Automatic Gain Control
Techniques and Architectures for RF Receivers

This book analyzes automatic gain control (AGC) loop circuits and demonstrates AGC solutions in the environment of wireless receivers, mainly in wireless receivers with stringent constraints in settling-time and wide dynamic range, such as WLAN and Bluetooth receivers. Since feedforward AGCs present great advantages in this context, as an alternative to conventional feedback AGCs, this book includes a detailed study of feedforward AGCs design – at the level of basic AGC cells, as well as the system level, including their main characteristics and performance.

Contents

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

Type of publication
Monograph

Intelligent Systems: Approximation by Artificial Neural Networks

This brief monograph is the first one to deal exclusively with the quantitative approximation by artificial neural networks to the identity-unit operator. Here we study with rates the approximation properties of the “right” sigmoidal and hyperbolic tangent artificial neural network positive linear operators. In particular, we study the degree of approximation of these operators to the unit operator in the univariate and multivariate cases over bounded or unbounded domains. This is given via inequalities and with the use of modulus of continuity of the involved function or its higher order derivative. We examine the real and complex cases. For the convenience of the reader, the chapters of this book are written in a self-contained style. This treatise relies on author’s last two years of related research work. Advanced courses and seminars can be taught out of this brief book. All necessary background and motivations are given per chapter. A related list of references is given also per chapter. The exposed results are expected to find applications in many areas of computer science and applied mathematics, such as neural networks, intelligent systems, complexity theory, learning theory, vision and approximation theory, etc.

Features
- Provides a complete review of automatic gain control loops, covering both feedback and feedforward approaches.
- Describes the complete design flow of the main blocks used in AGC circuits (PGAs/VGAs, peak detectors and control voltage generation circuits), considering low-voltage low-power restrictions.
- Includes real AGC architectures implemented as a general purpose digital feedforward CMOS AGC, a fully analogue feedforward AGC and a combined feedforward/feedback CMOS AGC.

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

Target groups
Research

Type of publication
Monograph

Due September 2011
- € 99,95 | £90.00
- *€ (D) 106,95 | € (A) 109,95 | sFr 143,50
ISBN 978-3-642-21430-1 01667

Due June 2011
- € 99,95 | £90.00
- *€ (D) 106,95 | € (A) 109,95 | sFr 143,50
ISBN 978-3-642-21430-1 01667

Due August 2011
2011, VIII, 434 p. 172 illus., 75 in color. (Lecture Notes in Electrical Engineering, Tentative volume 96) Hardcover
- € 129,95 | £117.00
- *€ (D) 139,05 | € (A) 142,94 | sFr 186,50
ISBN 978-3-642-21430-1 01667
Heat and Mass Transfer

This comprehensive textbook provides a solid foundation of knowledge on the principles of heat and mass transfer and shows how to solve problems by applying modern methods. The basic theory is developed systematically, exploring in detail the solution methods to all important problems. The thoroughly revised 3rd edition includes an introduction to the numerical solution of Finite Elements. A new section on heat and mass transfer in porous media has also been added. The book will be useful not only to upper-level and graduate students, but also to practicing scientists and engineers, offering a firm understanding of the principles of heat and mass transfer, and showing how to solve problems by applying modern methods. Many completed examples and numerous exercises with solutions facilitate learning and understanding, and an appendix includes data on key properties of important substances.

Features
► Provides a firm understanding of the principles of heat and mass transfer ► Shows how to solve problems by applying modern methods ► An appendix includes property data on important substances

Contents

Fields of interest
Engineering Thermodynamics, Heat and Mass Transfer; Thermodynamics; Physical Chemistry

Target groups
Graduate

Type of publication
Graduate/Advanced undergraduate textbook

Applications of Chaos and Nonlinear Dynamics in Engineering – Vol. 1

Chaos and nonlinear dynamics initially developed as a new emergent field with its foundation in physics and applied mathematics. The highly generic, interdisciplinary quality of the insights gained in the last few decades has spawned myriad applications in almost all branches of science and technology—and even well beyond. Wherever quantitative modeling and analysis of complex, nonlinear phenomena is required, chaos theory and its methods can play a key role. This volume concentrates on reviewing the most relevant contemporary applications of chaotic nonlinear systems as they apply to the various cutting-edge branches of engineering. The book covers the theory as applied to robotics, electronic and communication engineering (for example chaos synchronization and cryptography) as well as to civil and mechanical engineering, where its use in damage monitoring and control is explored. Featuring contributions from active and leading research groups, this collection is ideal both as a reference and as a 'recipe book' full of tried and tested, successful engineering applications

Features
► State-of-the-art applications in various fields of engineering/applied sciences ► Contributions written by active and leading research groups ► Useful both as a reference and recipe handbook of successful applications

Fields of interest
Vibration, Dynamical Systems, Control; Statistical Physics, Dynamical Systems and Complexity; Appl.Mathematics/Computational Methods of Engineering

Target groups
Research

Type of publication
Monograph

Adaptive Multimodal Interactive Systems

Adaptive Multimodal Interactive Systems introduces a general framework for adapting multimodal interactive systems and comprises a detailed discussion of each of the steps required for adaptation. This book also investigates how interactive systems may be improved in terms of usability and user friendliness while describing the exhaustive user tests employed to evaluate the presented approaches.

After introducing general theory, a generic approach for user modeling in interactive systems is presented, ranging from an observation of basic events to a description of higher-level user behavior. Adaptations are presented as a set of patterns similar to those known from software or usability engineering. These patterns describe recurring problems and present proven solutions. The authors include a discussion on when and how to employ patterns and provide guidance to the system designer who wants to add adaptivity to interactive systems. In addition to these patterns, the book introduces an adaptation framework, which exhibits an abstraction layer using Semantic Web technology. Adaptations are implemented on top of this abstraction layer by creating a semantic representation of the adaptation patterns. The patterns cover both graphical interfaces as well as speech-based and multimodal interactive systems.

Features
► Presents novel methods for adapting multimodal interactive systems ► Investigates how multimodal, interactive systems may be improved in terms of usability and user friendliness ► Describes exhaustive user tests to evaluate the presented approaches

Fields of interest
Signal, Image and Speech Processing; User Interfaces and Human Computer Interaction; Computational Linguistics

Target groups
Research

Type of publication
Monograph
Innovation in Product Design
From CAD to Virtual Prototyping

Innovation in Product Design gives an overview of the research fields and achievements in the development of methods and tools for product design and innovation. It presents contributions from experts in many different fields covering a variety of research topics related to product development and innovation. Product lifecycle management, knowledge management, product customization, topological optimization, product virtualization, systematic innovation, virtual humans, design and engineering, and rapid prototyping are the key research areas described in the book. It also details successful case studies developed with industrial companies.Innovation in Product Design is written for academic researchers, graduate students and professionals in product development disciplines who are interested in understanding how novel methodologies and technologies can make the product development process more efficient.

From the contents

Features
► Teaches readers about methodological approaches and technological innovations that have led to the evolution of virtual prototyping tools ► Includes several industrial case studies ► Enables readers to improve product development

Fields of interest
Engineering Design; Computer-Aided Engineering (CAD, CAE) and Design; Innovation/Technology Management

Target groups
Research

Type of publication
Monograph

Due August 2011

11, 201 p. 106 illus. 3 in color. Hardcover
► approx. € 99,95 | £90.00
► approx. * € (D) 106,95 | € (A) 109,95 | sFr 143,50
ISBN 978-3-642-21270-3

Intelligent Decision Systems in Large-Scale Distributed Environments

One of the most challenging issues for the intelligent decision systems is to effectively manage the large-scale complex distributed environments such as computational clouds, grids, ad hoc and P2P networks, under the different types of users, their relations, and real-world uncertainties. In this context the IT resources and services usually belong to different owners (institutions, enterprises, or individuals) and are managed by different administrators. These administrators conform to different sets of rules and configuration directives, and can impose different usage policies on the system users. Additionally, uncertainties are presented in various types of information that are incomplete, imprecise, fragmentary or overloading, which hinders the full and precise determination of the evaluation criteria, their subsequent and selection, the assignment scores, and eventually the final integrated decision result. This book presents new ideas, analysis, implementations and evaluation of the next generation intelligent techniques for solving complex decision problems in large-scale distributed systems.

