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Generalized Continua as Models for Materials with Multi-scale Effects or Under Multi-field Actions

This volume presents contributions describing the micro- and macro-behaviours, new existence and uniqueness theorems, the formulation of multi-scale problems, etc. and now it is time to ponder again the state of matter and to discuss new trends and applications. The main focus is directed on the following items - Modelling and simulation of materials with significant microstructure, - Generalized continua as a result of multi-scale models, - Multi-field actions on materials resulting in generalized material models, and - Comparison with discrete modelling approaches

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Innovation By Design

Lessons from Post Box Design & Development

The book provides an in-depth knowledge on how a product is designed and developed by Product Designers. This has been achieved through a case study of one product – the Post Box. This product was chosen for the study primarily due to its simple and non-technical nature as that would make it easy for the readers to comprehend the design process. At the same time the Post Box posed all the challenges a designer would face while creating a new product. Through a step by step process the book gradually takes the reader through the design and development journey – right from understanding the product, identifying the user need through market research, comprehending client’s brief, [...]

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"During the last decades Computational Intelligence has emerged and showed its contributions in various broad research communities (computer science, engineering, finance, economic, decision making, etc.). This was done by proposing approaches and algorithms based either on turnkey techniques belonging to the large panoply of solutions offered by computational intelligence such as data mining, genetic algorithms, bio-inspired methods, Bayesian networks, machine learning, fuzzy logic, artificial neural networks, etc. or inspired by computational intelligence techniques to develop new ad-hoc algorithms for the problem under consideration. This volume is a comprehensive collection [...]

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C.B.K. Indian Institute of Technology Bombay, Mumbai, India; J. Krishnamoorthi

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Sound - Perception - Performance

Musical Performance covers many aspects like Musical Acoustics, Music Psychology, or motor and prosodic actions. It deals with basic concepts of the origin or music and its evolution, ranges over neurocognitive foundations, and covers computational, technological, or simulation solutions. This volume gives an overview about current research in the foundation of musical performance studies on all these levels. Recent concepts of synchronized systems, evolutionary concepts, basic understanding of performance as Gestalt patterns, theories of chill as performance goals or historical aspects are covered. The neurocognitive basis of motor action in terms of music, musical syntax, as well as [...]

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Forthcoming
G.R. Baran, Temple University, Philadelphia, USA; M.F. Kiani, Temple University, Philadelphia, USA; S.P. Samuel, Albert Einstein Medical Center, Philadelphia, USA

Healthcare and Biomedical Technology in the 21st Century
An Introduction for Non-Science Majors

Healthcare and Biotechnology in the 21st Century: Concepts and Case Studies introduces students not pursuing degrees in science or engineering to the remarkable new applications of technology now available to physicians and their patients and discusses how these technologies are evolving to permit new treatments and procedures. The book also elucidates the societal and ethical impacts of advances in medical technology, such as extending life and end of life decisions, the role of genetic testing, confidentiality, costs of health care delivery, scrutiny of scientific
claims, and provides background on the engineering approach in healthcare and the scientific method as a guiding[...]

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Erscheinungstermin: October 31, 2013


Model-Based Design of Adaptive Embedded Systems

This book describes model-based development of adaptive embedded systems, which enable improved functionality using the same resources. The techniques presented facilitate design from a higher level of abstraction, focusing on the problem domain rather than on the solution domain, thereby increasing development efficiency. Models are used to capture system specifications and to implement (manually or automatically) system functionality. The authors demonstrate the real impact of adaptivity on engineering of embedded systems by providing several industrial examples of the models used in the development of adaptive embedded systems.

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ISBN 978-1-4614-4820-4
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R.I. Borja, Stanford University, Stanford, USA

Plasticity
Modeling & Computation

There have been many excellent books written on the subject of plastic deformation in solids, but rarely can one find a textbook on this subject. "Plasticity Modeling & Computation" is a textbook written specifically for students who want to learn the theoretical, mathematical, and computational aspects of inelastic deformation in solids. It adopts a simple narrative style that is not mathematically overbearing, and has been written to emulate a professor giving a lecture on this subject inside a classroom. Each section is written to provide a balance between the relevant equations and the explanations behind them. Where relevant, sections end with one or more exercises designed to[...]

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R.I. Borja, Stanford University, Stanford, USA

Mechatronic Modeling of Real-Time Wheel-Rail Contact

Real-time simulations of the behaviour of a rail vehicle require realistic solutions of the wheel-rail contact problem which can work in a real-time mode. Examples of such solutions for the online mode have been well known and are implemented within standard and commercial tools for the simulation codes for rail vehicle dynamics. This book is the result of the research activities carried out by the Railway Technology Lab of the Department of Mechanical and Aerospace Engineering at Politecnico di Torino. This book presents work on the project for the development of a real-time wheel-rail contact model and provides the simulation results obtained with dSpace real-time hardware. Besides[...]

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N. Bosso, Politecnico di Torino, Torino, Italy; M. Spiryagin, Centre for Railway Engineering, Rockhampton, Australia; A. Gugliotta, Politecnico di Torino, Torino, Italy; A. Somà, Politecnico di Torino, Torino, Italy

Internet Privacy
Options for adequate realisation

A thorough multidisciplinary analysis of various perspectives on internet privacy was published as the first volume of a study, revealing the results of the achat-tech project "Internet Privacy - A Culture of Privacy and Trust on the Internet." The second publication from this project presents integrated, interdisciplinary options for improving privacy on the Internet utilizing a normative, value-oriented approach. The ways in which privacy promotes and preconditions fundamental societal values and how privacy violations endanger the flourishing of said values are exemplified. The conditions which must be fulfilled in order to achieve a culture of privacy and trust on the Internet are[...]

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Softcover 2013. 112 p. (acatech STUDIE)
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ISBN 978-3-642-37912-3
Erscheinungstermin: May 7, 2013

J. Buchmann (Ed.)

Freedom 7
The Historic Flight of Alan B. Shepard, Jr.

Inevitably, there are times in a nation’s history when its hopes, fears and confidence in its own destiny appear to hinge on the fate of a single person. One of these pivotal moments occurred on the early morning of May 5, 1961, when a 37-year-old test pilot
squeezed himself into the confines of the tiny Mercury spacecraft that he had named Freedom 7. On that historic day, U.S. Navy Commander Alan Shepard carried with him the hopes, prayers, and anxieties of a nation as his Redstone rocket blasted free of the launch pad at Cape Canaveral, hurling him upwards on a 15-minute suborbital flight that also propelled the United States into the bold new frontier of human space exploration. This [...] More on www.springer.com/978-3-319-01155-4

Modern Linear Control Design
A Time-Domain Approach
This book offers a compact introduction to modern linear control design. The simplified overview presented of linear time-domain methodology paves the road for the study of more advanced non-linear techniques. Only rudimentary knowledge of linear systems theory is assumed - no use of Laplace transforms or frequency design tools is required. Emphasis is placed on assumptions and logical implications, rather than interpretation rather than derived or solvability. The topics covered include transient performance and stabilization via state or output feedback; disturbance [...] More on www.springer.com/978-1-4614-6942-1

Compilation and Synthesis for Embedded Reconfigurable Systems
An Aspect-Oriented Approach
This book provides techniques to tackle the design challenges raised by the increasing diversity and complexity of emerging, heterogeneous architectures for embedded systems. It describes an approach based on techniques from software engineering called aspect-oriented programming, which allow designers to control today's sophisticated design tool chains, while maintaining a single application source code. Readers are introduced to the basic concepts of an aspect-oriented, domain specific language that enables control of a wide range of compilation and synthesis tools in the partitioning and mapping of an application to a heterogeneous (and possibly multi-core) target architecture. [...] More on www.springer.com/978-1-4614-4893-8

Fundamentals of Nanoscaled Field Effect Transistors
Fundamentals of Nanoscaled Field Effect Transistors gives comprehensive coverage of the fundamental physical principles and theory behind nanoscale transistors. The specific issues that arise for nanoscale MOSFETs, such as quantum mechanical tunneling and inversion layer quantization, are fully explored. The solutions to these issues, such as high-κ technology, alternate devices structures and graphene technology are also given. Some case studies regarding the above issues and solution are also given in the book. More on www.springer.com/978-1-4614-6821-9

A Time-Domain Approach
This book offers a compact introduction to modern linear control design. The simplified overview presented of linear time-domain methodology paves the road for the study of more advanced non-linear techniques. Only rudimentary knowledge of linear systems theory is assumed - no use of Laplace transforms or frequency design tools is required. Emphasis is placed on assumptions and logical implications, rather than interpretation rather than derived or solvability. The topics covered include transient performance and stabilization via state or output feedback; disturbance [...] More on www.springer.com/978-1-4614-6942-1

Structural Analysis of Composite Wind Turbine Blades
Nonlinear Mechanics and Finite Element Models with Material Damping
This book concerns the development of novel finite elements for the structural analysis of composite beams and blades. The introduction of material damping is also an important aspect of composite structures and it is presented here in terms of their static and dynamic behavior. The book thoroughly presents a new shear beam finite element, which entails new blade section mechanics, capable of predicting structural blade coupling due to composite coupling and/or internal section geometry. Theoretical background is further expanded towards the inclusion of nonlinear structural blade models and damping mechanics for composite structures. The models effectively include geometrically [...] More on www.springer.com/978-3-319-00863-9
Numerical Simulation of Distributed Parameter Processes

The present monograph defines, interprets and uses the matrix of partial derivatives of the state vector with applications for the study of some common categories of engineering. The book covers broad categories of processes that are formed by systems of partial derivative equations (PDEs), including systems of ordinary differential equations (ODEs). The work includes numerous applications specific to Systems Theory based on Mpdx, such as parallel, serial as well as feed-back connections for the processes defined by PDEs. For similar, more complex processes based on Mpdx with PDEs and ODEs as components, we have developed control schemes with PID effects for the propagation phenomena.[...]

