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Aerospace Technology and Astronautics

Paradise Regained
The Regreening of Earth

What was our planet like before the advent of our modern civilization? What effect has our civilization had on the planet and its ecology? Paradise Regained begins by discussing these questions and then generates a scenario for the re-greening of Earth. It introduces new and innovative ideas on how humankind could use the resources of the Solar System for terrestrial benefit. The environmental challenges facing humanity today are too serious to be resolved simply by conservation and current technologies. Paradise Regained highlights the risk of humankind’s future extinction from environmental degradation. Human population growth, climate change, and the diminishing sustainability of the few remaining habitats for wildlife are all analyzed. Rather than losing heart, we need to recognize that the answer to these problems lies in the development of space. Not only will extraterrestrial resources avert a crisis, but they will also provide the basis for continued technological and societal progress. The resources of the Solar System will help meet our projected industrial needs. Space-based power generation systems will work synergistically with Earth-based conservation. The book concludes with a discussion on how closed ecological systems in space will function. This is a book that needs to be read urgently by many, if we are to save ourselves from environmental disasters and build a prosperous and sustainable future for all the creatures of Earth.

More on www.springer.com/978-0-387-79985-8
Due January 2010
2010. XXVIII, 180 p. 30 illus., 5 in color. (Springer Praxis Books, ) 978-0-387-79985-8 ► approx. 27,50 €

Reuseable Space Transportation Systems

In Reuseable Space Transportation Systems the authors review the past 20 years in which concepts for reusable space transportation systems have been evaluated in Europe and elsewhere, including technological studies and assessments, and developments of the essential technologies needed for the design and construction of such transportation systems. For example, within the European Space Agency’s FESTIP programme, of which one of the authors, Dr Kuczera, was the Programme Director, many different types of reusable launch vehicles (RLVs) were designed, investigated and technologically assessed. Although the authors focus on European efforts in the development of reusable space transportation systems, they describe briefly what has been done elsewhere and reference all major international programmes and projects in this field.

More on www.springer.com/978-3-540-89180-2
Due January 2010

The Fair and Responsible Use of Space
An International Perspective

As space applications become central to modern interaction, more and more entities are becoming involved in space activities. Consequently, strategies to establish the coordinated, ethically justifiable and sustainable conduct of space activities have to be found. Such an endeavour requires addressing current questions regarding the use of space, dealing with fair rules in orbit and discussing the way towards achieving truly global engagement on space security issues. The book outlines the current situation and identifies key challenges from the policy perspective. Taking this one step further, it also formulates principles and recommendations for global action. Nineteen eminent personalities from the space sector have united for this project, which is based on a conference organised at the European Space Policy Institute (ESPI) in November 2008 in Vienna.

More on www.springer.com/978-3-211-99652-2
Due March 2010
2010. Approx. 200 p. (Studies in Space Policy, 4) 978-3-211-99652-2 ► approx. 93,41 €

Planetary Rovers
Tools for Space Exploration

With the recent declarations of intent by space-faring 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 will open with an introduction to the use of robotic rovers for planetary exploration and their relationship to other terrestrial applications, including oceanography. The terrain in particular, in planetary environment, is a major design driver for the planetary rover and therefore a review of each planet and small bodies of the solar system and their impact on rover design is provided. Mars is the best known example for the NASA
Appl. Mathematics / Computational Methods of Engineering

Forthcoming

C.A. Coello Coello, C. Dhaeneens, L. Jourdan

Advances in Multi-Objective Nature Inspired Computing

The purpose of this book is to collect contributions that deal with the use of nature inspired metaheuristics for solving multi-objective combinatorial optimization problems. Such a collection intends to provide an overview of the state-of-the-art developments in this field, with the aim of motivating more researchers in operations research, engineering, and computer science, to do research in this area. As such, this book is expected to become a valuable reference for those wishing to do research on the use of nature inspired metaheuristics for solving multi-objective combinatorial optimization problems.

More on www.springer.com/978-3-642-11217-1

Due February 2010
2010. Approx. 195 p. (Studies in Computational Intelligence, 272)
978-3-642-11217-1 ▶ 99,95 €

Forthcoming

A. Hanazawa, T. Miki, K. Horio

Brain-Inspired Information Technology

"Brain-inspired information technology" is one of key concepts for the development of information technology in the next generation. Explosive progress of computer technology has been continuing based on a simple principle called "if-then rule". This means that the programmer of software have to direct every action of the computer programs in response to various inputs. There inherently is a limitation of complexity because we human have a limited capacity for managing complex systems. Actually, many bugs, mistakes of programming, exist in computer software, and it is quite difficult to extinguish them. The parts of computer programs where computer viruses attack are also a kind of programming mistakes, called security hole. Of course, human body or nervous system is a considerable impact on the entire research community. Due to our personal relations with Ashley, we also had an opportunity to get familiar with his deep thinking about the areas of his expertise and interests. Ashley has been involved since the very beginning of his professional career in database research and practice. Notably, he introduced first some novel solution in database management systems that could handle imprecise and uncertain data, and flexible queries based on imprecisely specified user interests. He proposed to use for that purpose fuzzy logic as an effective and efficient tool. Later the interests of Ashley moved to ways of how to represent and manipulate more complicated databases involving spatial or temporal objects. In this research he discovered and pursued the power of Geographic Information Systems (GISs). These two main lines of Ashley's research interests and contributions are reflected in the composition of this volume. Basically, we collected some significant papers by well known researchers and scholars on the above mentioned topics. The particular contributions will now be briefly summarized to help the reader get a view of the topics covered and the contents of the particular contributions.