Features
► Recent research in Intelligent Decision Systems in Large-Scale Distributed Environments ► New insights in Intelligent Decision Systems ► Written by leading experts in the field

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

Target groups
Research

Type of publication
Monograph

Due June 2011

2011, 358 p. (Studies in Computational Intelligence, Volume 362) Hardcover
► € 129,95 | £117.00
► * € (D) 139,05 | € (A) 142,94 | sFr 186,50
ISBN 978-3-642-21269-7

Life-Cycle Assessment of Semiconductors

Life-Cycle Assessment of Semiconductors presents the first and thus far only available transparent and complete life cycle assessment of semiconductor devices. A lack of reliable semiconductor LCA data has been a major challenge to evaluation of the potential environmental benefits of information technologies (IT). The analysis and results presented in this book will allow a higher degree of confidence and certainty in decisions concerning the use of IT in efforts to reduce climate change and other environmental effects. Coverage includes but is not limited to semiconductor manufacturing trends by product type and geography, unique coverage of life-cycle assessment, with a focus on uncertainty and sensitivity analysis of energy and global warming emissions for CMOS logic devices, life cycle assessment of flash memory and life cycle assessment of DRAM. The information and conclusions discussed here will be highly relevant and useful to individuals and institutions.

Features
► Provides a detailed, complete and transparent life cycle assessment of semiconductor logic and memory devices ► Offers thorough evaluations of many technology generations of semiconductor logic and memory ► Contains an overview of environmentally significant trends in the semiconductor industry

Contents

Fields of interest
Electronics and Microelectronics, Instrumentation; Semiconductors; Renewable Energy Sources

Target groups
Research

Type of publication
Monograph

Due August 2011

2011, 190 p. 50 illus. Hardcover
► approx. * € (D) 106,95 | € (A) 109,95 | sFr 143,50
ISBN 978-1-4419-9987-0
Predictive Technology Model for Robust Nanoelectronic Design

Predictive Technology Model for Robust Nanoelectronic Design explains many of the technical mysteries behind the Predictive Technology Model (PTM) that has been adopted worldwide in explorative design research. Through physical derivation and technology extrapolation, PTM is the de-factor device model used in electronic design. This work explains the systematic model development and provides a guide to robust design practice in the presence of variability and reliability issues. Having interacted with multiple leading semiconductor companies and university research teams, the author brings a state-of-the-art perspective on technology scaling to this work and shares insights gained in the practices of device modeling.

Features
- Provides a systematic treatment of predictive modeling and design prototyping, from the fundamental concept to practical benchmarks
- Includes a complete and quantitative vision on the opportunities and limits of technology scaling toward the 10nm regime
- Addresses the emergent modeling and design needs under ever-increasing variability and reliability concerns
- Covers state-of-the-art compact modeling solutions for CMOS alternatives and post-silicon devices, enabling exploratory design activities beyond traditional CMOS
- Discusses the seamless integration of the process/materials development and circuit simulation that supports concurrent technology-design research

Fields of interest
- Circuits and Systems; Electronics and Microelectronics; Instrumentation; Nanotechnology

Target groups
- Research

Type of publication
- Monograph

Due July 2011


- approx. € 99.95 | £86.50
- approx. * € (D) 106.95 | € (A) 109.95 | sFr 137.00
ISBN 978-1-4614-0060-8

Reconfigurable Computing

From FPGAs to Hardware/Software Codesign

As the complexity of modern embedded systems increases, it becomes less practical to design monolithic processing platforms. As a result, reconfigurable computing is being adopted widely for more flexible design. Reconfigurable Computers offer the spatial parallelism and fine-grained customizability of application-specific circuits with the postfabrication programmability of software. To make the most of this unique combination of performance and flexibility, designers need to be aware of both hardware and software issues. FPGA users must think not only about the gates needed to perform a computation but also about the software flow that supports the design process. The goal of this book is to help designers become comfortable with these issues, and thus be able to exploit the vast opportunities possible with reconfigurable logic.

Features
- Focuses on both hardware and software systems
- Treatment of FPGAs as computing vehicles rather than glue-logic or ASIC substitutes
- Assembles a broad set of models for exploiting FPGA parallelism
- Demonstrates how to use and manage reconfiguration

Contents
- Introduction.
- The Relevance of Reconfigurable Computing.
- MORPHEUS: Exploitation of Reconfiguration for Increased Run-time Flexibility and Self-adaptive Capabilities in Future SoCs.
- Smart Chips for Smart Surroundings.

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

Target groups
- Research

Type of publication
- Monograph

Due August 2011


- € 129.95 | £117.00
- * € (D) 139.05 | € (A) 142.94 | sFr 186.50

Quantitative Methods in Supply Chain Management

Models and Algorithms

Quantitative Methods in Supply Chain Management presents some of the most important methods and tools available for modeling and solving problems arising in the context of supply chain management. In the context of this book, “solving problems” usually means designing efficient algorithms for obtaining high-quality solutions. The first chapter is an extensive optimization review covering continuous unconstrained and constrained linear and nonlinear optimization algorithms, as well as dynamic programming and discrete optimization exact methods and heuristics. The second chapter presents time-series forecasting methods together with prediction market techniques for demand forecasting of new products and services. The third chapter details models and algorithms for planning and scheduling with an emphasis on production planning and personnel scheduling. The fourth chapter presents deterministic and stochastic models for inventory control with a detailed analysis on periodic review systems and algorithmic development for optimal control of such systems. The fifth chapter discusses models and algorithms for location/allocation problems arising in supply chain management, and transportation problems arising in distribution management in particular, such as the vehicle routing problem and others. The sixth and final chapter presents a short list of new trends in supply chain management with a discussion of the related challenges that each new trend might bring along in the immediate to near future.

Features
- Provides the results of research from the last 6-12 months, which has not yet been published in book form
- Offers experience in dealing with advanced algorithms for some of the most challenging problems in supply chain design and management
- Includes a number of case studies

Fields of interest
- Engineering Economics, Organization, Logistics, Marketing; Production/Logistics/Supply Chain Management; Algorithms

Target groups
- Research

Type of publication
- Monograph

Due October 2011

2012. XII, 412 p. 98 illus., 19 in color. Hardcover

- approx. € 129.95 | £99.95
- approx. * € (D) 139.05 | € (A) 142.94 | sFr 186.50
ISBN 978-3-642-27623-7
Energy Pellets
Technology and Applications

This book provides a practical description of the technology of pellet production on the basis of renewable sources as well as the utilization of pellets. The author explains what kinds of biomass are usable in addition to wood, how to produce pellets and how to use pellets to produce energy. Starting with the basics of combustion, gasification and the pelletizing process, several different technologies are described. The design, planning, construction and economic efficiency are discussed as well. The appendix gives useful advice about plant concepts, calculations, addresses, conversion tables and formulas.

Features
▶ A compendium of pellets production ▶ Gives advice how to use pellets ▶ Written by an expert

Contents
1. Introduction.- 2 Biomasses for Pellet Production.- 3 Combustion Characteristics.- 4 Legal Requirements for Using Wood Pellets for Providing Heat.- 5 Fuel Quality.- 6 Wood Pellet Production.- 7 Using Wood Pellets as an Energy Source.- 8 Protection against Fire and Explosions.- 9 Profitability of Pellet Boilers.- 10 Research and Development.- Appendix.- Subject Index

Fields of interest
Renewable Energy Sources; Renewable and Green Energy; Industrial and Production Engineering

Target groups
Professional/practitioner

Type of publication
Professional book

W. C. Emmens, University of Twente, Enschede, The Netherlands

Formability
A Review of Parameters and Processes that Control, Limit or Enhance the Formability of Sheet Metal

Features
▶ Overview of materials and treatment aspects of manufacturability of sheet metal ▶ Written by an industrial expert turned scientist ▶ Concentrates on the formability of sheet metal, one of the fundamental form material is used in metalworking

Contents

Fields of interest
Operating Procedures, Materials Treatment; Metallic Materials; Continuum Mechanics and Mechanics of Materials

Target groups
Research

Type of publication
Monograph

S. Döring, PLANT Engineering GmbH, Neuwied, Germany

ECG Signal Processing, Classification and Interpretation
A Comprehensive Framework of Computational Intelligence

The book shows how the various paradigms of computational intelligence, employed either singly or in combination, can produce an effective structure for obtaining often vital information from ECG signals. The text is self-contained, addressing concepts, methodology, algorithms, and case studies and applications, providing the reader with the necessary background augmented with step-by-step explanation of the more advanced concepts. It is structured in three parts: Part I covers the fundamental ideas of computational intelligence together with the relevant principles of data acquisition, morphology and use in diagnosis; Part II deals with techniques and models of computational intelligence that are suitable for signal processing; and Part III details ECG system-diagnostic interpretation and knowledge acquisition architectures. Illustrative material includes: brief numerical experiments; detailed schemes, exercises and more advanced problems.

