of such a devices possible, enabling their adaptation and autonomous behavior, as well as guaranteeing trust, privacy and security.

From the contents
Internet of Things infrastructures and applications.- Communication systems and network architectures.- Implementation and integration of smart items.- Mobile Wireless Sensor and Actuator Networks.- Embedded systems.- Distributed processing (e.g. access, scheduling, radio resource management, etc.) systems.- Cooperation issues.- Network management and scalability.- Ubiquitous and wireless technologies.- Security and privacy issues.- Socio-technical implications.- Business models for emerging Internet of Things.- RFID technology and RFID middleware.- Standardization issues for the Internet of Things.

Features
► Full papers from the conference ► Focus on Networking Issues in the IoT ► Focus on Middleware ► Focus on Localization and applications ► Focus on RFID and Sensor Networks Technologies ► Focus on Security and Privacy Issues

Fields of interest
Communications Engineering, Networks; Signal, Image and Speech Processing; Computer Science, general

Target groups
Researchers and practitioners in embedded systems, computer architecture concerned with massively parallel processors

Type of publication
Monograph

Due February 2010

► approx. € 129,95 | £112.50
► approx. * € (D) 139,05 | € (A) 142,95 | sFr 194,50
ISBN 978-1-4419-1673-7

Intelligent and Soft Computing in Infrastructure Systems Engineering
Recent Advances

The use of intelligent and soft computing techniques in the field of geomechanical and pavement engineering has steadily increased over the past decade owing to their ability to admit approximate reasoning, imprecision, uncertainty and partial truth. Since real-life infrastructure engineering decisions are made in ambiguous environments that require human expertise, the application of soft computing techniques has been an attractive option in pavement and geomechanical modeling. The objective of this carefully edited book is to highlight key recent advances made in the application of soft computing techniques in pavement and geomechanical systems. Soft computing techniques discussed in this book include, but are not limited to: neural networks, evolutionary computing, swarm intelligence, probabilistic modeling, kernel machines, knowledge discovery and data mining, neuro-fuzzy systems and hybrid approaches. Highlighted application areas include infrastructure material modeling, pavement analysis and design, rapid interpretation of nondestructive testing results, porous asphalt concrete distress modeling, model parameter identification, pavement engineering inversion problems, subgrade soils characterization, and backcalculation of pavement layer thickness and moduli.

Fields of interest
Appl. Mathematics/Computational Methods of Engineering; Artificial Intelligence (incl. Robotics); Engineering Economics, Organization, Logistics, Marketing

Target groups
Researchers and practitioners engaged in developing and applying soft computing and intelligent systems principles to solving real-world geomechanical and pavement engineering problems

Type of publication
Monograph

Due November 2009

2010. Approx. 200 p. (Studies in Computational Intelligence, Volume 259) Hardcover
► * € 99,95 | £90.00
► * € (D) 106,95 | € (A) 109,95 | sFr 155,50
ISBN 978-3-642-04585-7

Mathematical Summary for Digital Signal Processing Applications with Matlab

Mathematical summary for Digital Signal Processing Applications with Matlab consists of Mathematics which is not usually dealt in the DSP core subject, but used in DSP applications. Matlab programs with illustrations are given for the selective topics such as generation of Multivariate Gaussian distributed sample outcomes, Bacterial foraging algorithm, Newton’s iteration, Steepest descent algorithm, etc. are given exclusively in the separate chapter. Also Mathematical summary for Digital Signal Processing Applications with Matlab is written in such a way that it is suitable for Non-Mathematical readers and is very much suitable for the beginners who are doing research in Digital Signal Processing.

Features
► Written in such a way that it is suitable for non-mathematical readers ► Very much suitable for the beginners who are doing research in Digital Signal Processing. ► Can also be used as the text for PG Course on “Mathematical summary for Digital Signal Processing Applications with Matlab” ► Consists of mathematics which is not usually dealt in the DSP core subject

Contents

Fields of interest
Signal, Image and Speech Processing: Linear and Multilinear Algebras, Matrix Theory; Algorithm Analysis and Problem Complexity

Target groups
Graduate level students and researchers active in the field of digital signal processing and mathematical applications, beginners research scholar, non-mathematical readers

Type of publication
Monograph

Due December 2009

2010. Approx. 250 p. Hardcover
► approx. * € 99,95 | £70.00
► approx. * € (D) 106,95 | € (A) 109,95 | sFr 171,00
ISBN 978-3-642-04585-7
Quality-Driven SystemC Design

A quality-driven design and verification flow for digital systems is developed and presented in Quality-Driven SystemC Design. Two major enhancements characterize the new flow: First, dedicated verification techniques are integrated which target the different levels of abstraction. Second, each verification technique is complemented by an approach to measure the achieved verification quality. The new flow distinguishes three levels of abstraction (namely system level, top level and block level) and can be incorporated in existing approaches. After reviewing the preliminary concepts, in the following chapters the three levels for modeling and verification are considered in detail. At each level the verification quality is measured. In summary, following the new design and verification flow a high overall quality results.