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Data Intensive Computing for Biodiversity

This book is focused on the development of a data integration framework for retrieval of biodiversity information from heterogeneous and distributed data sources. The data integration system proposed in this book links remote databases in a networked environment, supports heterogeneous databases and data formats, links databases hosted on multiple platforms, and provides data security for database owners by allowing them to keep and maintain their own data and to choose information to be shared and linked. The book is a useful guide for researchers, practitioners, and graduate-level students interested in learning state-of-the-art development for data integration in biodiversity.

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ISBN 978-3-642-38046-4
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Data Acquisition Systems

From Fundamentals to Applied Design

This book describes the fundamentals of data acquisition systems, how they enable users to sample signals that measure real physical conditions and convert the resulting samples into digital, numeric values that can be analyzed by a computer. The author takes a problem-solving approach to data acquisition, providing the tools engineers need to use the concepts introduced. Coverage includes sensors that convert physical parameters to electrical signals, signal conditioning circuitry to convert sensor signals into a form that can be converted to digital values and analog-to-digital converters, which convert conditioned sen-
Computing Nature
Turing Centenary Perspective
This book is about nature considered as the totality of physical existence, the universe, and our present day attempts to understand it. If we see the universe as a network of networks of computational processes at many different levels of organization, what can we learn about physics, biology, cognition, social systems, and ecology expressed through interacting networks of elementary particles, atoms, molecules, cells, (and especially neurons when it comes to understanding of cognition and intelligence), organs, organisms and their ecologies? Regarding our computational models of natural phenomena Feynman famously wondered: "Why should it take an infinite amount of logic to figure [...]"

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ISBN 978-3-642-37224-7

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Planetary Rovers
Tools for Space Exploration
With the recent declarations of intent by spacefaring nations to return to the Moon and to send sample return missions to Mars, this self-contained and comprehensive book will be most timely. It will include a case study - the ExoMars Rover - to which both authors have contributed for the European Space Agency. The highly successful US Mars Exploration Rover programme, in which Lutz Richter was involved, will also be covered. To the authors' knowledge, this unique book will be the only one that covers the space, automotive and robotics technologies specifically geared to the development and design of planetary rovers and the associated problems of locomotion and navigation. The book [...] More on [website](https://www.springer.com/978-3-642-03258-5)

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▶ 139.05 €
ISBN 978-3-642-03258-5

Erscheinungstermin: July 31, 2013

UWB Communication Systems:
Conventional and 60 GHz
Principles, Design and Standards
In this book the author examines 60 GHz and conventional UWB. The book introduces the fundamentals, architectures, and applications of unified ultra wideband devices. The material includes both theory and practice and introduces ultra wideband communication systems and their applications in a systematic manner. The material is written to enable readers to design, analyze, and evaluate UWB communication systems. More on [website](https://www.springer.com/978-1-4614-6752-6)

Hardcover
2013. XX, 220 p. 116 illus., 58 illus. in color.
An Intelligent Customer Complaint Management System with Application to the Transport and Logistics Industry

This thesis addresses the issue of customer complaints in the context of Customer Relationship Management (CRM). After a comprehensive survey of the current literature on CRM, the thesis describes the development of a new intelligent CRM (I-CRM) framework, which integrates text analytics, type mapping, SPSS, structural equation modeling, and linear and fuzzy approaches. This new methodology, in contrast to previous ones, is able to handle customer complaints with respect to different variables, thus allowing organizations to find their key customers and key complaints, and to address and provide solution to the major complaints of the key customers, hence promoting business.[...]

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Optimum Design of Steel Structures

This book helps designers and manufacturers to select and develop the most suitable and competitive steel structures, which are safe, fit for production and economic. An optimum design system is used to find the best characteristics of structural models, which guarantee the fulfillment of design and fabrication requirements and minimize the cost function. Realistic numerical models are used as main components of industrial steel structures. Chapter 1 contains some experiences with the optimum design of steel structures. Chapter 2 treats some newer mathematical optimization methods. Chapter 3 gives formulae for fabrication times and costs. Chapters 4 deals with beams and columns. Summarizes[...]

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Recent Advances in Research on Unmanned Aerial Vehicles

A team of launched and coordinated Unmanned aerial vehicles (UAVs), requires advanced technologies in sensing, communication, computing, and control to improve their intelligence and robustness towards autonomous operations. To enhance reliability, robustness, and mission capability of a team of UAVs, a system-oriented and holistic approach is desirable in which all components and subsystems are considered in terms of their roles and impact on the entire system. This volume aims to summarize the recent progress, identify challenges and opportunities, and develop new methodologies and systems on coordinated UAV control. A group of experts working in this area have contributed to this[...]

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Ethics for Biomedical Engineers

Over the last few decades, there are increasing public awareness of adverse events involving engineering failures that not only led to monetary losses but also more importantly, human injuries and deaths. Whilst it is vital for an engineering professional or student to acquire the necessary technical knowledge and skills in their respective field, they must also understand the ethical essences that are relevant to their profession. Engineering professionals like biomedical engineers, need to appreciate the fundamentals of best practices and recognise how any derivation from such practices can have undesirable impacts on human lives. Through this book, it is hoped that readers would... 

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Constraining Designs for Synthesis and Timing Analysis
A Practical Guide to Synopsis Design Constraints (SDC)

This book serves as a hands-on guide to timing constraints in integrated circuit design. Readers will learn to maximize performance of their IC designs, by specifying timing requirements correctly. Coverage includes key aspects of the design flow impacted by timing constraints, including synthesis, static timing analysis and placement and routing. Concepts needed for specifying timing requirements are explained in detail and then applied to specific stages in the design flow, all within the context of Synopsis Design Constraints (SDC), the industry-leading format for specifying constraints.


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Formal Methods for Mining Structured Objects

In the field of knowledge discovery, graphs of concepts are an expressive and versatile modeling technique providing ways to reason about information implicit in a set of data. Interesting examples of this can be found under the mathematical theory of formal concept analysis, dedicated to the construction of a lattice of concepts by defining a Galois connection on a binary relationship. This book present such graph of concepts under the more complex case of data that comes in a set of structured objects; e.g. a set of sequences, trees or graphs. Nodes of this graph will represent patterns in the data and edges will correspond to relationships of specificity. From this combinatorial...

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Transient Effects in Friction Fractal Asperity Creep

Transient friction effects determine the behavior of a wide class of mechatronic systems. Classic examples are squealing brakes, stick-slip in robotic arms, or stick-slip in linear drives. To properly design and understand mechatronic systems of this type, good quantitative models of transient friction effects are of primary interest. The theory developed in this book approaches this problem bottom-up, by deriving the behavior of macroscopic friction surfaces from the microscopic surface physics. The model is based on two assumptions: First, rough surfaces are inherently fractal, exhibiting roughness on a wide range of scales. Second, transient friction effects are caused by creep. 

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S.S. Hacısalihzade, Bosporus University, Istanbul, Turkey

Biomedical Applications of Control Engineering

Biomedical Applications of Control Engineering is a lucidly written textbook for graduate control engineering and biomedical engineering students as well as for medical practitioners who want to get acquainted with quantitative methods. It is based on decades of experience both in control engineering and clinical practice. The book begins by reviewing basic concepts of system theory and the modeling process. It then goes on to discuss control engineering application areas like: Different models for the human operator, dosage and timing optimization in oral drug administration, measuring symptoms of and optimal dopaminergic therapy in Parkinson’s disease, measurement and control of [...] 

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M. Hadzikadic, University of North Caroline, Charlotte, USA; S. O’Brien, Strategic Analysis Enterprises, Inc, Fairfax Station, USA; M. Khouja, The University of North Carolina at Char, Charlotte, USA (Eds.)