Features
▶ Shows the research how to combine various computational intelligence techniques to obtain more information from biological signals ▶ Meshing of material from engineering and clinical sources ensures comprehensive and appropriately balanced coverage ▶ Application of the ideas in this book will allow instrumentation engineers to help clinicians to improve diagnosis based on electrocardiogramatic results

Fields of interest
Biomedical Engineering; Signal, Image and Speech Processing; Cardiology

Target groups
Research

Type of publication
Monograph

A. Gacek, Institute of Medical Technology and Equipment, Zabrze, Poland; W. Pedrycz, University of Alberta, Edmonton, Alberta, AB, Canada (Eds.)

Due November 2011

2012. 250 p. Hardcover
▶ approx. € 99,95 | £90.00
▶ approx. * € (D) 106,95 | € (A) 109,95 | sFr 143,50
ISBN 978-3-642-19961-5

Due July 2011

2011. 100 p. 60 illus. (SpringerBriefs in Applied Sciences and Technology) Hardcover
▶ € 49,95 | £44,99
▶ * € (D) 53,45 | € (A) 54,95 | sFr 72,00
ISBN 978-3-642-21903-0

Due September 2011

2011. XX, 303 p. 95 illus., 54 in color. Hardcover
▶ approx. € 129,95 | £117.00
▶ approx. * € (D) 139,05 | € (A) 142,94 | sFr 186,50
ISBN 978-3-642-21969-7
Supply Chain Disruptions: Theory and Practice of Managing Risk

One of the most critical issues facing supply chain managers in today’s globalized and highly uncertain business environments is how to deal proactively with disruptions that might affect the complicated supply networks characterizing modern enterprises. Supply Chain Disruptions: Theory and Practice of Managing Risk presents a state-of-the-art perspective on this particular issue. Supply Chain Disruptions: Theory and Practice of Managing Risk demonstrates that effective management of supply disruptions necessitates both strategic and tactical measures – the former involving optimal design of supply networks; the latter involving inventory, finance and demand management. It shows that managers ought to use all available levers at their disposal throughout the supply network – like sourcing and pricing strategies, providing financial subsidies, encouraging information sharing and incentive alignment between supply chain partners – in order to tackle supply disruptions. The editors combine up-to-date academic research with the latest operational risk management practices used in industry to demonstrate how theoreticians and practitioners can learn from each other.

Mathematical Modeling

This textbook makes the difference whether one can see the whole picture of something or not. In its two parts, the book gives a complete overview of the spectrum of modeling techniques, basic modeling methods, and modeling solutions. Part I is focused on the explanation of basic modeling concepts based on analytical methods. Part II is focused on the introduction of simulation methods used for the solution of research problems. “Mathematical Modeling” provides: A complete range: The textbook covers continuously the complete range of basic modeling techniques: it provides a consistent transition from simple algebraic analysis methods to simulation methods used for research. Such an overview of the spectrum of modeling techniques is very helpful for the understanding, and it enables applications to research problems. Complete methods: Real-world processes always involve uncertainty, and the consideration of randomness is often relevant. Many students know deterministic methods, but they do not have access to stochastic methods because they cannot follow advanced textbooks on probability theory. The book develops consistently both deterministic and stochastic methods. In particular, it will be shown how deterministic methods are generalized by stochastic methods. Complete solutions: A bridge between empirical modeling and ‘first-principle’ methods. The book explains how the principles of modeling can be used to generalize empirical assumptions.

Cusped Shell-Like Structures

The book is devoted to an up-to-date exploratory survey of results concerning elastic cusped shells, plates, and beams and cusped prismatic shell-fluid interaction problems. It contains some up to now non-published results as well. Mathematically the corresponding problems lead to non-classical, in general, boundary value and initial-boundary value problems for governing degenerate elliptic and hyperbolic systems in static and dynamical cases, respectively. Its uses two fundamentally different approaches of investigation: 1) to get results for two-dimensional and one-dimensional problems from results of the corresponding three-dimensional problems and 2) to investigate directly governing degenerate and singular systems of 2D and 1D problems. In both the cases, it is important to study relation of 2D and 1D problems to 3D problems.

Features
► Presents an exploratory survey of elastic cusped shells, plates, and beams and cusped prismatic shell-fluid interaction problems

Contents
Introduction.- Geometry of Structures under consideration.- Hierarchical Models.- Cusped Shells and Plates.- Cusped Beams.- Relations of 3D, 2D, and 1D Problems.- Cusped Prismatic Shell-Fluid Interaction Problems

Fields of interest
Continuum Mechanics and Mechanics of Materials; Computational Science and Engineering; Mechanics

Type of publication
SpringerBriefs

Target groups
Research

Target groups
Graduate

Type of publication
Graduate/Advanced undergraduate textbook
Synchronization Techniques for Chaotic Communication Systems

Since the early 1990s, when synchronization of chaotic communication systems became a popular research subject, a vast number of scientific papers have been published. However, most of today's books on chaotic communication systems deal exclusively with the systems where perfect synchronization is assumed, an assumption which separates theoretical from practical, real world, systems. This book is the first of its kind dealing exclusively with the synchronization techniques for chaotic communication systems. It describes a number of novel robust synchronization techniques, which there is a lack of, for single and multi-user chaotic communication systems published and highly cited in world's leading journals in the area. In particular, it presents a solution to the problem of robust chaotic synchronization by presenting the first fully synchronized, highly secure, chaos based DS-CDMA system.

Features
- First book exclusively dealing with the Synchronization Techniques for Chaotic Communication Systems
- Presents the first fully synchronized, highly secure, chaos based DS-CDMA system
- Written by a leading expert in the field

Contents
From the content: Introduction to multi-user mobile communication systems. - Chaotic signals and their use in secure communications. - Chaotic synchronization, conditional Lyapunov exponents and Lyapunov's direct method. - Chaotic synchronization of maps. - A novel mathematical analysis for predicting master-slave chaotic synchronization. - Application of chaotic synchronization to secure communications.

Fields of interest
Communications Engineering, Networks; Complexity; Electrical Engineering

Target groups
Research

Type of publication
Monograph

Sustainable and Safe Nuclear Fission Energy

Technology and Safety of Fast and Thermal Nuclear Reactors

Unlike existing books of nuclear reactor physics, nuclear engineering and nuclear chemical engineering this book covers a complete description and evaluation of nuclear fission power generation. It covers the whole nuclear fuel cycle, from the extraction of natural uranium from ore mines, uranium conversion and enrichment up to the fabrication of fuel elements for the cores of various types of fission reactors. This is followed by the description of the different fuel cycle options and the final storage in nuclear waste repositories. In addition the release of radioactivity under normal and possible accidental conditions is given for all parts of the nuclear fuel cycle and especially for the different fission reactor types.

Features
- Written by one of the world-leading specialists in reactor physics and safety
- Most comprehensive book on nuclear fission technology, new safety concepts and waste disposal
- Complete description and evaluation of nuclear fission power generation

Contents
Nuclear reactors operating in the world by 2010. - Reactor physics needed for understanding of fission reactors. - Nuclear fuel supply. - Uranium enrichment. - Fission reactors with thermal neutron spectrum. - Breeder reactors with fast neutron spectrum.

Fields of interest
Nuclear Engineering; Particle and Nuclear Physics; Waste Management/Waste Technology

Target groups
Research

Type of publication
Monograph

Smart Power Grids 2011

Electric power systems are experiencing significant changes at the worldwide scale in order to become cleaner, smarter, and more reliable. This edited book examines a wide range of topics related to these changes, which are primarily caused by the introduction of information technologies, renewable energy penetration, digitalized equipment, new operational strategies, and so forth. The emphasis will be put on the modeling and control of smart grid systems. The book addresses research topics such as high efficiency transformers, wind turbines and generators, fuel cells, or high speed turbines and generators.

Features
- First book presenting modelling and control of smart grid systems
- Presents new developments in electric powers systems making them cleaner, smarter and more reliable

Contents

Fields of interest
Power Electronics, Electrical Machines and Networks; Renewable Energy Sources; Computational Intelligence

Target groups
Research

Type of publication
Monograph
N. I. Kolev, Framatome-ANP, Erlangen, Germany

**Multiphase Flow Dynamics 3**

**Thermal Interactions**

Volume 2 is devoted to these important constitutive relations for mathematical description of the mechanical and thermal interactions. The structure of the volume is in fact a state-of-the-art review and selection of the best available approaches for describing interfacial transfer processes. In many cases the original contribution of the author is incorporated in the overall presentation. The most important aspects of the presentation are that it stems from the author’s long years of experience developing computer codes. The emphasis is on the practical use of these relationships: either as stand-alone estimation methods or within a frame-work of computer codes.