Features
► Dedicated verification techniques for the different abstraction levels of System C
► Verification quality is measured throughout the refinement of the design
► Integrated design and verification flow

Contents

Fields of interest
Circuits and Systems; Software Engineering/Programming and Operating Systems; Register-Transfer-Level Implementation

Target groups
Researchers in industry and academia, graduate students, users in industry

Type of publication
Monograph

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Large-Scale PDE-Constrained Optimization in Applications

This book results from the authors work done on simulation based optimization problems at the Department of Mathematics, University of Trier, and reported in my postdoctoral thesis ("Habilitationsschrift") accepted by the Faculty-IV of this University in 2008. The focus of the work has been to develop mathematical methods and algorithms which lead to efficient and high performance computational techniques to solve such optimization problems in real-life applications. Systematic development of the methods and algorithms are presented here. Practical aspects of implementations are discussed at each level as the complexity of the problems increase, supporting with enough number of computational examples. It consists of two parts: first part deals with time dependent optimization problems with applications in environmental engineering and the second part deals with steady state optimization problems, in which the PDEs are solved using semi-iterative or pseudo-time-stepping techniques, with applications in aerodynamics.

Features
► Presents recent research in multiphase flow through porous media involving real experimental data
► The Development of the method is presented in a systematic way starting from the "grass-root" level

Fields of interest
Engineering Fluid Dynamics; Fluid- and Aerodynamics; Computational Science and Engineering

Target groups
Researchers and graduate students in applied and computational mechanics especially computational fluid dynamics

Type of publication
Monograph

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Next-Generation Actuators Leading Breakthroughs

Next-Generation Actuators Leading Breakthroughs is the proceedings of the final symposium of MEXT Grant-in-Aid for Scientific Research on Priority Areas: Next-Generation Actuators Leading Breakthroughs, held in January 2010. Since the realization of next-generation actuators requires an interdisciplinary approach, the research has been organized according to a broad technological perspective that consists of: actuators for small motion of nano-meters, small-size actuators of micro-meters structures, intelligent actuators for functional motions, power actuators for large force/torque and actuators for special environments.

Next-Generation Actuators Leading Breakthroughs also deals with common fundamental technologies for these actuators, such as intelligent materials, machining processes, control technologies, evaluation methods, and system integration. It provides cutting-edge research for researchers, postgraduates, and practitioners in mechanical, electrical, and materials industries.

Features
► Presents the latest R D in the MEXT Grant-in-Aid for Scientific Research on Priority Areas, No. 438, Next-Generation Actuators Leading Breakthroughs (2004-2009, PI: Toshiro Higuchi, University of Tokyo)► Maintains a broad technological perspective

Contents

Fields of interest
Control, Robotics, Mechatronics

Target groups
Researchers, postgraduates, and practitioners in mechanical, electrical and materials industries

Type of publication
Monograph
Adaptive Supply Chain Management

Adaptive Supply Chain Management develops new viewpoints on the SCM goal paradigm, problem semantics, and decision-making support. Drawing upon years of research and practical experience, and using numerous examples, the authors unite conceptual considerations of supply chains with a constructive level of engineering and solutions to real-world problems. Adaptive Supply Chain Management provides advanced insights into dynamics, complexity, and uncertainty in supply chains from the perspectives of systems analysis, control theory, and operations research. It also considers supply chain adaptability, stability, and crisis-resistance.

Providing readers with a comprehensive view of advanced SCM concepts, constructive mathematical techniques and models, Adaptive Supply Chain Management is an invaluable text for practitioners and researchers who specialize in SCM and operations.

Features
- Provides advanced insights into supply chain dynamics
- Offers mathematical models as solutions to real-life scenarios

From the contents
1. Evolution of Supply Chain Management (SCM).
2. Conceptual Frameworks for Supply Chain Management.
5. Uncertainty, Risk and Complexity.

Fields of interest
Quality Control, Reliability, Safety and Risk; Industrial and Production Engineering; Production/Logistics

Target groups
Postgraduate students and researchers in supply chain management, production and logistics networks and operations management

Type of publication
Monograph

Due January 2010

2010. XXX, 275 p. 69 illus. Hardcover

Due January 2010

Power consumption of VLSI (Very Large Scale Integrated) circuits has been growing at an alarmingly rapid rate. This increase in power consumption, coupled with the increasing demand for portable/hand-held electronics, has made power consumption a dominant concern in the design of VLSI circuits today. Traditionally, dynamic (switching) power has dominated the total power consumption of an IC. However, due to current scaling trends, leakage power has now become a major component of the total power consumption in VLSI circuits. Leakage power reduction is especially important in portable/hand-held electronics such as cell-phones and PDAs. This book presents two techniques aimed at reducing leakage power in digital VLSI ICs. The first technique reduces leakage through the selective use of high threshold voltage sleep transistors. The second technique reduces leakage by applying the optimal Reverse Body Bias (RBB) voltage.

Features
- Provides a variety of approaches to control and exploit leakage
- Examines the issues with implementing sub-threshold logic and describes techniques to tackle these issues
- Presents a new, practical self-compensated, closed loop approach to controlling leakage, via sub-threshold circuits, which yields upwards of 20X power savings

Fields of interest
Circuits and Systems; Computer-Aided Engineering (CAD, CAE) and Design

Target groups
Researchers who are interested in circuit modeling for reliability analysis, radiation and variation tolerant circuit design

Type of publication
Monograph

Due January 2010


Due April 2010


Theory of Applied Robotics: Kinematics, Dynamics, and Control 2E is appropriate for courses in robotics that emphasize kinematics, dynamics, and control.

The contents of this book are presented at a theoretical-practical level. It explains robotics concepts in detail, concentrating on their practical use. Related theorems and formal proofs are provided, as are real-life applications. Students, researchers, and practicing engineers alike will appreciate this user-friendly presentation of a wealth of robotics topics, most notably orientation, velocity, and forward kinematics.