Managing Complexity: Practical Considerations in the Development and Application of ABMs to Contemporary Policy Challenges

This book emerged out of a project initiated and funded by the Defense Advanced Research Projects Agency (DARPA) that sought to build on efforts to transform agent-based models into platforms for predicting and evaluating policy responses to real world challenges around the world. It began with the observation that social science theories of human behavior are often used to estimate the consequences of alternative policy responses to important issues and challenges. However, alternative theories that remain subject to contradictory claims are ill suited to inform policy. The vision behind the DARPA project was to mine the social sciences literature for alternative theories of human [...] 

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Intention Recognition, Commitment and Their Roles in the Evolution of Cooperation From Artificial Intelligence Techniques to Evolutionary Game Theory Models

This original and timely monograph describes a unique self-contained excursion that reveals to the readers the roles of two basic cognitive abilities, i.e. intention recognition and arranging commitments, in the evolution of cooperative behavior. This book analyses intention recognition, an important ability that helps agents predict others’ behavior, in its artificial intelligence and evolutionary computational modeling aspects, and proposes a novel intention recognition method. Furthermore, the book presents a new framework for intention-based decision making and illustrates several ways in which an ability to recognize intentions of others can enhance a decision making process. 

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G. Haobijam, Indian Institute of Technology Mandi, Mandi, India; R.P. Palathinkal, Indian Institute of Technology Guwahati, Guwahati, India

Design and Analysis of Spiral Inductors

The book addresses the critical challenges faced by the ever-expanding wireless communication market
and the increasing frequency of operation due to continuous innovation of high performance integrated passive devices. The challenges like low quality factor, design complexity, manufacturability, processing cost, etc., are studied with examples and specifics. Silicon on-chip inductor was first reported in 1990 by Nguyen and Meyer in a 0.8 μm silicon bipolar complementary metal oxide semiconductor technology (BiCMOS). Since then, there has been an enormous progress in the research on the performance trends, design and optimization, modeling, quality factor enhancement techniques, etc.[...]

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B. Harvey

China in Space
The Great Leap Forward
Rockets were invented in China, the home of many modern inventions, including ancient astronomy, and were used originally for military purposes in the 13th century. The Chinese space program was founded in October 1956 by the father of Chinese rocketry, Tsien Hsue Shen, who lived in California in the 1930s until his expulsion as a Chinese spy. In recent times there have been three manned space flights, highlighting China’s ambitious space program and generating worldwide interest. Future missions are planned, including a mission to go to Mars. The explosive growth of China’s innovative and rapidly developing space program in recent years has made it a ‘hot’ topic in international space [...] More on www.springer.com/978-1-4614-5042-9

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Y. Hasegawa

Control Problems of Discrete-Time Dynamical Systems
This monograph deals with control problems of discrete-time dynamical systems, which include linear and nonlinear input/output relations. It will be of popular interest to researchers, engineers and graduate students who specialized in system theory. A new method, which produces manipulated inputs, is presented in the sense of state control and output control. This monograph provides new results and their extensions, which can also be more applicable for nonlinear dynamical systems. To present the effectiveness of the method, many numerical examples of control problems are provided as well.

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T. Hester, University of Texas at Austin, Austin, USA

TEXPLORE: Temporal Difference Reinforcement Learning for Robots and Time-Constrained Domains
This book presents and develops new reinforcement learning methods that enable fast and robust learning on robots in real-time. Robots have the potential to solve many problems in society, because of their ability to work in dangerous places doing necessary jobs that no one wants or is able to do. One barrier to their widespread deployment is that they are mainly limited to tasks where it is possible to hand-program behaviors for every situation that may be encountered. For robots to meet their potential, they need methods that enable them to learn and adapt to novel situations that they were not programmed for. Reinforcement learning (RL) is a paradigm for learning sequential decision [...]

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P. Hulsroj, European Space Policy Institute, Vienna, Austria;
S. Pagkratis, European Space Policy Institute, Vienna, Austria;
B. Baranes, European Space Policy Institute, Vienna, Austria (Eds.)

Yearbook on Space Policy 2010/2011
The Forward Look
The Yearbook on Space Policy is the reference publication analysing space policy developments. Each year it presents issues and trends in space policy and the space sector as a whole. Its scope is global and its perspective is European. The Yearbook also links space policy with other policy areas. It highlights specific events and issues, and provides useful insights, data and information on space activities. The Yearbook on Space Policy is edited by the European Space Policy Institute (ESPI) based in Vienna, Austria. It combines in-house research and contributions of members of the European Space Policy Research and Academic Network (ESPRAN), coordinated by ESPI. The Yearbook is [...] More on www.springer.com/978-3-7091-1362-2

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Forthcoming
B. Iantovics, Petru Maior University, Targu Mures, Romania;
R. Kountchev, Technical University of Sofia, Sofia, Bulgaria (Eds.)

Advanced Intelligent Computational Technologies and Decision Support Systems
This book offers a state of the art collection covering themes related to Advanced Intelligent Computational Technologies and Decision Support Systems which can be applied to fields like healthcare assisting the humans in solving problems. The book brings forward a wealth of ideas, algorithms and case studies in themes like: intelligent predictive diagnosis; intelligent analyzing of medical images; new format for coding of single and sequences of medical images; Medical Decision Support Systems; diagnosis of Down’s syndrome; computational perspectives for electronic fetal monitoring; efficient compression of CT Images; adaptive interpolation and halftoning for medical images; [...] More on www.springer.com/978-3-319-00466-2

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Fiber Optic Sensing and Imaging

This book is designed to highlight the basic principles of fiber optic imaging and sensing devices. The book provides the readers with a solid foundation in fiber optic imaging and sensing devices. The text begins with an introductory chapter that starts from Maxwell’s equations and ends with the derivation of the basic optical fiber characteristic equations and solutions (i.e. fiber modes). Also covered within are reviews of the most common fiber optic interferometric devices which are the basis for many fiber optic imaging and sensing systems. The author discusses the basics of fiber optic imagers with an emphasis on fiber optic confocal microscope. Including chapters on fiber[...]

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A. Kaveh, Iran Univ. of Science and Technology, Tehran, Iran

Optimal Analysis of Structures by Concepts of Symmetry and Regularity

Optimal analysis is defined as an analysis that creates and uses sparse, well-structured and well-conditioned matrices. The focus is on efficient methods for eigen-solution of matrices involved in static, dynamic and stability analyses of symmetric and regular structures, or those general structures containing such components. Powerful tools are also developed for configuration processing, which is an important issue in the analysis and design of space structures and finite element models. Different mathematical concepts are combined to make the optimal analysis of structures feasible. Canonical forms from matrix algebra, product graphs from graph theory and symmetry groups from group[...]

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S.M. Kashmiri, Texas Instruments, Inc., Delft, Netherlands; K.A.A. Mabinwa, Delft University of Technology, Delft, Netherlands

Electrothermal Frequency References in Standard CMOS

This book describes an alternative method of realizing accurate on-chip frequency references in standard CMOS processes. This method exploits the thermal-diffusivity of silicon, i.e. the rate at which heat diffuses through a silicon substrate. This is the first book describing the design of such electrothermal frequency references. It includes the necessary theory, supported by practical realizations that achieve inaccuracies as low as 0.1% and thus demonstrate the feasibility of this approach. The book also includes several circuit and system-level solutions to the precision circuit design challenges encountered during the design of such frequency references.


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Advances in Intelligent Analysis of Medical Data and Decision Support Systems

This volume is a result of the fruitful and vivid discussions during the MedDecSup’2012 International Workshop bringing together a relevant body of knowledge, and new developments in the increasingly important field of medical informatics. This carefully edited book presents new ideas aimed at the development of intelligent processing of various kinds of medical information and the perfection of the contemporary computer systems for medical decision support. The book presents advances of the medical information systems for intelligent archiving, processing, analysis and search-by-content which will improve the quality of the medical services for every patient and of the global[...]

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Sensors: An Introductory Course

Sensors: An Introductory Course provides an essential reference on the fundamentals of sensors. The book is designed to help readers in developing skills and the understanding required in order to implement a wide range of sensors that are commonly used in our daily lives. This book covers the basic concepts in the sensors field, including definitions and terminologies. The physical sensing effects are described, and devices which utilize these effects are presented. The most frequently used organic and inorganic sensors are introduced and the techniques for implementing them are discussed.