**Features**
- Thermal Interactions of multiphase dynamics are provided
- Presents an introduction to thermal interactions in multiphase flow
- This fourth edition includes various updates, extensions and improvements in all book chapters

**Contents**
- Nucleation in liquids
- Bubble growth in superheated liquid
- Condensation of a pure steam bubble in a subcooled liquid
- Bubble departure diameter
- Bubble dynamics in single component fluid
- How accurately can we predict nucleate boiling?
- Heterogeneous nucleation and flashing in adiabatic pipes
- Boiling of subcooled liquid
- Natural convection film boiling
- Forced convection boiling
- Film boiling on vertical plates and spheres
- Liquid droplets
- Heat and mass transfer at the film-gas interface
- Condensation at cooled walls
- Discrete ordinate method for radiation transport in multi-phase computer codes
- Validation of multi-phase flow models

**Fields of interest**
- Engineering Fluid Dynamics; Engineering Thermodynamics; Heat and Mass Transfer; Fluid- and Aerodynamics

**Target groups**
- Research

**Type of publication**
- Monograph

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M. Köppen, Kyushu Institute of Technology, Fukuoka, Japan; G. Schaefer, Aston University, Birmingham, UK; A. Abraham, Machine Intelligence Research Labs (MIR Labs), Auburn, WA, USA (Eds.)

**Intelligent Computational Optimization in Engineering**

**Techniques & Applications**

We often come across computational optimization virtually in all branches of engineering and industry. Many engineering problems involve heuristic search and optimization and, once discretized, may become combinatorial in nature, which gives rise to certain difficulties in terms of solution procedure. Some of these problems have enormous search spaces, are NP-hard and hence require heuristic solution techniques. Another difficulty is the lack of ability of classical solution techniques to determine appropriate optima of non-convex problems. Under these conditions, recent advances in computational optimization techniques have been shown to be advantageous and successful compared to classical approaches. This Volume presents some of the latest developments with a focus on the design of algorithms for computational optimization and their applications in practice. Through the chapters of this book, researchers and practitioners share their experience and newest methodologies with regard to intelligent optimization and provide various case studies of the application of intelligent optimization techniques in real-world applications.

**Features**
- Reports recent research results on intelligent computational optimization techniques in engineering
- Written by leading experts in this field
- State-of-the-Art book

**Contents**
- Part I Frameworks
- Part II Algorithm Integration
- Part III Applications

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

**Target groups**
- Research

**Type of publication**
- Monograph

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M. Kreimeyer, MAN Truck & Bus AG, Munich, Germany; U. Lindemann, Technical University Munich, Germany

**Complexity Metrics in Engineering Design**

**Managing the Structure of Design Processes**

This book presents the results of several years’ research work on how to characterize complexity in engineering design with a specific regard to dependency modeling. The 52 complexity metrics that are presented show different facets of how complexity takes shape in design processes. The metrics are supported by a modeling method and a measurement framework to employ the metrics in a goal-oriented manner. The detailed description of all involved metrics and models makes it possible to apply the analysis approach to common process modeling methodologies. Three case studies from automotive process management illustrate the application to facilitate the transfer to other cases in an industrial context.

**Features**
- Extensive description of all involved models makes it possible to apply the analysis approach to all common process modeling methodologies
- Three detailed case studies to exemplify the application to facilitate the transfer to other cases
- The comprehensive appendix with all details and checklists for structural analysis provides a complete overview of current means of structural analysis

**Contents**
- Introduction: Focus of this research
- The foundations of complexity metrics
- Concept of a structural measurement system for engineering design processes
- Modeling the structure of engineering design processes
- Complexity Metrics for Design Processes
- The S-GQM framework to select metrics
- Industrial application of metrics
- Conclusions and outlook
- References
- Appendix
- Keyword index

**Fields of interest**
- Complexity; Engineering Design; Computer-Aided Engineering (CAD, CAE) and Design

**Target groups**
- Professional/practitioner

**Type of publication**
- Monograph
Reliability Engineering
Basic Concepts and Applications in ICT

This book gives a practical guide for designers and users in Information and Communication Technology context. In particular, in the first Section, the definition of the fundamental terms according to the international standards are given. Then, some theoretical concepts and reliability models are presented in Chapters 2 and 3: the aim is to evaluate performance for components and systems and reliability growth. Chapter 4, by introducing the laboratory tests, puts in evidence the reliability concept from the experimental point of view. In ICT context, the failure rate for a given system can be evaluate by means of specific reliability prediction handbooks; this aspect is considered in Chapter 5, with practical applications. In Chapters 6, 7 and 8, the more complex aspects regarding both the Maintainability, Availability and Dependability are taken into account; in particular, some fundamental techniques such as FMECA (Failure Mode, Effects, and Criticality Analysis) and FTA (Fault Tree Analysis) are presented with examples for reparable systems.

Features
► Gives a practical guide for designers and users in ICT context  
► Shows the evaluation of the performance for components and systems  
► Includes a reliability concept from the experimental point of view  
► Covers also more complex aspects regarding the Maintainability, Availability and Dependability

Contents

Fields of interest
Quality Control, Reliability, Safety and Risk; Organization/Planning; Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences

Target groups
Professional/practitioner

Type of publication
Professional book

Available
2011. 200 p. Hardcover  
► € 79,95 | £72.00  
► *€ (D) 85,55 | € (A) 87,95 | sFr 115,00  
ISBN 978-3-642-20982-6

3D TCAD Simulation for Semiconductor Processes, Devices and Optoelectronics

Technology computer-aided design, or TCAD, is critical to today’s semiconductor technology and anybody working in this industry needs to know something about TCAD. This book is about how to use computer software to manufacture and test virtually semiconductor devices in 3D. It brings to life the topic of semiconductor device physics, with a hands-on, tutorial approach that de-emphasizes abstract physics and equations and emphasizes real practice and extensive illustrations. Coverage includes a comprehensive library of devices, representing the state of the art technology, such as SuperJunction LDMOS, GaN LED devices, etc.

Features
► Provides a vivid, internal view of semiconductor devices, through 3D TCAD simulation  
► Includes comprehensive coverage of TCAD simulations for both optic and electronic devices, from nano-scale to high-voltage high-power devices  
► Presents material in a hands-on, tutorial fashion so that industry practitioners will find maximum utility  
► Includes a comprehensive library of devices, representing the state of the art technology, such as SuperJunction LDMOS, GaN LED devices, etc.

Contents

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

Target groups
Research

Type of publication
Professional book

Available
2012. XII. 288 p. Hardcover  
► € 89,95 | £81.00  
► *€ (D) 96,75 | € (A) 98,95 | sFr 129,00  
ISBN 978-3-642-30080-4
Parallel Genetic Algorithms
Theory and Real World Applications

This book is the result of several years of research trying to better characterize parallel genetic algorithms (pGAs) as a powerful tool for optimization, search, and learning. Readers can learn how to solve complex tasks by reducing their high computational times. Dealing with two scientific fields (parallelism and GAs) is always difficult, and the book seeks at gracefully introducing from basic concepts to advanced topics. The presentation is structured in three parts. The first one is targeted to the algorithms themselves, discussing their components, the physical parallelism, and best practices in using and evaluating them. A second part deals with the theory for pGAs, with an eye on theory-to-practice issues. A final third part offers a very wide study of pGAs as practical problem solvers, addressing domains such as natural language processing, circuits design, scheduling, and genomics. This volume will be helpful both for researchers and practitioners. The first part shows pGAs to either beginners and mature researchers looking for a unified view of the two fields: GAs and parallelism. The second part partially solves (and also opens) new investigation lines in theory of pGAs. The third part can be accessed independently for readers interested in applications. The result is an excellent source of information on the state of the art and future developments in parallel GAs.