The second edition includes updated and expanded exercise sets and problems, new coverage includes, Components and Mechanisms of a Robotic Systems with actuators, sensors and controllers and updated and expanded material on Kinematics including geometric kinematics, Derivative Kinematics, velocity kinematics, and new coverage on sensing and control including position sensors, speed sensors and acceleration sensors.

Features
- New coverage includes components and mechanisms of a robotics system with actuators, sensors and controllers and updated and expanded material on kinematics, and new coverage on sensing and control including position sensors, speed sensors and acceleration sensors
- Provides numerical algorithms that can be converted and used with computational software such as Matlab, Mathematica and Maple

Fields of interest
Vibration, Dynamical Systems, Control; Control, Robotics, Mechatronics; Systems Theory, Control

Target groups
Seniors and first year graduate students in mechanical, electrical, and aerospace engineering

Type of publication
Graduate/Advanced undergraduate textbook

Due April 2010

2nd ed. 2010. Approx. 750 p. Hardcover

Due April 2010

N. Jayakumar, S. Paul, R. Garg, K. Gulati, S. P. Khatri, Texas A&M University, College Station, TX, USA

R. N. Jazar, Manhattan College, Riverdale, NY, USA
Computers in Medical Activity

Papers selected to the present monograph are only a small piece of subjects being investigated in Poland in the range of medical computer science. Their summaries and preliminary results were presented during the international conference „Computers in Medical Activity” organized by the College of Computer Science in Lodz with the collaboration of the Polish Society of Medical Computer Science in Poland in 2007. The subject matter of the monograph is mainly steered on employing the computer systems in the diagnostics then the equipment of the medical activity and the general problems connected with the organization the medical care.

Features
► Presents latest research in utilization of computer systems in the various fields of medical activity
► Devoted to computer applications in both medical education and scientific research and prophylaxis, diagnostics, therapy, convalescence and hospital administration

Contents
Prophylaxis.- Diagnosis.- Prognosis.- Medical equipment.- General problems and healthcare organization.- Another computer applications.

Fields of interest
Computational Intelligence; Artificial Intelligence (incl. Robotics); Biomedical Engineering

Target groups
Researchers, engineers, graduate students in computational intelligence, computer science and medicine

Type of publication
Monograph

Introduction to Nonlinear Finite Element Analysis

Introduction to Nonlinear Finite Element Analysis will introduce the key concepts of nonlinear finite element analysis procedures. The book will explain the fundamental theories of the field, and provide instructions on how to apply the concepts to solving practical engineering problems. Instead of covering many nonlinear problems, only four representative problems are addressed: nonlinear elasticity, elastoplasticity, contact problem, and dynamic problem. The book is written independent of any particular software, but tutorials and examples using four commercial programs are included as appendices: ANSYS, NASTRAN, ABAQUS, and MATLAB. In particular, the MATLAB program will include all source codes so that students can develop their own material models, or different algorithms.

Features
► Clear explanations of nonlinear finite element analysis for elasticity, elastoplasticity, contact and dynamic problems
► Many informative examples of nonlinear analyses are included so that students can understand the nonlinear theory clearly
► Offers practical applications of FEM to engineering analysis, providing a balance between theory and practice

From the contents

Fields of interest
Theoretical and Applied Mechanics; Continuum Mechanics and Mechanics of Materials; Computational Mathematics and Numerical Analysis

Target groups
Graduate students in mechanical, civil, aerospace, biomedical, and industrial engineering, as well as researchers and engineers in the same fields

Type of publication
Graduate/Advanced undergraduate textbook

Introduction to Nonlinear Finite Element Analysis

N. Kim, University of Florida, Gainesville, FL, USA

Advances in Machine Learning I

Dedicated to the memory of Professor Ryszard S. Michalski

Features
► State of the art of Machine Learning
► Dedicated to the memory of Professor Ryszard S. Michalski

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

Target groups
Researchers, engineers, graduate students in computational intelligence, machine learning

Type of publication
Monograph

Due November 2009

► € 139.95 | £126.00
► * € (D) 149.75 | € (A) 153.95 | sFr 217.50
SBN 978-3-642-04461-6

Due February 2010

2010. Approx. 400 p. Hardcover
► € 79.95 | £72.00
► * € (D) 85.55 | € (A) 87.95 | sFr 124.50
SBN 978-1-4419-1745-7
On-Line Trajectory Generation in Robotics

Basic Concepts for Instantaneous Reactions to Unforeseen (Sensor) Events

This PhD thesis focuses on sensor integration in robotics, in particular in robotic manipulation control systems. We consider a mechanical system with multiple degrees of freedom equipped with one or more sensors delivering digital and/or analog sensor signals. There is no question that sensor integration and sensor-based control belong to the dominating domains for the future advancement of robotic systems. Although there has been much research on this objective, there is still one important question that has not been answered yet: If we consider a robot in an arbitrary state of motion, how can we calculate a trajectory, if we want the robot to react instantaneously to unforeseen sensor events?

Features

- Develops a new, very self-consistent theory on on-line trajectory generation for robotic systems
- For the first time(!), it becomes possible to let a robot motion controller (abruptly) switch between different reference frames, or different control state spaces at unforeseen time instants
- Introduces a new concept, accompanied by many comprehensive examples

Fields of interest

Robotics and Automation; Artificial Intelligence (incl. Robotics); Systems Theory, Control

Target groups

Researchers, graduate students and professionals in robotics

Type of publication

Monograph
**Electromagnetic Field Theory for Engineers and Physicists**

G. Lehner, University of Stuttgart, Germany

**Safety of Electromedical Devices**

N. Leitgeb

Discussed is the electromagnetic field theory and its mathematical methods. Maxwell’s equations are presented and explained. It follows a detailed discussion of electrostatics, flux, magnetostatics, quasi stationary fields and electromagnetic fields. The author presents how to apply numerical methods like finite differences, finite elements, boundary elements, image charge methods, and Monte-Carlo methods to field theory problems. He offers an outlook on fundamental issues in physics including quantum mechanics. Some of these issues are still unanswered questions. A chapter dedicated to the theory of special relativity, which allows to simplify a number of field theory problems, complements this book.