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Dimensionality Reduction with Unsupervised Nearest Neighbors
This book is devoted to a novel approach for dimensionality reduction based on the famous nearest neighbor method that is a powerful classification and regression approach. It starts with an introduction to machine learning concepts and a real-world application from the energy domain. Then, unsupervised nearest neighbors (UNN) is introduced as efficient iterative method for dimensionality reduction. Various UNN models are developed step by step, reaching from a simple iterative strategy for discrete latent spaces to a stochastic kernel-based algorithm for learning submanifolds with independent parameterizations. Extensions that allow the embedding of incomplete and noisy patterns are [...] More on www.springer.com/978-3-642-33560-0

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Drilling of Polymer-Matrix Composites
This brief focus on drilling of polymer matrix composites for aerospace and defence applications. It gives an introduction to machining of polymer composites and discusses drilling as a processing of composites. More on www.springer.com/978-3-642-38876-7

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Static and Dynamic Buckling of Thin-Walled Plate Structures
This monograph deals with buckling and postbuckling behavior of thin plates and thin-walled structures with flat wall subjected to static and dynamic loads. The investigations are carried out in elastic range. The basic assumption here is the thin plate theory. This method is used to determine the buckling load and postbuckling analysis of thin-walled structures subjected to static and dynamic load. The book introduces two methods for static and dynamic buckling investigation which allow for a wider understanding of the phenomenon. Two different methods also can allow uncoupling of the phenomena occurring at the same time and attempt to estimate their impact on the final result. [...] More on www.springer.com/978-3-319-00653-6

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M. Krawczak, Polish Academy of Sciences, Warsaw, Poland

Multilayer Neural Networks
A Generalized Net Perspective
The primary purpose of this book is to show that a multilayer neural network can be considered as a multi-tissue system, and then that the learning of this class of neural networks can be treated as a special sort of the optimal control problem. In this way, the optimal control problem methodology, like dynamic programming, with modifications, can yield a novel class of learning algorithms for multilayer neural networks. Another purpose of this book is to show that the generalized net theory can be successfully used as a new description of multilayer neural networks. Several generalized net descriptions of neural networks functional processes are considered, namely: the simulation [...] More on www.springer.com/978-3-319-00247-7

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V. Kumar, University of Pennsylvania, Philadelphia, USA; J. Schmiedeler, University of Notre Dame, Notre Dame, USA;
Advances in Mechanisms, Robotics and Design Education and Research

This book contains papers on a wide range of topics in the area of kinematics, mechanisms, robotics, and design, addressing new research advances and innovations in design education. The content is divided into five main categories headed: 'Historical Perspectives', 'Kinematics and Mechanisms', 'Robotic Systems', 'Legged Locomotion', and 'Design Engineering Education'. Contributions take the form of survey articles, historical perspectives, commentaries on trends on education or research, original research contributions, and papers on design education. This volume celebrates the achievements of Professor Kenneth Waldron who has made innumerable and invaluable contributions to these.[...]

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Surface Tension in Microsystems
Engineering Below the Capillary Length

This book describes how surface tension effects can be used by engineers to provide mechanical functions in miniaturized products (<1 mm). Even if precursors of this field such as Jurin or Laplace already date back to the 18th century, describing surface tension effects from a mechanical perspective is very recent. The originality of this book is to consider the effects of capillary bridges on solids, including forces and torques exerted both statically and dynamically by the liquid along the 6 degrees-of-freedom. It provides a comprehensive approach to various applications, such as capillary adhesion (axial force), centering force in comprehensive approach to various applications, such as capillary adhesion (axial force), centering force in packaging and micro-assembly (lateral force) and>[...]

A.D. Lantada, Universidad Politécnica de Madrid, Madrid, Spain (Ed.)

Handbook on Advanced Design and Manufacturing Technologies for Biomedical Devices

The last decades have seen remarkable advances in computer-aided design, engineering and manufacturing technologies, multi-variable simulation tools, medical imaging, biomimetic design, rapid prototyping, micro and nanomanufacturing methods and information management resources, all of which provide new horizons for the Biomedical Engineering fields and the Medical Device Industry. Advanced Design and Manufacturing Technologies for Biomedical Devices covers such topics in depth, with an applied perspective and providing several case studies that help to analyze and understand the key factors of the different stages linked to the development of a novel biomedical device, from the[...]


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The Future of Thermal Comfort in an Energy- Constrained World

The dissertation investigates the scientific and business factors that have resulted in air-conditioning being a major contributor to climate change. With his architectural background, the author demonstrates how a design methodology, not commonly adopted in scientific studies, may actually be a suitable way of dealing with a complex problem: the business as usual scenario involving building science, sociological values and consumer behavior. Using his innovations as case studies, the author shows how good ideas cannot be evaluated on scientific merit alone and demonstrates why commercialization may have a pivotal role in deployment of research-based technology. He advances the[...]

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image recognition, foveation, image fusion and information extraction. The third edition reflects renewed international interest in pulse image processing with updated sections presenting several newly developed applications. This edition also introduces a suite of Python scripts that assist readers in replicating results presented in the text and to further develop their own applications.

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X. Liu, University of California, Berkeley, Stanford, USA; Q. Xu, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong/P.R.China

Trace-Based Post-Silicon Validation for VLSI Circuits
This book first provides a comprehensive coverage of state-of-the-art validation solutions based on real-time signal tracing to guarantee the correctness of VLSI circuits. The authors discuss several key challenges in post-silicon validation and provide automated solutions that are systematic and cost-effective. A series of automatic tracing solutions and innovative design for debug (DfD) techniques are described, including techniques for trace signal selection for enhancing visibility of functional errors, a multiplexed signal tracing strategy for improving functional error detection, a tracing solution for debugging electrical errors, an interconnection fabric for increasing data[...]

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Z. Ma, Northeastern University, Shenyang, China; People’s Republic; L. Yan, Northeastern University, Shenyang, China, People’s Republic (Eds.)

Advances in Probabilistic Databases for Uncertain Information Management
This book covers a fast-growing topic in great depth and focuses on the technologies and applications of probabilistic data management. It aims to provide a single account of current studies in probabilistic data management. The objective of the book is to provide the state of the art information to researchers, practitioners, and graduate students of information technology of intelligent information processing, and at the same time serving the information technology professional faced with non-traditional applications that make the application of conventional approaches difficult or impossible.

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null Mahle GmbH, Mahle International GmbH, Stuttgart, Germany (Ed.)

Valve train
Systems and components
Valve train systems control the gas exchange in a combustion engine, which means that they represent a significant opportunity for optimizing the combustion process. Since they draw energy from the crankshaft, an efficient valve train contributes greatly to improving overall efficiency. The components of the valve train system are subjected to high loads. In addition to wear due to mechanical forces increasing combustion pressures and temperatures, in particular, place greater demands on the materials and heat dissipation of components on the combustion side. This technical book clearly and thoroughly presents a holistic understanding of the valve train system.

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Wireless Cortical Implantable Systems
Wireless Cortical Implantable Systems examines the design for data acquisition and transmission in cortical implants. The first part of the book covers existing system level cortical implants, as well as future devices. The authors discuss the major constraints in terms of microelectronic integrations are presented. The second part of the book focuses on system level as well as circuit and system level solutions to the development of ultra low-power and low-noise microelectronics for cortical implants. Existing solutions are presented and novel methods and solutions proposed. The third part of the book focuses on the usage of digital impulse radio ultra wide band transmission as an[...]

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A.C.J. Luo, Southern Illinois University, Edwardsville, USA

Dynamical System Synchronization
Dynamical System Synchronization (DSS) meticulously presents for the first time the theory of dynamical systems synchronization based on the local singularity theory of discontinuous dynamical systems. The book details the sufficient and necessary conditions for dynamical systems synchronization, through extensive mathematical expression. Techniques for engineering implementation of DSS are clearly presented compared with the existing techniques.


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**Infobiotics**

*Information in Biotic Systems*

The book presents topics in discrete biomathematics. Mathematics has been widely used in modeling biological phenomena. However, the molecular and discrete nature of basic life processes suggests that their logic follow principles that are intrinsically based on discrete and informational mechanisms. The ultimate reason of polymers, as key element of life, is directly based on the computational power of strings, and the intrinsic necessity of metabolism is related to the mathematical notion of multiset. The switch of the two roots of bioinformatics suggests a change of perspective. In bioinformatics, the biologists ask computer scientists to assist them in processing biological.[...]

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**Small Universal Cellular Automata in Hyperbolic Spaces**

*A Collection of Jewels*

Hyperbolic geometry is an essential part of theoretical astrophysics and cosmology. Besides specialists of these domains, many specialists of new domains start to show a growing interest both to hyperbolic geometry and to cellular automata. This is especially the case in biology and computer science. This book gives the reader a deep and efficient introduction to an algorithmic approach to hyperbolic geometry. It focuses the attention on the possibilities to obtain in this frame the power of computing everything a computer can compute, that is to say: universality. The minimal ways to get universality are investigated in a large family of tilings of the hyperbolic plane. In several[...]