Features
- Presents theory and applications of Parallel Genetic Algorithms
- Written by leading experts in this field
- State-of-the-Art book

Contents

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

Target groups
Research

Type of publication
Monograph

Due July 2011

2010. 190 p. (Studies in Computational Intelligence, Volume 367) Hardcover
- approx. € 99,95 | £90.00
- approx. $ (D) 106.95 | $ (A) 109,95 | sFr 143,50
ISBN 978-3-642-22083-8

Commercial-Industrial Cleaning, by Pressure-Washing, Hydro-Blasting and UHP-Jetting

The Business Operating Model and How-To Manual for 450 Specific Applications

Commercial-Industrial Cleaning, by Pressure-Washing, Hydro-Blasting and UHP-Jetting is the first proprietary manual for cleaning and rehabilitation through pressure-washing, hydro-blasting and ultra high pressure water jetting (UHP). It examines the cleaning, restoration and rehabilitation of statutory and historical structures; manufacturing hardware; and application technologies for residential, commercial and industrial areas, structures and buildings. Commercial-Industrial Cleaning, by Pressure-Washing, Hydro-Blasting and UHP-Jetting contains over 450 applications from agricultural, marine, municipal, food processing, paper-pulp, pharmaceutical and cosmetic, industrial and power generating maintenance areas. It includes gear lists to help readers easily identify the appropriate tooling and equipment for each specific application and industry. Commercial-Industrial Cleaning, by Pressure-Washing, Hydro-Blasting and UHP-Jetting supplies readers with the tools to create a successful business model for retaining and safeguarding corporate application itineraries.

Features
- Gives access to over 400 application procedures
- Covers 24 commercial-industrial sectors
- Provides analytical job identifications facilitating the constant upgrade of manual content

Contents

Fields of interest
Operating Procedures, Materials Treatment; Building Repair and Maintenance

Target groups
Professional/practitioner

Type of publication
Monograph

Due November 2011

2012. XII. 908 p. 549 illus. Hardcover
- approx. € 199,95 | £180.00
- approx. $ (D) 213,95 | $ (A) 219,94 | sFr 287,00
ISBN 978-0-85729-814-4

Nonlinear and Complex Dynamics

Applications in Physical, Biological, and Financial Systems

Nonlinear Dynamics of Complex Systems describes chaos, fractal and stochastics within celestial mechanics, financial systems and biochemical systems. Part I discusses methods and applications in celestial systems and new results in such areas as low energy impact dynamics, low-thrust planar trajectories to the moon and earth-to-halo transfers in the sun, earth and moon. Part II presents the dynamics of complex systems including bio-systems, neural systems, chemical systems and hydro-dynamical systems. Finally, Part III covers economic and financial systems including market uncertainty, inflation, economic activity and foreign competition and the role of nonlinear dynamics in each.

Features
- Presents, for the first time in one volume, methods and applications that can be used to analyze celestial systems
- Shows how nonlinear dynamics can be used to analyze complex biological systems and address problems such as waste disposal, the biological impact of transportation systems on oceans, and predicting climate zone fluctuations and potential impacts on farming and other agricultural activities
- Discusses the role that dynamics and complex systems play in the economy and financial systems especially as related to inflation, international markets and uncertainty

Fields of interest
Vibration, Dynamical Systems, Control; Mechanics; Complexity

Target groups
Research

Type of publication
Monograph

Due September 2011

2011. V. 301 p. 129 illus., 54 in color. Hardcover
- € 129,95 | £117.00
- $ (D) 139,05 | $ (A) 142,94 | sFr 186,50
Rational Ethics

Studies in Applied Philosophy, Epistemology and Rational Ethics
Series editor: L. Magnani

Studies in Applied Philosophy, Epistemology and Rational Ethics (SAPERE) publish new developments and advances in all the fields of philosophy, epistemology, and ethics, and bring them together with a cluster of scientific disciplines and technological outcomes: ranging from computer science to life sciences, from economics, law, and education to engineering, logic, and mathematics, from medicine to physics, human sciences, and politics. The series aims at covering all the challenging philosophical and ethical themes of contemporary society, making them appropriately applicable to contemporary theoretical and practical problems, impasses, controversies, and conflicts.

Our scientific and technological era has offered “new” topics to all areas of philosophy and ethics – for instance concerning scientific rationality, creativity, human and artificial intelligence, social and folk epistemology, ordinary reasoning, cognitive niches and cultural evolution, ecological crisis, ecologically situated rationality, consciousness, freedom and responsibility, human identity and uniqueness, cooperation, altruism, intersubjectivity and empathy, spirituality, violence. The impact of such topics has been mainly undermined by contemporary cultural settings, whereas they should increase the demand of interdisciplinary applied knowledge and fresh and original understanding. In turn, traditional philosophical and ethical themes have been profoundly affected and transformed as well: they should be further examined as embedded and applied within their scientific and technological environments so to update their received and often old-fashioned disciplinary treatment and appeal. Applying philosophy individuates therefore a new research commitment for the 21st century, focused on the main problems of recent methodological, logical, epistemological, and cognitive aspects of modeling activities employed both in intellectual and scientific discovery, and in technological innovation, including the computational tools intertwined with such practices, to understand them in a wide and integrated perspective.

L. Magnani, University of Pavia, Italy

Understanding Violence

The Intertwining of Morality, Religion and Violence: A Philosophical Stance

This volume sets out to give a philosophical “applied” account of violence, engaged with both empirical and theoretical debates in other disciplines such as cognitive science, sociology, psychiatry, anthropology, political theory, evolutionary biology, and theology. The book’s primary thesis is that violence is inescapably intertwined with morality and typically enacted for “moral” reasons. To show this, the book compellingly demonstrates how morality operates to trigger and justify violence and how people, in their violent behaviors, can engage and disengage with discrete moralities. The author’s fundamental account of language, and in particular its normative aspects, is particularly insightful as regards extending the range of what is to be understood as violence beyond the domain of physical harm. By employing concepts such as “coalition enforcement”, “moral bubbles”, “cognitive niches”, “over-moralization”, “military intelligence” and so on, the book aims to spell out how perpetrators and victims of violence systematically disagree about the very nature of violence.

Features

▶ Explores the problem of violence, an important but neglected topic of philosophical tradition
▶ Increases knowledge about the role of morality in violence

Contents


Fields of interest

Computational Intelligence; Ethics; Philosophy of Man

Target groups

Research

Type of publication

Monograph

New Concepts in Autonomous Robotic Map Representations

Random Finite Sets for Robot Mapping & SLAM

The monograph written by John Mullen, Ba-Ngu Vo, Martin Adams and Ba-Tuong Vo is devoted to the field of autonomous robot systems, which have been receiving a great deal of attention by the research community in the latest few years. The contents are focused on the problem of representing the environment and its uncertainty in terms of feature based maps. Random Finite Sets are adopted as the fundamental tool to represent a map, and a general framework is proposed for feature management, data association and state estimation. The approaches are tested in a number of experiments on both ground based and marine based facilities.

Features

▶ First book on the use of random finite sets (RFS) and finite set statistics (FISST) in robotics
▶ Focuses on a critical area of autonomous robotic research - the representation of the environment and its uncertainty
▶ Written by leading experts in the field

Contents


Fields of interest

Robotics and Automation; Artificial Intelligence (incl. Robotics)

Target groups

Research

Type of publication

Monograph
Ultra-Wideband Radio Frequency Identification Systems

Ultra-Wideband Radio Frequency Identification Systems describes the essentials of radio frequency identification systems as well as their target markets. The authors provide a study of commercially available RFID systems and characterize their performance in terms of read range and reliability in the presence of conductive and dielectric materials. The capabilities and limitations of some commercial RFID systems are reported followed by comprehensive discussions of the advantages and challenges of using ultra-wideband technology for tag/reader communications. The book presents practical aspects of UWB RFID system such as: pulse generation, remote powering, tag and reader antenna design, as well as special applications of UWB RFID in a simple and easy-to-understand language.

Features
► Offers a comprehensive overview of RFID systems, tag and reader communications, classification of tags, tag/reader antennas, tag/reader networks as well as RFID applications ► Provides a comparative analysis of commercially off the shelf (COTS) RFID systems and emphasizes on strengths and weaknesses of each for specific applications ► Offers a comprehensive bibliography at the end of each chapter

Contents
1: Basics of radio frequency identification (RFID) systems. 2: Characteristics and limitations of conventional RFID systems. 3: Improvements in RFID physical layer using ultra-wideband signals. 4: Ultra-wideband technology for RF tags: concepts, implementations, and regulations. 5: Antenna design for ultra-wideband passive RFID systems. 6: RF tags for special applications.