**Features**

- Convinces by its excellent didactics
- Very precise regarding its conception and derivations
- The author depicts the electromagnetic field theory and the relevant mathematical methods

**From the contents**


**Fields of interest**

Microwaves, RF and Optical Engineering; Optics and Electrodynamics; Engineering, general

**Target groups**

Students in electrical engineering and in physics

**Type of publication**

Graduate/Advanced undergraduate textbook

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**Securing Electricity Supply in the Cyber Age**

Z. Lukso, Delft University of Technology, The Netherlands; G. Deconinck, K.U. Leuven, ESAT/ELECTA, Leuven, Belgium; M. P. Weijnen, Delft University of Technology, The Netherlands (Eds.)

**Due December 2009**

101. 200 p. (Topics in Safety, Risk, Reliability and Quality, Volume 15) Hardcover

- approx. * € 99,95 | £90.00
- approx. * € (D) 106,95 | € (A) 109,95 | sFr 166,00
- SBN 978-90-481-3593-4

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**Discussed**

The electricity infrastructure is one of society’s most critical infrastructures. The complexity of the electricity infrastructure system is increasing quickly, due to the increasing intensity of market-based power exchanges between electricity systems, the associated market restructuring and an increasing share of decentralized generation. As a consequence, the organizational complexity of power systems has exploded. At the same time, there is a shift in public and societal goals towards low-carbon and sustainable power generation. This will eventually require a drastic transformation of the industry. Increasingly, ICT is being depended upon for managing this infrastructure, for technical control and operation and for facilitating markets. A recent example is demand-side management, based on detailed metering of consumption and decentralized electricity generation.

**Features**

- Provides a coherent view of problems and solutions for the security of current and future electricity infrastructures

**Fields of interest**

Power Engineering; Communications Engineering, Networks; Quality Control, Reliability, Safety and Risk

**Target groups**

Researchers and (research-oriented) policy makers in the area of infrastructure systems. Readers with a background in infrastructure networks, especially electricity networks and ICT networks

**Type of publication**

Monograph
Shipping and Logistics Management

Shipping and Logistics Management serves to consolidate the knowledge its authors have acquired from being educators and observers of the shipping industry. Against the background of a global business environment, it explains how the shipping market functions, examining the strategic and operational issues that affect entrepreneurs in this industry. The authors discuss global trends and strategies in the shipping business, looking at the role of logistics service providers and at how the use of information technology can help shipping operations. Shipping and Logistics Management also aims to answer several important questions in the shipping industry, including: what are the shipping cost structures?, what are the patterns of sea transport? and how do companies in the shipping industry operate? An invaluable source of information for researchers and advanced, or graduate, students, Shipping and Logistics Management is also a useful reference for shipping practitioners and consultants.

Features
► Provides advanced material based on the latest research
► Discusses pertinent strategic and operational issues

Fields of interest
Engineering Economics, Organization, Logistics, Marketing; Production/Logistics

Target groups
Researchers, advanced/graduate students, consultants, shipping industry practitioners

Type of publication
Monograph

Advancing Computing, Communication, Control and Management

This volume contains revised and extended research articles written by prominent researchers participating in the conference. Topics covered include intelligent computing, network management, wireless networks, telecommunication, power engineering, control engineering, Signal and Image Processing, Machine Learning, Control Systems and Applications. The book will offer the states of arts of tremendous advances in Computing, Communication, Control, and Management and also serve as an excellent reference work for researchers and graduate students working on Computing, Communication, Control, and Management Research.

Features
► Presents latest research on computing, communication, control and management

From the contents
Study on MRF and REF to Semi-Supervised Classification.- An Extension Method of Space Syntax and Application.- A Feasible Registration Method for Underwater SLAM.- A Promoted Global Convergence Particle Swarm Optimization Algorithm.- A Web-based Integrated System for Construction Project Cost Prediction.- Research of Corporate Credit for Anhui Province’s Listed Companies Based on Computer Technology.- Evaluation of Industrial Parks’ Industrial Transformations and Environmental Reform Actualized by AHP Based on MatLab Software.

Fields of interest
Applied Mathematics/Computational Methods of Engineering; Artificial Intelligence (incl. Robotics); Communications Engineering, Networks

Target groups
Researchers, engineers, graduate students in computational intelligence, engineering, computer science

Type of publication
Monograph

Advances in Biomedical Sensing, Measurements, Instrumentation and Systems

Advances in biomedical devices unveil new architectures for instrumentation and improvements in measurement techniques. Sensing technology, related to biomedical aspects, plays a key role in nowadays applications; it promotes different advantages for: healthcare, solving difficulties for elderly persons, clinical analysis, microbiological characterizations, etc. This book intends to illustrate and to collect recent advances in biomedical measurements and sensing instrumentation, not as an encyclopedia but as a reference to stimulate exchange and discussions for further developments.