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H. Mario, TU Graz, Graz, Austria; W. Dietrich, Magna Steyr Fahrzeugtechnik AG & Co. KG, Graz, Austria; A. Gferrer, Graz University of Technology, Graz, Austria; J. Lang, Graz University of Technology, Graz, Austria

**Integrated Computer-Aided Design in Automotive Development**

*Development Processes, Geometric Fundamentals, Methods of CAD, Knowledge-Based Engineering Data Management*

The automotive industry faces constant pressure to reduce development costs and time while still increasing vehicle quality. To meet this challenge, engineers and researchers in both science and industry are developing effective strategies and flexible tools by enhancing and further integrating powerful, computer-aided design technology. This book provides a valuable overview of the development tools and methods of today and tomorrow. It is targeted not only towards professional project and design engineers, but also to students and to anyone who is interested in state-of-the-art computer-aided development. The book begins with an overview of automotive development processes and the[...]

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T. Matsuo, Advanced Institute of Industrial, Tokyo, Japan; R. Colomo-Palacios, Universidad Carlos III de Madrid, Leganés, Spain (Eds.)

**Electronic Business and Marketing**

*New Trends on its Process and Applications*

Electronic business today is not only business transactions supported in information and communication technologies; it is a new way of communicating and integrating with customers, suppliers, employees and other stakeholders. In this scenario, electronic business is now part of a wider economic context that is causing radical transformations in business and organizations including the entire value chain from customer service to supply chain management. One of the areas affected is marketing. Given that the new technologies have enabled firms to reach out to global customers and has provided them with the opportunity to customize their strategies and offerings in an unprecedented way,[...]

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J. Masuch, University of Sevilla, Sevilla, Spain; M. Delgado-Restituto, University of Sevilla, Sevilla, Spain

**Ultra Low Power Transceiver for Wireless Body Area Networks**

*Wireless Body Area Networks*

Wireless Body Area Networks (WBANs) are expected to promote new applications for the ambulatory health monitoring of chronic patients and elderly population, aiming to improve their quality of life and independence. These networks are composed by wireless sensor nodes (WSNs) used for measuring physiological variables (e.g., glucose level in blood or body temperature) or controlling therapeutic devices (e.g., implanted insulin pumps). These nodes should exhibit a high degree of energy autonomy in order to extend their battery lifetime or even make the node supply to rely on harvesting techniques. Typically, the power budget of WSNs is dominated by the wireless link and, hence, many[...]
Automotive Systems Engineering

This book reflects the shift in design paradigm in automobile industry. It presents future innovations, often referred as “automotive systems engineering”. These cause fundamental innovations in the field of driver assistance systems and electro-mobility as well as fundamental changes in the architecture of the vehicles. New driving functionalities can only be realized if the software programs of multiple electronic control units work together correctly. This volume presents the new and innovative methods which are mandatory to master the complexity of the vehicle of the future.

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SystemVerilog Assertions and Functional Coverage

Guide to Language, Methodology and Applications

This book provides a hands-on, application-oriented guide to the language and methodology of both SystemVerilog Assertions and SystemVerilog Functional Coverage. Readers will benefit from the step-by-step approach to functional hardware verification, which will enable them to uncover hidden and hard to find bugs, point directly to the source of the bug, provide for a clean and easy way to model complex timing checks and objectively answer the question ‘have we functionally verified everything’. Written by a professional end-user of both SystemVerilog Assertions and SystemVerilog Functional Coverage, this book explains each concept with easy to understand examples, simulation logs and [...] More on www.springer.com/978-1-4614-7323-7

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Co-evolution of Intelligent Socio-technical Systems

Modelling and Applications in Large Scale Emergency and Transport Domains

As the interconnectivity between humans through technical devices is becoming ubiquitous, the next step is already in the making: ambient intelligence, i.e. smart (technical) environments, which will eventually play the same active role in communication as the human players, leading to a co-evolution in all domains where real-time communication is essential. This topical volume, based on the findings of the Socionical European research project, gives equal attention to two highly relevant domains of applications: transport, specifically traffic, dynamics from the viewpoint of a socio-technical interaction and evacuation scenarios for large-scale emergency situations. Care was taken to [...] More on www.springer.com/978-3-319-00932-2

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The model-based investigation of motions of anthropomorphic systems is an important interdisciplinary research topic involving specialists from many fields such as Robotics, Biomechanics, Physiology, Orthopedics, Psychology, Neurosciences, Sports, Computer Graphics and Applied Mathematics. This book presents a study of basic locomotion forms such as walking and running is of particular interest due to the high demand on dynamic coordination, actuator efficiency and balance control. Mathematical models and numerical simulation and optimization techniques are explained, in combination with experimental data, which can help to better understand the basic underlying mechanisms of these [...] More on www.springer.com/978-3-642-36367-2

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Intelligent Sensing, Instrumentation and Measurements

“Intelligent Sensing, Instrumentation and Measurements” addresses issues towards the development of sensor nodes for wireless Sensor Networks. The fundamentals of sensors, interfacing, power supplies, configuration of sensor node, and GUI development are covered. The book will be useful for engineers and researchers in the field, especially for higher undergraduate and postgraduate students as well as practitioners working on the development of Wireless Sensor Networks or Smart Sensors. More on www.springer.com/978-3-642-37026-7

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S.C. Mukhopadhyay, Massey University (Turitea Campus), Palmerston North, New Zealand

Smart Sensors for Real-Time Water Quality Monitoring

Sensors are being utilized to increasing degrees in all forms of industry. Researchers and industrial practitioners in all fields seek to obtain a better understanding of appropriate processes so as to improve quality of service and efficiency. The quality of water is no exception, and the water industry is faced with a wide array of water quality issues being present worldwide. Thus, the need for sensors to tackle this diverse subject is paramount. The aim of this book is to combine, for the first time, international expertise in the area of water quality monitoring using smart sensors and systems in order that a better understanding of the challenges faced and solutions posed [...] More on www.springer.com/978-3-642-37005-2

R. Naja, PRiSM Laboratory-University of Versaille, NOISY LE GRAND, France (Ed.)

Wireless Vehicular Networks for Car Collision Avoidance

Wireless Vehicular Networks for Car Collision Avoidance focuses on the development of the ITS (Intelligent Transportation Systems) in order to minimize vehicular accidents. The book presents and analyses a range of concrete accident scenarios while examining the causes of vehicular collision and proposing countermeasures based on wireless vehicular networks. The book also describes the vehicular network standards and quality of service mechanisms focusing on improving critical dissemination of safety information. With recommendations on techniques and protocols to consider when improving road safety
Vision Based Systems for UAV Applications

This monograph is motivated by a significant number of vision based algorithms for Unmanned Aerial Vehicles (UAV) that were developed during research and development projects. Vision information is utilized in various applications like visual surveillance, aim systems, recognition systems, collision-avoidance systems and navigation. This book presents practical applications, examples and recent challenges in these mentioned application fields. The aim of the book is to create a valuable source of information for researchers and constructors of solutions utilizing vision from UAV. Scientists, researchers and graduate students involved in computer vision, image processing, data fusion, [...] More on www.springer.com/978-3-319-00368-9

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Efficient 3D Scene Modeling and Mosaicing

This book proposes a complete pipeline for monocular (single camera) based 3D mapping of terrestrial and underwater environments. The aim is to provide a solution to large-scale scene modeling that is both accurate and efficient. To this end, we have developed a novel Structure from Motion algorithm that increases mapping accuracy by registering camera views directly with the maps. The camera registration uses a dual approach that adapts to the type of environment being mapped. In order to further increase the accuracy of the resulting maps, a new method is presented, allowing detection of images corresponding to the same scene region (crossovers). Crossovers then used in conjunction [...] More on www.springer.com/978-3-642-36417-4

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Human Spaceflight and Exploration

The book presents a unique overview of activities in human spaceflight and exploration and a discussion of future development possibilities. It provides an introduction for the general public interested in space and would also be suitable for students at university. The book includes the basics of the space environment and the effects of space travel on the human body. It leads through the challenges of designing life support systems for spacecraft as well as space suits to protect astronauts during extravehicular activities. Research being carried out by humans in Earth orbit is being brought into context to other forms of space exploration. Between the end of 2007 and May 2009 ESA, [...] More on www.springer.com/978-3-642-36417-4

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Advances in Bio-Mechanical Systems and Materials

This monograph presents the latest results related to bio-mechanical systems and materials. The bio-mechanical systems with which his book is concerned are prostheses, implants, medical operation robots and muscular re-training systems. To characterize and design such systems, a multi-disciplinary approach is required which involves the classical disciplines of mechanical/materials engineering and biology and medicine. The challenge in such an approach is that views, concepts or even language are sometimes different from discipline to discipline and the interaction and communication of the scientists must first be developed and adjusted. Within the context of materials' science, the [...] More on www.springer.com/978-3-319-00478-5