Fields of interest
Signal, Image and Speech Processing; Microwaves; RF and Optical Engineering; Communications Engineering, Networks

Target groups
Professional/practitioner

Type of publication
Professional book

Due August 2011
2011. 235 p. 120 illus. Hardcover
► approx. 100,10 | 118,50
► approx. € (D) 107,11 | € (A) 110,11 | sFr 216,00

Forensic Speaker Recognition:
Law Enforcement and Counter-Terrorism

Forensic Speaker Recognition: Law Enforcement and Counter-Terrorism is an anthology of the research findings of 35 speaker recognition experts from around the world. The volume provides a multidimensional view of the complex science involved in determining whether a suspect’s voice truly matches forensic speech samples, collected by law enforcement and counter-terrorism agencies, that are associated with the commission of a terrorist act or other crimes. While addressing such topics as the challenges of forensic case work, handling speech signal degradation, analyzing features of speaker recognition to optimize voice verification system performance, and designing voice applications that meet the practical needs of law enforcement and counter-terrorism agencies, this material all sounds a common theme: how the rigors of forensic utility are demanding new levels of excellence in all aspects of speaker recognition. The contributors are among the most eminent scientists in speech engineering and signal processing; and their work represents such diverse countries as Switzerland, Sweden, Italy, France, Japan, India and the United States.

Speaker recognition is a useful book for forensic speech scientists, speech signal processing experts, system speech developers, criminal prosecutors and counter-terrorism intelligence officers and agents.

Features
► Presents case studies about new methods of forensic speaker recognition for combating crime and detecting threats to security ► Includes an analysis of the constraints posed by noisy texts in today’s mobile environments ► Introduces Sequence Package Analysis (SPA) for performing speaker verification in stressed environments

Fields of interest
Signal, Image and Speech Processing; Language Translation and Linguistics; Linguistics (General)

Target groups
Research

Type of publication
Monograph

Due September 2011
► 169,95 | £153.00
► approx. € (D) 181,85 | € (A) 186,94 | sFr 244,00
ISBN 978-3-642-21383-0

Advances in Distributed Agent-Based Retrieval Tools

This volume contains revised and extended versions of papers presented at the 4th edition of the international workshop on Distributed and Agent-based Retrieval Tools (DART’10) held in June 2010, in conjunction with the Symposium on Human Language Technology for the Information Society, in Geneva, Switzerland. Practitioners and researchers working on pervasive and intelligent access to web services and distributed information retrieval met to share their results and insights in intriguing and challenging topics such as: (i) social media and collaboration, (ii) new challenges in search technology, (iii) sentiment analysis and opinion mining, (iv) distributed information retrieval, (v) pervasive intelligence. Every chapter, before discussing in depth the specific topic, presents a comprehensive review of related work and state of the art, in the hope of this volume to be of use in the years to come, to both researchers and students.

Features
► Recent Research in Distributed Agent-Based Retrieval Tools ► Post Proceedings Book of the 4th International Workshop DART 2010, Geneva, Switzerland, June 18, 2010 ► Written by Leading Experts in the Field

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

Target groups
Research

Type of publication
Monograph

Due June 2011
2011. 182 p. (Studies in Computational Intelligence, Volume 361) Hardcover
► 106,95 | £109,95 | sFr 143,50
► approx. € (D) 106,95 | € (A) 109,95 | sFr 143,50
ISBN 978-3-642-21384-7

V. Pallotta, University of Fribourg, Switzerland; A. Soro, CRIS4, Pula, Italy; E. Vargiu, University of Cagliari, Italy (Eds.)
Digital Imaging Handbook

Digital Imaging Handbook targets anyone with an interest in digital imaging, professional or private, who uses even quite modest equipment such as a PC, digital camera and scanner, a graphics editor such as PAINT, and an inkjet printer. Uniquely, it is intended to fill the gap between the highly technical texts for academics (with access to expensive equipment), and the superficial introductions for amateurs. The four-part treatment spans theory, technology, programs and practice. Theory covers integer arithmetic, additive and subtractive color, greyscales, computational geometry, and a new presentation of discrete Fourier analysis; Technology considers bitmap file structures, scanners, digital cameras, graphic editors, and inkjet printers; Programs develops several processing tools for use in conjunction with a standard Paint graphics editor and supplementary processing tools; Practice discusses 1-bit, greyscale, 4-bit, 8-bit, and 24-bit images for the practice section. Relevant QBASIC code is supplied an accompanying CD and algorithms are listed in the appendix. Readers can attain a level of understanding and the practical insights to obtain optimal use and satisfaction from even the most basic digital-imaging equipment.

Features
► Most comprehensive handbook on digital image processing ► Provides additional information on theory and applications ► Readers can attain a level of understanding and the practical insights to obtain optimal use and satisfaction from even the most basic digital-imaging equipment

Fields of interest
Signal, Image and Speech Processing; Image Processing and Computer Vision; Engineering, general

Target groups
Research

Type of publication
Handbook

Due October 2011

Structural Health Monitoring Using Genetic Fuzzy Systems

Structural health monitoring (SHM) has emerged as a prominent research area in recent years owing to increasing concerns about structural safety, and the need to monitor and extend the lives of existing structures. Structural Health Monitoring Using Genetic Fuzzy Systems elaborates the process of intelligent SHM development and implementation using the evolutionary system. The use of a genetic algorithm automates the development of the fuzzy system, and makes the method easy to use for problems involving a large number of measurements, damage locations and sizes; such problems being typical of SHM. The ideas behind fuzzy logic, genetic algorithms and genetic fuzzy systems are also explained. The functionality of the genetic fuzzy system architecture is elucidated within a case-study framework, covering: SHM of beams; SHM of composite tubes; and SHM of helicopter rotor blades. Structural Health Monitoring Using Genetic Fuzzy Systems will be useful for aerospace, civil and mechanical engineers working with structures and structured components. It will also be useful for computer scientists and applied mathematicians interested in the application of genetic fuzzy systems to engineering problems.

Features
► Demonstrates the application of genetic fuzzy systems to engineering problems, which will be of interest to computer scientists and applied mathematicians ► Provides the reader with information on the use of genetic fuzzy systems as a computational tool for solving structural health monitoring problems ► Examples provided in this book assist the reader in developing genetic fuzzy systems for new structures and aerospace systems

Fields of interest
Structural Mechanics; Signal, Image and Speech Processing; Aerospace Technology and Astronautics

Target groups
Research

Type of publication
Monograph

Due July 2011

Synthesis of Computational Structures for Analog Signal Processing

Synthesis of Computational Structures for Analog Signal Processing focuses on analysis and design of analog signal processing circuits. The author presents a multitude of design techniques for improving the performances of analog signal processing circuits, and proposes specific implementation strategies that can be used in CMOS technology. The author's discussion proceeds from the perspective of signal processing as it relates to analog. Included are coverage of low-power design, portable equipment, wireless nano-sensors and medical implantable devices. The material is especially appropriate for researchers and specialists in the area of analog and mixed-signal CMOS VLSI design, as well as postgraduate or Ph.D. students working on analog microelectronics.

Features
► Presents the most important classes of computational structures for analog signal processing, including differential or multiplier structures, squaring or square-rooting circuits, exponential or Euclidean distance structures and active resistor circuits ► Introduces the original concept of the multifunctional circuit, an active structure that is able to implement, starting from the same circuit core, a multitude of continuous mathematical functions ► Covers mathematical analysis, design and implementation of a multitude of function generator structures

Contents

Fields of interest
Signal, Image and Speech Processing; Circuits and Systems; Appl.Mathematics/Computational Methods of Engineering

Target groups
Research

Type of publication
Monograph

Due October 2011
Vibration Control of Active Structures
An Introduction

This text is an introduction to the dynamics of active structures and to the feedback control of lightly damped flexible structures; the emphasis is placed on basic issues and simple control strategies that work. Now in its third edition, more chapters have been added, and comments and feedback from readers have been taken into account, while at the same time the unique premise of bridging the gap between structure and control has remained. Many examples and problems bring the subject to life and take the audience from theory to practice. The book has chapters dealing with some concepts in structural dynamics; electromagnetic and piezoelectric transducers; piezoelectric beam, plate and truss; passive damping with piezoelectric transducers; collocated versus non-collocated control; active damping with collocated systems; vibration isolation; state space approach; analysis and synthesis in the frequency domain; optimal control; controllability and observability; stability; applications: tendon control of cable structures; active control of large telescopes; and semi-active control.

Features
► Third updated and expanded edition of this textbook
► Bridges the gap between structure and control
► Proven to be successful as a course text

Fields of interest
Vibration, Dynamical Systems, Control; Mechanical Engineering; Automotive Engineering

Target groups
Research

Type of publication
Graduate/Advanced undergraduate textbook

Digital Signal Processing in Power System Protection and Control

Digital Signal Processing in Power System Protection and Control bridges the gap between the theory of protection and control and the practical applications of protection equipment. Understanding how protection functions is crucial not only for equipment developers and manufacturers, but also for their users who need to install, set up and operate the protection devices in an appropriate manner. After introductory chapters related to protection technology and functions, Digital Signal Processing in Power System Protection and Control presents the digital algorithms for signal filtering, followed by measurement algorithms of the most commonly-used protection criteria values and decision-making methods in protective relays. A large part of the book is devoted to the basic theory and applications of artificial intelligence techniques for protection and control. Fuzzy logic based schemes, artificial neural networks, expert systems and genetic algorithms with their advantages and drawbacks are discussed. AI techniques are compared and it is also shown how they can be combined to eliminate the disadvantages and magnify the useful features of particular techniques.