Features
► Presents recent advances in biomedical measurements and sensing instrumentation
► Overviews the state of the art of biomedical sensing

Fields of interest
Electronics and Microelectronics, Instrumentation; Biomedical Engineering; Computational Biology/Bioinformatics

Target groups
Engineers, researchers and students in acoustics, speech processing, electrical engineering

Type of publication
Monograph

Due May 2010

Originally published with the title: Shipping and Transport Logistics, by McGraw-Hill, 2006

2010. IV, 356 p. 44 Illus. Hardcover
►  € 129,95 | £116.95
► * € (D) 139,05 | € (A) 142,95 | sFr 202,00
SBN 978-1-84882-996-7

Due January 2010

2010. Approx. 800 p. (Lecture Notes in Electrical Engineering, Volume 56) Softcover
► approx.  € 229,00 | £208.00
► approx. * € (D) 245,03 | € (A) 251,90 | sFr 380.50
SBN 978-3-642-05172-7

S. C. Mukhopadhyay, Massey University, Palmerston North, New Zealand; A. Lay-Ekuakille, Università Salento, Lecce, Italy (Eds.)
Multi-Objective Swarm Intelligent Systems
Theory & Experiences

The editors of this volume, Nadia Nedjah, Ajith Abraham and Luiza de Macedo Mourelle, have done a superb job of assembling some of the most innovative and intriguing applications and additions to the methodology and theory of genetic programming – an automatic programming technique that starts from a high-level statement of what needs to be done and automatically creates a computer program to solve the problem.

Features
► Recent advances in multi-objective swarm intelligence and cooperative behaviour

Fields of interest
Appl. Mathematics/Computational Methods of Engineering; Artificial Intelligence (incl. Robotics)

Target groups
Researchers, engineers, graduate students in computational intelligence

Type of publication
Monograph

Blast Waves

The primary purpose of this text is to document many of the lessons that have been learned during the authors more than 40 years in the field of blast and shock. This writing therefore takes on an historical perspective, in some sense, because it follows the author's experience. The book deals with blast waves propagating in fluids or materials that can be treated as fluids. This monograph provides a broad overview of blast waves. We start with the distinction between blast waves and the more general category of shock waves. We examine several ways of generating blast waves and the propagation of blast waves in one, two and three dimensions and through the real atmosphere. One section will cover the propagation of shocks in layered gasses. We then cover the interaction of shock waves with simple structures starting with reflections from planar structures, then two dimensional structures, such as ramps or wedges.

Features
► Basic Introduction to Blast Waves ► Documents many of the lessons that have been learned during the authors more than 40 years in the field of blast and shock

Contents

Fields of interest
Engineering Fluid Dynamics; Fluid- and Aerodynamics; Acoustics

Target groups
Researchers, engineers, graduate students in Shockwaves, Aerodynamics, Computational Fluid Dynamics, Flow Visualisation

Type of publication
Monograph

Intelligent Infrastructures

Society heavily depends on infrastructure systems, such as road-traffic networks, water networks, electricity networks, etc. Infrastructure systems are hereby considered to be large-scale, networked systems, that almost everybody uses on a daily basis, and that are so vital that their incapacity or destruction would have a debilitating impact on the defense or economic security and functioning of society. The operation and control of existing infrastructures such as road-traffic networks, water networks, electricity networks, etc. are failing: too often we are confronted with capacity problems, unsafety, unreliability and inefficiency. This book concentrates on a wide range of problems concerning the way infrastructures are functioning today and discuss novel advanced, intelligent, methods and tools for the operation and control of existing and future infrastructures.

Features
► Shows in a coherent way several kinds of intelligence for infrastructures ► Is demonstrated how infrastructures can be made more intelligent ► Novel, state-of-the-art methods and tools for the operation and control of infrastructures are proposed ► Different points-of-view on how to use intelligence for modeling and control of infrastructure systems are brought together ► Analogies between different infrastructures are drawn

Fields of interest
Operations Research/Decision Theory; Systems Theory, Control; Simulation and Modeling

Target groups
Researchers and research-oriented policy makers, with backgrounds in varying types of infrastructure networks including in particular electricity networks, road-traffic networks, and water networks

Type of publication
Contributed volume
Dielectric Polymer Nanocomposites

Dielectric Polymer Nanocomposites provides the first in-depth discussion of nano-dielectrics, an emerging and fast moving topic in electrical insulation. The text begins with an overview of the background, principles and promise of nanodielectrics, followed by a discussion of the processing of nanocomposites and then proceeds with special considerations of clay based processes, mechanical, thermal and electric properties and surface properties as well as erosion resistance. Carbon nanotubes are discussed as a means of creation of non linear conductivity, the text concludes with a industrial applications perspective.

Features

➤ Discusses the background, principles and importance of nano-dielectric composites
➤ Detailed coverage on the processing of nanocomposites ➤ Discusses the physical and chemical nature of polymers ➤ Provides a summary and review of all one needs to know nanodielectric polymers ➤ Includes complete coverage of nanodielectric composites such as cryogenic applications, high voltage stress grading materials and applications in the capacitor industry

Contents

Background principles and promise of nanodielectrics. - The processing of nanocomposites. - Special considerations for clay-based materials. - The chemistry of the interface region and functionalization. - Mechanical and thermal properties. - Electrical properties. - Surface properties and erosion resistance. - Carbon nanotubes and the creation of non-linear conductivity. - The emerging mechanistic picture. - The industrial applications perspective.