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Design Technologies for Green and Sustainable Computing Systems

This book provides a comprehensive guide to the design of sustainable and green computing systems (GSC). Coverage includes important breakthroughs in various aspects of GSC, including multi-core architectures, interconnection technology, data centers, high-performance computing (HPC), and sensor networks. The authors address the challenges of power efficiency and sustainability in various contexts, including system design, computer architecture, programming languages, compilers and networking. More on www.springer.com/978-1-4614-4974-4

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Towards the Security Limits of Secure Embedded Circuits

Advanced DPA Theory and Practice provides a thorough survey of new physical leakages of embedded systems, namely the power and the electromagnetic emanations. The book presents a thorough analysis about leakage origin of embedded system. This book examines the systematic approach of the different aspects and advanced details about experimental setup for electromagnetic attack. The author discusses advanced statistical methods to successfully attack embedded devices such as high-order attack, template attack in principal subspaces, machine learning methods. The book includes theoretical framework to define side-channel based on two metrics: mutual information and success rate. More on www.springer.com/978-1-4614-6782-3

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Engineering Economics and Finance for Transportation Infrastructure

This textbook provides a fundamental overview of the application of engineering economic principles to transportation infrastructure investments. Basic theory is presented and illustrated with examples specific to the transportation field. It also reviews the history of transportation finance, as well as current methods for funding transportation investments in the U.S. Future problems and potential solutions are also discussed and illustrated.

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A. Rajan, University of Oxford, Oxford, United Kingdom; Th. Wahl, University of Oxford, Oxford, United Kingdom (Eds.)

CESAR - Cost-efficient Methods and Processes for Safety-relevant Embedded Systems

The book summarizes the findings and contributions of the European ARTEMIS project, CESAR, for improving and enabling interoperability of methods, tools, and processes to meet the demands in embedded systems development across four domains - avionics, automotive, automation, and rail. The contributions give insight into an improved engineering and safety process life-cycle for the development of safety critical systems. They present new concept of engineering tools integration platform to improve the development of safety critical embedded systems and illustrate capacity of this framework for end-user instantiation to specific domain needs and processes. They also advance [...] More on www.springer.com/978-3-7091-1386-8

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M. Rakotondrabe, University of Franche-Comté, Besancon, France (Ed.)

Smart Materials-Based Actuators at the Micro/Nano-Scale
Characterization, Control, and Applications

Smart Materials-Based Actuators at the Micro/Nano-Scale: Characterization, Control, and Applications gives a state of the art of emerging techniques to the characterization and control of actuators based on smart materials working at the micro/nano scale. The book aims to characterize some commonly used structures based on piezoelectric and electroactive polymeric actuators and also focuses on various and emerging techniques employed to control them. This book also includes two of the most emerging topics and applications: nanorobotics and cells micro/nano-manipulation.


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Digital Repetitive Control under Varying Frequency Conditions

The tracking/rejection of periodic signals constitutes a wide field of research in the control theory and applications area. Repetitive Control has proven to be an efficient way to face this topic. However, in some applications the frequency of the reference/disturbance signal is time-varying or uncertain. This causes an important performance degradation in the standard Repetitive Control scheme. This book presents some solutions to apply Repetitive Control in varying frequency conditions without loosing steady-state performance. It also includes a complete theoretical development and experimental results in two representative systems. The presented solutions are organized in two [...] More on www.springer.com/978-3-642-37777-8

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C. Reig, University of Valencia, Burjassot, Spain; S. Cardoso, INESC-MN, Lisboa, Portugal; S.C. Mukhopadhyay, Massey University (Manawatu Campus), Palmerston North, New Zealand

Giant Magnetoresistance (GMR) Sensors
From Basis to State-of-the-Art Applications

Since the discovery of the giant magnetoresistance (GMR) effect in 1988, spintronics has been presented as a new technology paradigm, awarded by the Nobel Prize in Physics in 2007. Initially used in read heads of hard disk drives, and while disputing a piece of
the market to the flash memories, GMR devices have broadened their range of usage by growing towards magnetic field sensing applications in a huge range of scenarios. Potential applications at the time of the discovery have become real in the last two decades. Definitively, GMR was born to stand. In this sense, selected successful approaches of GMR based sensors in different applications: space, automotive, microelectronics, [...] More on www.springer.com/978-3-642-37171-4

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B. Ristic, DSTO, Port Melbourne, Australia

Particle Filters for Random Set Models

This book discusses state estimation of stochastic dynamic systems from noisy measurements, specifically sequential Bayesian estimation and nonlinear or stochastic filtering. The class of solutions presented in this book is based on the Monte Carlo statistical method. Although the resulting algorithms, known as particle filters, have been around for more than a decade, the recent theoretical developments of sequential Bayesian estimation in the framework of random set theory have provided new opportunities which are not widely known and are covered in this book. This book is ideal for graduate students, researchers, scientists and engineers interested in Bayesian estimation.

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M.D. Rosini, University of Warsaw, Warsaw, Poland

Macroscopic Models for Vehicular Flows and Crowd Dynamics: Theory and Applications

Classical and Non–Classical Advanced Mathematics for Real Life Applications

This monograph presents a systematic treatment of the theory for hyperbolic conservation laws and their applications to vehicular traffics and crowd dynamics. In the first part of the book, the author presents very basic considerations and gradually introduces the mathematical tools necessary to describe and understand the mathematical models developed in the following parts focusing on vehicular and pedestrian traffic. The book is a self-contained valuable resource for advanced courses in mathematical modeling, physics and civil engineering. A number of examples and figures facilitate a better understanding of the underlying concepts and motivations for the students. Important new[...]

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A. Sadeghian, Ryerson University, Toronto, Canada; J.M. Mendel, University of Southern California, Los Angeles, USA; H. Tahayori, Ryerson University, Toronto, Canada (Eds.)

Advances in Type-2 Fuzzy Sets and Systems

Theory and Applications

This book explores recent developments in the theoretical foundations and novel applications of general and interval type-2 fuzzy sets and systems, including: algebraic properties of type-2 fuzzy sets, geometric-based definition of type-2 fuzzy set operators, generalizations of the continuous KM algorithm, adaptiveness and novelty of interval type-2 fuzzy logic controllers, relations between conceptual spaces and type-2 fuzzy sets, type-2 fuzzy logic systems versus perceptual computers; modeling human perception of real world concepts with type-2 fuzzy sets, different methods for generating membership functions of interval and general type-2 fuzzy sets, and applications of interval[...]

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Intelligent Audio Analysis

This book provides the reader with the knowledge necessary for comprehension of the field of Intelligent Audio Analysis. It firstly introduces standard methods and discusses the typical Intelligent Audio Analysis chain going from audio data to audio features to audio recognition. Further, an introduction to audio source separation, and enhancement and
robustness are given. After the introductory parts, the book shows several applications for the three types of audio: speech, music, and general sound. Each task is shortly introduced, followed by a description of the specific data and methods applied, experiments and results, and a conclusion for this specific task. The books provides [...] More on www.springer.com/978-3-642-36805-9

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SpaceX

Making Commercial Spaceflight a Reality

This first account of commercial spaceflight’s most successful venture describes the extraordinary feats of engineering and human achievement that have placed SpaceX at the forefront of the launch industry and made it the most likely candidate for transporting humans to Mars. Since its inception in 2002, SpaceX has sought to change the space launch paradigm by developing a family of launch vehicles that will ultimately reduce the cost and increase the reliability of space access tenfold. Coupled with the newly emerging market for governmental, private, and commercial space transport, this new model will ignite humanity’s efforts to explore and develop space. Formed in 2002 by Elon [...] More on www.springer.com/978-3-642-36526-3


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Recent Advances in Robotics and Automation

There isn’t a facet of human life that has not been touched and influenced by robots and automation. What makes robots and machines versatile is their computational intelligence. While modern intelligent sensors and powerful hardware capabilities have given a huge fillip to the growth of intelligent machines, the progress in the development of algorithms for smart interaction, collaboration and pro-activeness will result in the next quantum jump. This book deals with the recent advancements in design methodologies, algorithms and implementation techniques to incorporate intelligence in robots and automation systems. Several articles deal with navigation, localization and mapping of [...] More on www.springer.com/978-3-642-37386-2

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Application Systems in Health Care

A Companion Volume to Sadegh-Zadeh’s Handbook of Analytical Philosophy of Medicine