Features
► Illustrates theory with many computational examples
► Includes examples of the application of algorithms for power system protection
► Pays particular attention to applications of those intelligent approaches and paradigms that have great potential for improving the operation of protective devices

Fields of interest
Signal, Image and Speech Processing; Energy Systems; Artificial Intelligence (incl. Robotics)

Target groups
Research

Type of publication
Monograph

Nonlinear Power Flow Control Design
Utilizing Exergy, Entropy, Static and Dynamic Stability, and Lyapunov Analysis

This book presents an innovative control system design process motivated by renewable energy electric grid integration problems. The concepts developed result from the convergence of research and development goals which have important concepts in common: exergy flow, limit cycles, and balance between competing power flows. A unique set of criteria is proposed to design controllers for a class of nonlinear systems. A combination of thermodynamics with Hamiltonian systems provides the theoretical foundation which is then realized in a series of connected case studies. It allows the process of control design to be viewed as a power flow control problem, balancing the power flowing into a system against that being dissipated within it and dependent on the power being stored in it – an interplay between kinetic and potential energies. Human factors and the sustainability of self-organizing systems are dealt with as advanced topics.

Features
► Shows the reader effective methods for integrating renewable and conventional sources of electricity into a power grid
► Integrates the effects of human interaction with energy grids
► Employs a combination of ideas from many disciplines to allow the reader to judge the amount of useful energy available at any one time

Fields of interest
Renewable Energy Sources; Communications Engineering, Networks; Control, Robotics, Mechatronics

Target groups
Research

Type of publication
Monograph

Due July 2011

For information regarding the Solutions Manual, please contact the Publishing Editor, Nathalie Jacobs, at nathalie.jacobs@springer.com

► approx. € 69,95 | £62.99
► approx. * € (D) 74,95 | € (A) 76,95 | sFr 100,50
ISBN 978-94-007-2032-9

Due August 2011

2011. XIV, 386 p. 165 illus., 27 in color. (Signals and Communication Technology) Hardcover
► approx. € 129,95 | £117.00
► approx. * € (D) 139,05 | € (A) 142,94 | sFr 186,50
ISBN 978-0-85729-801-0

Due September 2011

2011. XXXIV, 346 p. 274 illus., 134 in color. (Understanding Complex Systems) Hardcover
► approx. € 129,95 | £117.00
► approx. * € (D) 139,05 | € (A) 142,94 | sFr 186,50
Experience from the DARPA Urban Challenge

Experience from the DARPA Urban Challenge provides details of the types of systems, software and processes that were used to develop the complex unmanned vehicles that participated in the DARPA Urban Challenge. The vehicle developers explain how autonomous vehicle software in this race was designed and implemented. The chapters range from system and software architecture, navigation, path planning, steering, perception, engineering autonomous systems, and testing and performance evaluation. This book is based on papers from entrants in the Urban Challenge. The content is broken into five parts: an introduction to the DARPA Urban Challenge; systems and software architecture; navigation; control and sensors; and development and test. Experience from the DARPA Urban Challenge provides graduate students in robotics and engineering professionals with an insight into multiple ways of approaching the development of autonomous vehicles.

Features
► Provides a variety of approaches for developing unmanned navigational systems, which can be applied to a range of different projects ► Gives readers an understanding of how autonomous vehicle software is structured and how they might develop their own vehicles ► Written by selected experts in autonomous vehicles

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

Target groups
Research

Type of publication
Monograph

Due October 2011
2012. XX, 316 p. 159 illus., 12 in color. Hardcover
► approx. € 129,95 | £99.95
► approx. *€ (D) 139,45 | € (A) 142,95 | sFr 186,50

Mechanical Vibrations
Modeling and Measurement

Mechanical Vibrations: Modeling and Measurement describes essential concepts in vibration analysis of mechanical systems. It incorporates the required mathematics, experimental techniques, fundamentals of model analysis, and beam theory into a unified framework that is written to be accessible to undergraduate students, researchers, and practicing engineers. To unify the various concepts, a single experimental platform is used throughout the text. Engineering drawings for the platform are included in an appendix. Additionally, MATLAB programming solutions are integrated into the content throughout the text.

Features
► Discusses model development using frequency response function measurements ► Presents a clear connection between continuous beam models and discrete finite degree of freedom models ► Includes MATLAB code for numerical examples that is integrated in the text narrative ► Covers a single physical model that is used to demonstrate concepts throughout the text ► Uses mathematics to support the vibrations theory, and discusses and emphasizes the practical significance of the results

Contents

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

Target groups
Upper undergraduate

Type of publication
Graduate/Advanced undergraduate textbook

Due November 2011
2012. 120 p. 30 illus. (SpringerBriefs in Electrical and Computer Engineering / SpringerBriefs in Speech Technology) Softcover
► approx. € 49,95 | £44.99
► approx. *€ (D) 53,45 | € (A) 54,95 | sFr 72,00

Speech Processing and Soft Computing

Through practical cases, the author explores, dissects and examines how soft computing may complement conventional techniques in speech enhancement and speech recognition in order to provide robust systems. Includes coverage of synergy between speech technology and bio-inspired soft computing methods. The material is especially useful to graduate students and experienced researchers who are interested in expanding their horizon and in investigating new research directions through a review of the theoretical and practical settings of soft computing methods in very recent speech applications.

Features
► Focuses on the missing link between speech technology and soft computing ► Contains coverage of the innovative approaches in speech technology ► Gives new insights in speech recognition/enhancement obtained by investigating solutions beyond the statistical approach

From the contents

Fields of interest
Signal, Image and Speech Processing; User Interfaces and Human Computer Interaction; Computational Intelligence

Target groups
Research

Type of publication
SpringerBriefs

Due October 2011
► approx. € 74,95 | £66.99
► approx. *€ (D) 80,20 | € (A) 82,45 | sFr 105,50
ISBN 978-1-4419-0459-0

S. Selouani, Université de Moncton, Moncton, NB, Canada

C. Rouff, Lockheed Martin Advanced Technology Laboratories, Arlington, VA, USA; M. Hinchey, University of Limerick, Limerick, Ireland (Eds.)
A. Söbester, University of Southampton, Southampton, UK

Stratospheric Flight
Aeronautics at the Limit

In this book, the author reviews the science behind high altitude flight. He takes the reader on a journey that begins with the complex physiological questions involved in taking humans into the “death zone.” How does the body react to falling ambient pressure? Why is hypoxia (oxygen deficiency associated with low air pressure) so dangerous and why is it so difficult to “design out” of aircraft, why does it still cause fatalities in the 21st century? What cabin pressures are air passengers and military pilots exposed to and why is the choice of an appropriate range of values such a difficult problem? How do high altitude life support systems work and what happens if they fail? What happens if cabin pressure is lost suddenly or, even worse, slowly and unnoticed? The second part of the book tackles the aeronautical problems of flying in the upper atmosphere. What loads does stratospheric flight place on pressurized cabins at high altitude and why are these difficult to predict? What determines the maximum altitude an aircraft can climb to? What is the ‘coffin corner’ and how can it be avoided?

Features
- Includes actual accounts of famous and infa- mous flights and milestone events in the history of stratospheric flight
- Gives detailed analysis of the science behind stratospheric flight
- Conveys in a non-technical way the challenges and trade-offs of stratospheric flight
- Presents original research that debunks myths and clarifies many widely misunderstood facts and events

Fields of interest
Aerospace Technology and Aeronautics; Popular Science in Mathematics/Computer Science; Natural Science/Technology; Extraterrestrial Physics, Space Sciences

Target groups
Popular/general

Type of publication
Popular science

Due August 2011

A. Tewari, Indian Institute of Technology, Kanpur, India

Automatic Control of Atmospheric and Space Flight Vehicles
Design and Analysis with MATLAB® and Simulink®

Automatic Control of Atmospheric and Space Flight Vehicles is perhaps the first book on the market to present a unified and straightforward study of the design and analysis of automatic control systems for both atmospheric and space flight vehicles. Covering basic control theory and design concepts, it is meant as a textbook for senior undergraduate and graduate students in modern courses on flight control systems. The presentation is concise and easy to read, but does not sacrifice rigor. It includes abundant examples and exercises, with a particular focus on those that require programming. Meanwhile, the text makes extensive use of MATLAB®/Simulink® codes in the many solved examples for illustrating flight control design and analysis, giving the reader a hands-on experience with practical problems and making the book an even more useful and illuminating tool. For convenience, all the codes used are available for free download from the author’s website.