Fields of interest

Engineering, general; Polymer Sciences; Optical and Electronic Materials

Target groups

Academic and industrial researchers

Type of publication

Contributed volume

Due December 2009


➤ € 79,95 | £49.95
➤ * € (D) 85,55 | € (A) 87,95 | sFr 124,50

SBN 978-1-84882-971-8

Programming Finite Elements in Java™

Programming Finite Elements in Java™ teaches the reader how to programme the algorithms of the finite element method (FEM) in Java™. The compact, simple code helps the student to read the algorithms, to understand them and thus to be able to refine them. All of the main aspects of finite element techniques are considered: finite element solution; generation of finite element meshes; and visualization of finite element models ans results with Java 3D™.

The step-by-step presentation includes algorithm programming and code explanation at each point. Problems and exercises are provided for each chapter, with Java™ source code and problem data sets available for the book’s webpage at springer.com/978-1-84882-971-8.

Features

➤ Use of Java™ as a programming language provides students with easy-to-understand compact algorithm development ➤ Provision of explanation for each coding step ensures that every stage of learning is firmly cemented before proceeding to the next ➤ Source code and problem data allow students to practise what they have learnt and saves tutors time

Fields of interest

Theoretical and Applied Mechanics; Programming Techniques; Computational Mathematics and Numerical Analysis

Target groups

Graduate students studying mechanical, aerospace, automotive and civil engineering; academics teaching finite element methods; practising engineers working with finite element analysis of mechanical parts and structures

Type of publication

Graduate/Advanced undergraduate textbook

Available


➤ approx. € 79,95 | £72.00
➤ approx. * € (D) 85,55 | € (A) 87,95 | sFr 124,50

SBN 978-3-540-23955-4

Electroactive Polymer Gel Robots

Modelling and Control of Artificial Muscles

This monograph presents new developments and advances of deformable robots made of electroactive polymer (EAP) gel, which is a promising new material for artificial muscles. “Electroactive Polymer Gel Robots” presents the design, development and experimental control of deformable machines consisting of EAP gel on the basis of a theoretical deformation model. Experimental results are demonstrated including beam-shaped gels curling around an object and starfish-shaped gel robots turning over. Future direction of gel robots are presented such as polymer robots assisting human with physical interaction or muscle suits wrapping around the elders or athletes to support their movements.

Features

➤ Explores fundamental methods for deformable robots consisting of electroactive polymer, promising materials for artificial muscles

Fields of interest

Control, Robotics, Mechatronics; Polymer Sciences; Artificial Intelligence (incl. Robotics)

Target groups

Researchers, students and professionals in robotics

Type of publication

Monograph
Optimal Linear Controller Design for Periodic Inputs

Optimal Linear Controller Design for Periodic Inputs proposes a general design methodology for linear controllers facing periodic inputs which applies to all feedforward control, estimated disturbance feedback control, repetitive control and feedback control. The design methodology proposed is able to reproduce and outperform the major current design approaches, where this superior performance stems from the following properties: uncertainty on the input period is explicitly accounted for, periodic performance being traded-off against conflicting design objectives and controller design being translated into a convex optimization problem, guaranteeing the efficient computation of its global optimum. The potential of the design methodology is illustrated by both numerical and experimental results.

Features
- Proposes a new design structure that overcomes uncertainty in the input period of periodic systems
- Reduces the necessity to trade off periodic performance against lowered measurement noise and stricter requirements for accurate models
- Expresses controller design in terms of convex optimisation allowing for efficient computation of global optima

From the contents
Design Methodology for Controllers Facing Periodic Inputs. - Application to Feedforward Control. - Application to Estimated Disturbance Feedback Control. - Application to Repetitive Control. - Application to Feedback Control.

Fields of interest
Control; Systems Theory, Control

Target groups
Academic researchers and graduate students working with periodic systems; industrial control engineers working with repeating and periodic processes; libraries

Type of publication
Monograph

Due November 2009

2009. XVI, 164 p. 75 illus., 2 in color. (Lecture Notes in Control and Information Sciences, Volume 394) Softcover
- € 79,95 | £64.95
- * € (D) 85,55 | € (A) 87,95 | sFr 124,50
SBN 978-1-84882-974-7

Advances in Intelligent Information Systems

Intelligent Information Systems (IIS) can be defined as the next generation of Information Systems (IS) developed as a result of integration of AI and database (DB) technologies. IIS embody knowledge that allows them to exhibit intelligent behavior, allows them to cooperate with users and other systems in problem solving, discovery, retrieval, and manipulation of data and knowledge. For any IIS to serve its purpose, the information must be available when it is needed. This means that the computing systems used to store data and process the information, and the security controls used to protect it must be functioning correctly. This book covers some of the above topics and it is divided into four sections: Classification, Approximation and Data Security, Knowledge Management, and Application of IIS to medical and music domains.

Features
- Overview over the latest research in intelligent information systems

Fields of interest
Appl. Mathematics/Computational Methods of Engineering; Artificial Intelligence (incl. Robotics)

Target groups
Researchers, engineers, graduate students in computational intelligence, computer science

Type of publication
Monograph

Due January 2010

2010. Approx. 350 p. (Studies in Computational Intelligence, Volume 265) Hardcover
- € 129,95 | £118.50
- approx. * € (D) 139,05 | € (A) 142,95 | sFr 216,00
SBN 978-3-642-05182-7

Irreversible Electroporation

This is a brief introduction to the emerging field of irreversible electroporation in medicine. Certain electrical fields when applied across a cell can have as a sole effect the permeabilization of the cell membrane, presumable through the formation of nanoscale defects in the cell membrane. Sometimes this process leads to cell death, primarily when the electrical fields cause permanent permeabilization of the membrane and the consequent loss of cell homeostasis, in a process known as irreversible electroporation. This is an unusual mode of cell death that is not understood yet. While the phenomenon of irreversible electroporation may have been known for centuries it has become only recently rigorously considered in medicine for various applications of tissue ablation. A brief historical perspective of irreversible electroporation is presented and recent studies in the field are discussed.