This book is a collection of contributions written by philosophers and scientists active in different fields, such as mathematics, logics, social sciences, computer sciences and linguistics. They comment on and discuss various parts of and subjects and propositions introduced in the Handbook of Analytical Philosophy of Medicine from Kadem Sadegh-Zadeh, published by Springer in 2012. This volume reports on the fruitful exchange and debate that arose in the fuzzy community upon the publication of the Handbook. This was not only very much appreciated by the community but also seen as a critical starting point for beginning a new discussion. The results of this discussion, which involved [...] More on www.springer.com/978-3-642-36526-3

Lyapunov Functionals and Stability of Stochastic Functional Differential Equations

Stability conditions for functional differential equations can be obtained using Lyapunov functionals. Lyapunov Functionals and Stability of Stochastic Functional Differential Equations describes the general method of construction of Lyapunov functionals to investigate the stability of differential equations with delays. This work continues and complements the author’s previous book Lyapunov Functionals and Stability of Stochastic Difference Equations, where this method is described for difference equations with discrete and continuous time. The text begins with both a description and a delineation of the peculiarities of deterministic and stochastic functional differential [...] More on www.springer.com/978-3-319-00100-5

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Advances in Biomedical Infrastructure 2013
Proceedings of International Symposium on Biomedical Data Infrastructure (BDI 2013)
Current Biomedical Databases are independently administered in geographically distinct locations, lending them almost ideally to adoption of intelligent data management approaches. This book focuses on research issues, problems and opportunities in Biomedical Data Infrastructure identifying new issues and directions for future research in Biomedical Data and Information Retrieval, Semantics in Biomedicine, and Biomedical Data Modeling and Analysis. The book will be a useful guide for researchers, practitioners, and graduate-level students interested in learning state-of-the-art development in biomedical data management.

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Nano-tribology and Materials in MEMS
This book brings together recent developments in the areas of MEMS tribology, novel lubricants and coatings for nanotechnological applications, biomimetics in tribology and fundamentals of micro/nano-tribology. Tribology plays important roles in the functioning and durability of machines at small length scales because of the problems associated with strong surface adhesion, friction, wear etc. Recently, a number of studies have been conducted to understand tribological phenomena at nano/micro scales and many new tribological solutions for MEMS have been proposed.

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Structural Dynamics
This book introduces to the theory of structural dynamics, with focus on civil engineering structures that may be described by line-like beam or beam-column type of systems, or by a system of rectangular plates. Throughout this book the mathematical presentation contains a classical analytical description as well as a description in a discrete finite element format, covering the mathematical development from basic assumptions to the final equations ready for practical dynamic response predictions. Solutions are presented in time domain as well as in frequency domain. Structural Dynamics starts off at a basic level and step by step brings the reader up to a level where the necessary [...] More on www.springer.com/978-3-319-01801-0

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Approaches to Probabilistic Model Learning for Mobile Manipulation Robots
Mobile manipulation robots are envisioned to provide many useful services both in domestic environments as well as in the industrial context. Examples include domestic service robots that implement large parts of the housework, and versatile industrial assistants that provide automation, transportation, inspection, and monitoring services. The challenge in these applications is that the robots have to function under changing, real-world conditions, be able to deal with considerable amounts of noise and uncertainty, and operate without the supervision of an expert. This book presents novel learning techniques that enable mobile manipulation robots, i.e., mobile platforms with one or more [...] More on www.springer.com/978-3-642-37159-2

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Cross-Layer Design in Optical Networks

This work addresses the topic of optical networks cross-layer design with a focus on physical-layer-impairment-aware design. Contributors capture both the physical-layer-aware network design as well as the latest advances in service-layer-aware network design. Treatment of topics such as, optical transmissions which are prone to signal impairments, dense packing of wavelengths, dispersion, crosstalk, etc., as well as how to design the network to mitigate such impairments, are all covered.

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MagneToencephalography
From Signals to Dynamic Cortical Networks

MagneToencephalography (MEG) is an invaluable functional brain imaging technique that provides direct, real-time monitoring of neuronal activity necessary for gaining insight into dynamic cortical networks. Our intentions with this book are to cover the richness and transdisciplinary nature of the MEG field, make it more accessible to newcomers and experienced researchers and to stimulate growth in the MEG area. The book presents a comprehensive overview of MEG basics and the latest developments in methodological, empirical and clinical research, directed toward master and doctoral students, as well as researchers. There are three levels of contributions: 1) tutorials on [...] More on www.springer.com/978-3-642-33044-5

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Metaheuristics for Bi-level Optimization

This book provides a complete background on metaheuristics to solve complex bi-level optimization problems (continuous/discrete, mono-objective/multi-objective) in a diverse range of application domains. Readers learn to solve large scale bi-level optimization problems by efficiently combining metaheuristics with complementary metaheuristics and mathematical programming approaches. Numerous real-world examples of problems demonstrate how metaheuristics are applied in such fields as networks, logistics and transportation, engineering design, finance and security.

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Wireless Power Transfer for Medical Microsystems

This book provides an in-depth introduction to the newest technologies for designing wireless power transfer systems for medical applications. The authors present a systematic classification of the various types of wireless power transfer, with a focus on inductive power coupling. Readers will learn to overcome many challenges faced in the design a wirelessly powered implant, such as power transfer efficiency, power stability, and the size of power antennas and circuits. This book focuses exclusively on medical applications of the technology and a batteryless capsule endoscopy system and other, real wirelessly powered systems are used as examples of the techniques described.

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J. Terzic, E. Terzic, R. Nagarajah, M. Alamgir

Ultrasonic Fluid Quantity Measurement in Dynamic Vehicular Applications
A Support Vector Machine Approach

Accurate fluid level measurement in dynamic environments can be assessed using a Support Vector Machine (SVM) approach. SVM is a supervised learning model that analyzes and recognizes patterns. It is a signal classification technique which has far greater accuracy than conventional signal averaging methods. Ultrasonic Fluid Quantity Measurement in Dynamic Vehicular Applications: A Support Vector Machine Approach describes the research and development of a fluid level measurement system for dynamic environments. The measurement system is based on a single ultrasonic sensor. A Support Vector Machines (SVM) based signal characterization and processing system has been developed to[...]

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Y.N. Toulovetski, I.Y. Zinurov

Innovation in Electric Arc Furnaces
Scientific Basis for Selection

This book equips a reader with knowledge necessary for critical analysis of innovations in electric arc furnaces and helps to select the most effective ones and for their successful implementation. The book also covers general issues related to history of development, current state and prospects of steelmaking in Electric Arc Furnaces. Therefore, it can be useful for everybody who studies metallurgy, including students of colleges and universities. The modern concepts of mechanisms of Arc Furnace processes are discussed in the book at the level sufficient to solve practical problems: To help readers lacking knowledge required in the field of heat transfer as well as hydro-gas[...]

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H.K. Toenshoff, Leibniz Universität Hannover, Garbsen, Germany; B. Denkena, Gottfried Wilhelm Leibniz, Garbsen, Germany

Basics of Cutting and Abrasive Processes

Manufacturing is the basic industrial activity generating real value. Cutting and abrasive technologies are the backbone of precision production in machine, automotive and aircraft building as well as of production of consumer goods. We present the knowl-
as their mobile counterparts (i.e., m-services). Despite the tremendous growth of multimedia services over the recent years, there is an increasing demand for their further development. This demand is driven by the ever-increasing desire of society for easy accessibility to information in friendly, personalized and...

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Standardization in Smart Grids
Introduction to IT-Related Methodologies, Architectures and Standards

The first successful finished Smart Grid Prototype Projects deliver new requirements and best practices to meet them. These solutions will be the base for the upcoming norms and standards in the near future. This domain is not only part of one Standard Developing Organization (SDO), but also of many different organizations like ITU, ISO, IEC and additionally for the electro mobility part the SAE. This results in many standards which are based on different aspects. Furthermore the European mirror organizations (ETSI, CEN, CENELEC) as well as the German mirror groups of these groups are involved, which are delivering further rules and adaption for the local market. Because of this...

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A.S. Uyar, Istanbul Teknik Universitesi, Istanbul, Turkey; E. Ozcan, University of Nottingham, Nottingham, United Kingdom; N. Urquhart, Edinburgh Napier University, Edinburgh, United Kingdom (Eds.)

Automated Scheduling and Planning
From Theory to Practice

Solving scheduling problems has long presented a challenge for computer scientists and operations researchers. The field continues to expand as researchers and practitioners examine ever more challenging problems and develop automated methods capable of solving them. This book provides 11 case studies in automated scheduling, submitted by leading researchers from across the world. Each case study examines a challenging real-world problem by analysing the problem in detail before investigating how the problem may be solved using state of the art techniques. The areas covered include aircraft scheduling, microprocessor instruction scheduling, sports fixture scheduling, exam scheduling, ...

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K.P. Valavanis, University of Denver, Denver, USA (Ed.)