Features
- The first book with a unified approach to both atmospheric and space flight control systems
- Written in a concise and easy-to-read manner, but without sacrificing mathematical rigor
- Many practical examples, figures, and problems emphasize the underlying physical principles of many concepts
- For a broad audience of advanced undergraduates, graduate students, researchers, and practitioners
- Includes many end-of-chapter exercises and hands-on programming tools, with selected solutions in print and online (www.home.iitk.ac.in/~ashtew)

Fields of interest
Aerospace Technology and Aeronautics; Control, Robotics, Mechatronics; Systems Theory, Control

Target groups
Graduate

Type of publication
Graduate/Advanced undergraduate textbook

Due August 2011

B. Thomas, Fraunhofer IITB, Karlsruhe, Germany; A. Gnauck, BTU Cottbus, Germany; M. Jacob, TU Ilmenau, Germany; D. Karimanzira, Fraunhofer IITB, Ilmenau, Germany; O. Krol, Fraunhofer IITB, Karlsruhe, Germany; T. Pfützenreuter, T. Rauschenbach, B. Scharaw, Fraunhofer IITB, Ilmenau, Germany; T. Rauschenbach, Fraunhofer IITB, Ilmenau, Germany (Ed.)

Modelling, Control and Optimization of Water Systems
Systems Engineering Methods for Control and Decision Making Tasks

This book provides background knowledge on the development of model based real-world solutions in the field of control and decision making for water systems. It presents system engineering methods for modelling surface water and groundwater resources as well as water transportation systems (rivers, channels and pipelines). The models in turn provide information on both the water quantity (flow rates, water levels) of surface water and groundwater and water quality. In addition, methods for modelling and predicting water demand are described. Sample applications of the models are presented, such as a water allocation decision support system for semi-arid regions, a multiple-criteria control model for run-of-river hydropower plants and a supply network simulation for public services.

Features
- An approach for simulation of surface water and ground water systems which is different from the tradition hydrological approach
- The systems engineering approach is developed for control and decision making tasks

Contents

Fields of interest
Control; Hydrogeology; Structural Foundations, Hydraulic Engineering

Target groups
Research

Type of publication
Monograph

Due November 2011

2012. 300 p. Hardcover
- approx. £ 99.95 | £90.00
- approx. € 106.45 | € 109.95 | sFr 143.50
ISBN 978-3-642-16025-7
Principles of Spread-Spectrum Communication Systems

Principles of Spread-Spectrum Communication Systems, Second Edition provides a concise but lucid explanation of the fundamentals of spread-spectrum systems with an emphasis on theoretical principles. The choice of specific topics is tempered by the author's judgment of their practical significance and interest to both researchers and system designers. Throughout the book, learning is facilitated by many new or streamlined derivations of the classical theory. Problems at the end of each chapter are intended to assist readers in consolidating their knowledge and to provide practice in analytical techniques. The evolution of spread spectrum communication systems and the prominence of new mathematical methods in their design provided the motivation to undertake this new edition of the book. This edition is intended to enable readers to understand the current state-of-the-art in this field. More than 20 percent of the material in this edition is new, including a chapter on systems with iterative channel estimation, and the remainder of the material has been thoroughly revised.

Features
- Focuses on the fundamentals of spread spectrum communication systems and its use in commercial applications such as mobile cellular and satellite communications
- Includes problem sets for practice and class assignment
- Throughout book, learning is facilitated by many new or streamlined derivations of the classical theory

From the contents

Fields of interest
Communications Engineering, Networks; Coding and Information Theory; Signal, Image and Speech Processing

Target groups
Upper undergraduate

Type of publication
Graduate/Advanced undergraduate textbook

Due August 2011

Asynchronous Operators of Sequential Logic: Venjunction & Sequenton

Digital Circuit Analysis and Design

This book is dedicated to new mathematical instruments assigned for logical modeling of the memory of digital devices. The case in point is logic-dynamical operation named venjunction and venjunctive function as well as sequention and sequential function. Venjunction and sequention operate within the framework of sequential logic. In a form of the corresponding equations, they organically fit analytical expressions of Boolean algebra. Thus, a sort of symbiosis is formed using elements of asynchronous sequential logic on the one hand and combinational logic on the other hand. So, asynchronous logic is represented in the form of enhanced Boolean logic. The book contains initial concepts, fundamental definitions, statements, principles and rules needed for theoretical justification of the mathematical apparatus and its validity for asynchronous logic. Asynchronous operators named venjunct and sequent are designed for practical implementation. These basic elements are assigned for realizing of memory functions in sequential circuits. Present research work is the final stage of generalization and systematization of all those ideas and investigations, author’s interest to which alternately flashed up and faded over many years and for various reasons until formed “critical mass”, and all findings were arranged definitively as a mathematical basis of a theory appropriately associated under a common theme – asynchronous sequential logic, essentially classified as switching logic, which falls into category of algebraic logics.

Features
- Conceptually new research on digital circuits with memory
- Presents original mathematical instruments assigned for sequential circuits analysis
- Presents digital circuits design in practice on the basis of venjunctors and sequentors

Fields of interest
Circuits and Systems; Electrical Engineering

Target groups
Research

Type of publication
SpringerBriefs

Due July 2011

Near-Space Remote Sensing Potential and Challenges

Near-space is defined as the atmospheric region from about 20 kilometer (km) altitude to 100 km altitude above the Earth’s surface. It has received much attention in recent years and several types of near-space vehicles are currently being studied, developed, or employed. “Near-Space Remote Sensing: Potential and Challenges” concentrates mainly on the role of near-space vehicles in bridging the gap between satellites and airplanes for microwave remote sensing applications, providing a top-level system description and aiming to encourage further research. Further, this book also describes several potential applications such as passive surveillance, reconnaissance, and high resolution wide swath remote imaging. The book is intended for geographers, transportation engineers and other researchers involved in remote sensing development and applications, in particular for near-space vehicles. Wen-Qin Wang is an assistant professor at the School of Communication and Information Engineering, University of Electronic Science and Technology of China.

Contents

Fields of interest
Microwaves, RF and Optical Engineering; Signal, Image and Speech Processing; Remote Sensing/Photogrammetry

Target groups
Research

Type of publication
SpringerBriefs

Due September 2011

2nd ed. 2011. 562 p. 200 illus. Hardcover

£ 89.95 | £81.00
ISBN 978-1-4419-9594-0

Due July 2011

2011. 150 p. (Lecture Notes in Electrical Engineering, Volume 101) Hardcover

£ 99.95 | £90.00
ISBN 978-3-642-21610-7

Due September 2011

2011. 116 p. (SpringerBriefs in Electrical and Computer Engineering) Softcover

approx. € 49,95 | £44.99
ISBN 978-3-642-22187-3
Theory of Periodic Conjugate Heat Transfer

This book presents the theory of periodic conjugate heat transfer in a detailed way. The effects of thermophysical properties and geometry of a solid body on the commonly used and experimentally determined heat transfer coefficient are analytically presented from a general point of view. The main objective of the book is a simplified description of the interaction between a solid body and a fluid as a boundary value problem of the heat conduction equation for the solid body. At the body surface, the true heat transfer coefficient is composed of two parts: the true mean value resulting from the solution of the steady state heat transfer problem and a periodically variable part, the periodic time and length to describe the oscillatory hydrodynamic effects. The second edition is extended by (i) the analysis of stability boundaries in helium flow at supercritical conditions in a heated channel with respect to the interaction between a solid body and a fluid; (ii) a periodic model and a method of heat transfer simulation in a fluid at supercritical pressure and (iii) a periodic quantum-mechanical model for homogeneous vapor nucleation in a fluid with respect to nanoscale effects.

Features
- Gives a concise theoretical explanation of the theory of heat transfer
- Presents a simplified description of the interaction between a solid body and a fluid to design experiments and technology
- Displays all related models and theories

From the contents

Fields of interest
Engineering Thermodynamics, Heat and Mass Transfer; Appl.Mathematics/Computational Methods of Engineering; Energy Technology

Target groups
Research

Type of publication
Monograph

Due September 2011