Features
- The First book on Irreversible Electroporation
- Includes Fundamental physical Basics and an outlook on clinical applications
- Written by the Leading Researchers
- Opens new ways in Cancer Therapie

From the contents
Irreversible electroporation in medicine, Towards solid tumor treatment by irreversible electroporation: Intrinsic redistribution of fields and currents in tissue, Mathematical Modeling of Irreversible Electroporation for Treatment Planning. - Imaging Guided Percutaneous Irreversible Electroporation: Ultrasound and Immunohistological Correlation. - Irreversible Electroporation: Implications for Prostate Ablation.

Fields of interest
Biomedical Engineering; Oncology; Cell Biology

Target groups
Biomedical and biophysical engineers, pharmaceutical researchers

Type of publication
Monograph

Due January 2010

2010. Approx. 400 p. (Series in Biomedical Engineering) Hardcover
- € 129,95 | £117.00
- * € (D) 139,05 | € (A) 142,95 | sFr 202,00
SBN 978-3-642-05419-5
Fault Location on Power Networks

Fault Location on Power Lines enables readers to pinpoint the location of a fault on power lines following a disturbance. The nine chapters are organised according to the design of different locators. The authors do not simply refer the reader to manufacturers’ documentation, but instead have compiled detailed information to allow for in-depth comparison.

Fault Location on Power Lines describes basic algorithms used in fault locators, focusing on fault location on overhead transmission lines, but also covering fault location in distribution networks. An application of artificial intelligence in this field is also presented, to help the reader to understand all aspects of fault location on overhead lines, including both the design and application standpoints.

Professional engineers, researchers, and postgraduate and undergraduate students will find Fault Location on Power Lines a valuable resource, which enables them to reproduce complete algorithms of digital fault locators in their basic forms.

Features
- The reader will learn to understand all aspects of protective relaying and automation from both the design and application standpoints

Fields of interest
Power Electronics, Electrical Machines and Networks; Electrical Engineering; Quality Control, Reliability, Safety and Risk

Target groups
Professional engineers, researchers, and postgraduate and undergraduate students in power engineering

Type of publication
Monograph

Seventh IUTAM Symposium on Laminar-Turbulent Transition


The dynamics of transition from laminar to turbulent flows remains to this day a major challenge in theoretical and applied mechanics. The subject is of significance in diverse areas like gas turbines, underwater applications, flow control etc. This volume will contain approximately 100 papers on flow instability, transition to turbulence, flow control, etc., of presentations made during the seventh IUTAM symposium on laminar-turbulent transition, Stockholm, Sweden, 2009. It thus equips the reader with the latest research in this area. For the present volume, the areas of emphasis are: Novel approaches to receptivity analysis and transition modeling, Non-normal effects and global modes, Stability of complex flows, such as non-Newtonian and miscible-interface flows, Transition in simple shear flows and its relation to properties of non-linear dynamical systems, Modern feedback control and design techniques applied to transition, Transition in high-speed flows, Direct and Large-Eddy Simulation of transition, Applied Laminar Flow Control.

Features
- IUTAM Symposia always represent the state of the art in a given field and attract top scholars

Fields of interest
Fluid- and Aerodynamics; Engineering Fluid Dynamics

Target groups
Conference participants, IUTAM committee, academic libraries, researchgroups in academia and research labs concerned with fundamental fluidmechanics and aerospace engineering, individual researchers and engineers inaerospace industry

Type of publication
Contributed volume

Innovation performance accounting

Financing Decisions and Risk Assessment of Innovation Processes

With contributions of numerous experts

For successful innovation in business the responsible managers need a consistent view of the individual processes as well as an assessment of key projects in all phases of the development. Generating new ideas, fast examination of its feasibility requires skilled methods for evaluation of these ideas, plans and especially costs and revenues. Business models, calculation methods and some assessments of certain options are presented by the authors. The ability to identify risks and appropriate responses to misperceptions are important milestones in the innovation process. From analysis of problems to the introduction of market-ready solutions, legal requirements, business demands and risk management systems are discussed. Concepts promoting uniform, binding rules for ratings in the innovation process are treated. The identification of target pricing, target costing and litigation, the evaluation of the solution to calculate risk aspects as tasks in financial management and innovation controlling are part of the content.

Features
- A new approach presenting the financial evaluation of innovation processes in various technological businesses
- Financial evaluation of patents or R D-plans
- Based on european as well as US rules (IFRS balancing)

Fields of interest
Engineering Economics, Organization, Logistics, Marketing; Accounting/Auditing; Engineering Design

Target groups
Intellectual property managers, research engineers, R&D management

Type of publication
Professional book
From Motor Learning to Interaction Learning in Robots

This book is largely based on the successful workshop “From motor to interaction learning in robots” held at the IEEE/RSJ International Conference on Intelligent Robot Systems. The major aim of the book is to give students interested the topics described above a chance to get started faster and researchers a helpful compendium.