Unmanned Aircraft Systems
The Current State-of-the-Art

This spin-off hardback volume, is devoted to the current state-of-the-art and recent advances in Unmanned Aircraft Systems (UAS). The area of UAS has seen unprecedented levels of growth over the last decade, and it is also expected to be one of the most dominant areas of research and development in the future. Although the main focus of UAS applications was in military domains, we now see a shift of UAS use in civilian/public domains. However, it will be long before UAS are extensively utilized in civilian domains, but their importance in applications related to earth science, environment/pollution monitoring, land management, civil infrastructure, health management, public security, ...

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Neuroelectrical Brain Imaging Tools for the Study of the Efficacy of TV Advertising Stimuli and their Application to Neumarketing

In this book the authors describe their original research on the potential of both standard and high-resolution electroencephalography (EEG) for analyzing brain activity in response to TV advertising. When engineering techniques, neuroscience concepts and marketing stimuli converge in one research field, known as neuromarketing, various theoretical and practical aspects need to be considered. The book introduces and discusses those aspects in detail, while showing several experiments performed by the authors during their attempts to measure both the cognitive activity and emotional involvement of the test subjects. In these experiments, the authors apply simultaneous EEG, galvanic...

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Multicriteria and Multiagent Decision Making with Applications to Economics and Social Sciences

The book provides a comprehensive and timely report on the topic of decision making and decision analysis in economics and the social sciences. The various contributions included in the book, selected using a peer review process, present important studies and research conducted in various countries around the globe. The majority of these studies are concerned with the analysis, modeling and formalization of the behavior of groups or committees that are in charge of making decisions of social and economic impor-
tance. Decisions in these contexts have to meet precise coherence standards and achieve a significant degree of sharing, consensus and acceptance, even in uncertain and fuzzy[...]

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D.A. Vattchenin, National Academy of Sciences of Belarus, Minsk, Belarus

A Heuristic Approach to Possibilistic Clustering: Algorithms and Applications

The present book outlines a new approach to possibilistic clustering in which the sought clustering structure of the set of objects is based directly on the formal definition of fuzzy cluster and the possibilistic memberships are determined directly from the values of the pairwise similarity of objects. The proposed approach can be used for solving different classification problems. Here, some techniques that might be useful at this purpose are outlined, including a methodology for constructing a set of labeled objects for a semi-supervised clustering algorithm, a methodology for reducing analyzed attribute space dimensionality and a methods for asymmetric data processing.[...]

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E. Wachspress, Senior Research Scientist (retired), East Windsor, USA

The ADI Model Problem

The ADI Model Problem presents the theoretical foundations of Alternating Direction Implicit (ADI) iteration for systems with both real and complex spectra and extends early work for real spectra into the complex plane with methods for computing optimum iteration parameters for both one and two variable problems. This book provides application of theory to the solution of boundary value problems and description of stable similarity reduction of a full matrix to low-band upper Hessenberg form, with application to computation of eigenvalues and solution of Lyapunov and Sylvester equations. Also included are MATLAB programs and numerical verification of theory and applications.

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D. Wang, Dalian University of Technology, Dalian, China, People’s Republic; P. Shi, Victoria University, Melbourne, Australia; W. Wang, Dalian University of Technology, Dalian, China, People’s Republic

Robust Filtering and Fault Detection of Switched Delay Systems

Switched delay systems appear in a wide field of applications including networked control systems, power systems, memristive systems. Though the large amount of ideas with respect to such systems have generated, until now, it still lacks a framework to focus on filter design and fault detection issues which are relevant to life safety and property loss. Beginning with the comprehensive coverage of the new developments in the analysis and control synthesis for switched delay systems, the monograph not only provides a systematic approach to designing the filter and detecting the fault of switched delay systems, but it also covers the model reduction issues. Specific topics covered[...]

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F. Vollertsen (Ed.)

Micro Metal Forming

Micro Metal Forming, i.e. forming of parts and features with dimensions below 1 mm, is a young area of research in the wide field of metal forming technologies, expanding the limits for applying metal forming towards micro technology. The essential challenges arise from the reduced geometrical size and the increased lot size. In order to enable potential users to apply micro metal forming in production, information about the following topics are given: tribological behavior: friction between tool and work piece as well as tool wear. Mechanical behavior: strength and formability of the work piece material, durability of the work pieces size effects: basic description of effects occurring[...]

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L.Q. Wang, The University of Hong Kong, Hong Kong, China (P.R.) (Ed.)

Advances in Transport Phenomena 2012

The term transport phenomena is used to describe processes in which mass, momentum, energy and entropy move about in matter. Advances in Transport Phenomena provide state-of-the-art expositions of major advances by theoretical, numerical and experimental studies from a molecular, microscopic, mesoscopic, macroscopic or megascopic point of view across the spectrum of transport phenomena, from scientific enquiries to practical applications. The annual review series intends to fill the information gap between regularly published journals and university-level textbooks by providing in-depth review articles over a broader scope than in journals. The authoritative articles, contributed by[...]

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Forthcoming

I. Woungang, Ryerson University, Toronto, Canada; S.K. Dhuman, IIT Delhi, New Delhi, India; Anpalagan,
Routing in Opportunistic Networks

Routing in Opportunistic Networks focuses on the basics of opportunistic networks, modeling and communication in opportunistic networks, routing in opportunistic networks, and collaboration and cooperation in opportunistic networks. The editors will cover such topics as mobility characterization and discovery in opportunistic networks, scheduling and medium access control in opportunistic networks as well as testbeds, tools, and measurements for opportunistic networks.

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Analysis and Synthesis of Singular Systems with Time-Delays

Singular time-delay systems are very suitable to describe a lot of practical systems such as manufacturing systems, networked control systems, power systems and electrical circuits. Thus, the past two decades have witnessed a significant progress on the theory of singular time-delay systems, and many fundamental and important topics have been successfully investigated including stability analysis, stabilization, guaranteed cost control, filtering, observer design, sliding mode control and so on. The main objective of this book is to present the latest developments and references in the analysis and synthesis of singular time-delay systems with or without Markov jumping parameters in an accessible way.

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Laser Forming and Welding Processes

This book introduces model studies and experimental results associated with laser forming and welding such as laser induced bending, welding of sheet metals, and related practical applications. The book provides insight into the physical processes involved with laser forming and welding. The analytical study covers the formulation of laser induced bending while the model study demonstrates the simulation of bending and welding processes using the finite element method. Analytical and numerical solutions for laser forming and welding problems are provided.

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3D Video Coding for Embedded Devices

Energy Efficient Algorithms and Architectures

This book shows readers how to develop energy-efficient algorithms and hardware architectures to enable high-definition 3D video coding on resource-constrained embedded devices. Users of the Multi-view Video Coding (MVC) standard face the challenge of exploiting its 3D video-specific coding tools for increasing compression efficiency at the cost of increasing computational complexity and, consequently, the energy consumption. This book enables readers to reduce the multiview video coding energy consumption through jointly considering the algorithmic and architectural levels. Coverage includes an introduction to 3D videos and an extensive discussion of the current state-of-the-art of many issues.

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Repetitive Motion Planning and Control of Redundant Robot Manipulators presents four typical motion planning schemes based on optimization techniques, including the fundamental RMP scheme and its extensions. These schemes are unified as quadratic programs (QPs), which are solved by neural net-
Dental Biotribology

Dental Biotribology summarizes the latest achievements in dental wear and is designed to help the reader better understand the relationship between structures and tribological properties of human teeth. This book provides guidance on the biomimic design of anti-wear engineering systems based on human teeth and also explains mechanisms of occlusal wear and erosion as well as fretting wear related to dental implants and orthodontics. Additionally, this book and simulation techniques, advanced analysis techniques, optimization of structures and materials and constitutive modelling. Well known experts present their research on damage and fracture of material and structures, materials modelling and evaluation up to image processing and visualization for advanced analyses and evaluation.

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Social Web Artifacts for Boosting Recommenders

Theory and Implementation

Recommender systems, software programs that learn from human behavior and make predictions of what products we are expected to appreciate and purchase, have become an integral part of our everyday life. They proliferate across electronic commerce around the globe and exist for virtually all sorts of consumable goods, such as books, movies, music, or clothes. At the same time, a new evolution on the Web has started to take shape, commonly known as the “Web 2.0” or the “Social Web”: Consumer-generated media has become rife, social networks have emerged and are pulling significant shares of Web traffic. In line with these developments, novel information and knowledge artifacts have become...[

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Feedback Strategies for Wireless Communication

This book explores the different strategies regarding limited feedback information. The book analyzes the impact of quantization and the delay of CSI on the performance. The author shows the effect of the reduced feedback information and gives an overview about the feedback strategies in the standards. This volume presents theoretical analysis as well as practical algorithms for the required feedback information at the base stations to perform adaptive resource algorithms efficiently and mitigate interference coming from other cells.


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