Features
► Presents recent research in motor learning and interaction learning in robots

Fields of interest
Computational Intelligence; Robotics and Automation; Artificial Intelligence (incl. Robotics)

Target groups
Researchers, engineers, graduate students in computational intelligence, robotics, and computer science

Type of publication
Monograph

Internet – Technical Development and Applications

Internet technologies and systems are nowadays the key enablers of digital economy and modern world-wide connected society. This contributed book is a collection of cautiously chosen articles delivered by specialists with significant level of expertise in the domain of Internet technical foundations and its applications.

The content of the book is divided into three parts: Internet - technical fundamentals and applications, Information management systems, and Information security in distributed computer systems. This book is a reference tool prepared for scientists and other persons involved in designing, implementation and evaluation of internet technologies. Its readers can be found among researchers, teachers and also students of computer science and related disciplines.

Features
► Presents the state of the art of the technical development and applications of the internet
► Proceedings of the Conference “Internet in the Information Society” held in Ustron, 26th-28th November, 2009 Poland

Contents

Fields of interest
Applied Mathematics/Computational Methods of Engineering; Information Systems Applications (incl.Internet); Artificial Intelligence (incl. Robotics)

Target groups
Researchers, engineers, graduate students in soft computing and statistics

Type of publication
Monograph

Friction-Induced Vibration in Lead Screw Drives

Friction-Induced Vibration in Lead Screw Drives covers the dynamics of lead screw drives with an emphasis on the role of friction. Although lead screw drives have a long history and their mechanical design and manufacturing aspects are very well understood, the role of friction in their dynamical behavior, as well as friction-induced instability in such systems, has not been comprehensively treated. The use of friction-induced vibration in lead screws can be the cause of unacceptably high levels of audible noise, and may lead to instabilities and vibration. This book will serve as the definitive text on the friction-induced vibration of lead screws and will identify ways to prevent self-excited vibration by design. It includes several approaches to actively suppress vibration using robust control methodologies.

Features
► Unique coverage of lead screw dynamics and the role of friction in causing self-excited vibration
► Connects the frictional behavior of lead screw to other well-known mechanisms like disk brake and covers the fundamental theory
► Uses modeling and analysis techniques to address the issue of robust vibration control specific to lead screws

Contents

Fields of interest
Vibration, Dynamical Systems, Control; Systems Theory, Control; Manufacturing, Machines, Tools

Target groups
Researchers, graduate students and engineers working on aspects of machines with friction, and especially lead screw drives

Type of publication
Monograph
Z. Waszczyszyn, Cracow University of Technology, Poland (Ed.)

**Advances of Soft Computing in Engineering**

The articles in this book present advanced soft methods related to genetic and evolutionary algorithms, immune systems, formulation of deterministic neural networks and Bayesian NN. Many attention is paid to hybrid systems for inverse analysis fusing soft methods and the finite element method. Numerical efficiency of these soft methods is illustrated on the analysis and design of complex engineering structures.

**Fields of interest**
Structural Mechanics; Civil Engineering; Computational Intelligence

**Target groups**
Master and PhD students, post docs and researchers in engineering

**Type of publication**
Contributed volume

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R. E. White, V. R. Subramanian, University of South Carolina, Columbia, SC, USA

**Computational Methods in Chemical Engineering with Maple Applications**

This book helps chemical and other engineers to develop their skills for solving mathematical models using Maple. These mathematical models consist of systems of linear and/or nonlinear algebraic equations, ordinary differential equations, partial differential equations, or a combination of these. A new unified approach to solve these equations is presented, including the volume averaging method, the shell balance approach, or the state space approach, as well as the classical analytical tools for solving partial differential equations. A solutions manual is provided on an accompanying CD-ROM, as well as Maple worksheets, which can be used by readers to solve the given example problems and their own additional problems.

**Features**
- Classical and new methods solving differential equations for chemical engineers using Maple

**Fields of interest**
Theoretical and Computational Chemistry; Software Engineering/Programming and Operating Systems; Applications of Mathematics

**Target groups**
Researchers and professionals

**Type of publication**
Graduate/Advanced undergraduate textbook

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Y. You, Digital Rise Technologies, San Diego, CA, USA

**Audio Coding**
Theory and Applications

Audio Coding: Theory and Applications provides succinct coverage of audio coding technologies that are widely used in modern audio coding standards, delivered from the perspective of an engineer, it will articulate how signal processing is used in the context of audio coding. It presents a detailed treatment of contemporary audio coding technologies such as the DRA audio coding standard. This book will present DRA audio coding standard as a practical example to illustrate how all those technologies are integrated into a fully fledged audio coding algorithm. Audio Coding: Theory and Applications will be a valuable reference book for engineers in the consumer electronics industry and graduate students in electrical engineering. It will help them grasp the state-of-art technologies and build a solid foundation for them to either understand other audio coding standards or develop their own.

**Features**
- Shows how to design a high-performance algorithm so it can be readily implemented on fixed-point or integer microprocessors
- Discusses how to properly implement an audio decoder on various microprocessors
- Includes such advanced topics as transient detection, and has production-quality code snippets
- Provides a full description of the DRA Audio Coding Standard

**Fields of interest**
Signal, Image and Speech Processing; Electrical Engineering; Communications Engineering, Networks

**Target groups**
Practicing engineers in the consumer electronics industry and academic researchers

**Type of publication**
Professional book

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Springer Wien New York

**Chemistry and Materials Science**

Due November 2009
2010. Approx. 800 p. With CD-ROM. Hardcover
- € 64,95 | £56.99
- $69,50 | A 71,45 | sFr 108,00
ISBN 978-3-642-04310-9

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Springer Wien New York

**Engineering**

Due June 2010
- € 99,35 | £90.00
- $106,30 | A 109,29 | sFr 165,00