More on www.springer.com/978-3-642-10662-0

Due January 2010
2010. Approx. 225 p. (Studies in Computational Intelligence, 271)
978-3-642-10662-0 ▶ 99,95 €

E. Layer, K. Tomczuk

Measurements, Modelling and Simulation of Dynamic Systems

This book discusses an analog-to-digital system intended to dynamic measurement, particularly for non-electrical quantities. The construction and properties of measurement sensors are analyzed in detail, as these represent the primary components for all measurement systems. Procedures for signal noise
Operational work systems are slowly becoming reality. This book shall contribute to give system designers some more guidelines about designing work systems and associated cognitive machines effectively, in particular those related to guidance and control of manned and unmanned vehicles. The issue is that the findings on cognition have to become sufficient commonsense for all from the various disciplines involved in system design, and that guidelines are given how to make use of it in an appropriate and systematic manner. These guidelines are to account for both the needs of the human operator in the work process and the use of computational potentials to make the work system a really most effective one. In other words, this book is meant to provide guidelines for the organisational and technical design of work systems. Therefore, this book is an interdisciplinary one. Findings in individual disciplines are not the main issue. It is rather the combination of these findings for the sake of the performance of work systems which makes this book a useful one for designers who are interested in this modern approach and its implementation.

More on www.springer.com/978-3-642-03134-2
Due January 2010
2010. Approx. 350 p. (Studies in Computational Intelligence, 235)
978-3-642-03134-2 ► 129,95 €

Forthcoming
Q. Luo

Advancing Computing, Communication, Control and Management

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

More on www.springer.com/978-3-642-05172-2
Due January 2010
2010. X, 294 p. (Lecture Notes in Electrical Engineering, 56)
978-3-642-05172-2 ► 199,95 €

Forthcoming
R. Onken, A. Schulte

System-Ergonomic Design of Cognitive Automation

Dual-Mode Cognitive Design of Vehicle Guidance and Control Work Systems

Why this book? Simply because it is due. Cognitive automation and its system-ergonomic introduction into work systems have been advanced in the meantime to such a degree that already applications for key part of neural network technology: methods used to pass the tough verification and validation (V&V) standards required in many safety-critical applications. The book presents what kinds of evaluation methods have been developed across many sectors, and how to pass the tests. A new adaptive structure of V&V is developed in this book, different from the simple six sigma methods usually used for large-scale systems and different from the theorem-based approach used for simplified component subsystems. More on www.springer.com/978-3-642-10689-7
Due January 2010
2010. Approx. 280 p. (Studies in Computational Intelligence, 268)
978-3-642-10689-7 ► 99,95 €

Forthcoming
Y. Tenne, C. Goh

Computational Intelligence in Expensive Optimization Problems

In modern science and engineering, laboratory experiments are replaced by high fidelity and computationally expensive simulations. Using such simulations reduces costs and shortens development times but introduces new challenges to design optimization process. Examples of such challenges include limited computational resource for simulation runs, complicated response surface of the simulation inputs-outputs, and etc. Under such difficulties, classical optimization and analysis methods may perform poorly. This motivates the application of computational intelligence methods such as evolutionary algorithms, neural networks and fuzzy logic, which often perform well in such settings. This is the first book to introduce the emerging field of computational intelligence in expensive optimization problems. Topics covered include: Dedicated implementations of evolutionary algorithms, neural networks and fuzzy logic. Reduction of expensive evaluations (modelling, variable-fidelity, fitness inheritance). Frameworks for optimization (model management, complexity control, model selection). Parallelization of algorithms (implementation issues on clusters, grids, parallel machines). Incorporation of expert systems and human-system interface. Single and multiobjective algorithms. Data mining and statistical analysis. Analysis of real-world cases (such as multidisciplinary design optimization). The edited book provides both theoretical treatments and real-world insights gained by experience, all contributed by leading researchers in the respective fields. As such, it is a comprehensive reference for researchers, practitioners, and advanced-level students interested in both the theory and practice of using computational intelligence for expensive optimization problems. More on www.springer.com/978-3-642-10700-9
Due February 2010
2010. Approx. 800 p. (Adaptation, Learning, and Optimization, 2)
978-3-642-10700-9 ► 199,95 €
like ignition delay, fuel air mixing, rate of heat release, and emissions of smoke, particulate and nitric oxide. It enables quantitative evaluation of these important phenomena and parameters. Most importantly, it attempts to model them with constants that are independent of engine types. This work recognises the importance of the spray at the wall in precisely describing the heat release and emissions for most of the engines on and off road. It gives models for heat release and emissions. Every model is thoroughly validated by detailed experiments using a broad range of engines. Throughout the book, the models use constants that are independent of engine type or design and hence they could be applied by the designer and researcher for a general engine. All the models not only describe the trends of important parameters but also quantitatively close to the experimentally observed results. The enhanced understanding of the phenomena like turbulent flows, high-pressure sprays naturally converges to quantitative prediction using multi-dimensional CFD tools to reveal finer details of in-cylinder processes of diesel combustion. The CFD tools are introduced with case studies in two chapters of the book to help study innovative combustion concepts and improve engine designs in terms of emissions reduction and fuel economy.

Due January 2010
2010. IV, 296 p. (Mechanical Engineering Series,)
978-90-481-3884-5 ▶ 99,95 €

K. Mollenhauer, H. Tschoke

**Handbook of Diesel Engines**

The diesel engine continues to be the most cost effective internal combustion engine for motor vehicles as well as mobile and stationary machines. Given the discussion of CO2, the diesel engine is superior to all other drive engines in terms of flexibility, performance, emissions and ruggedness. The intensive search for alternative drive concepts, e.g. hybrid or purely electric drives, has revealed the advantages of the diesel engine for cost effective long distance use wherever high energy densities of energy carriers are indispensable, i. e. storage capacities are low. This English edition of the Handbook of Diesel Engines provides a comprehensive overview of diesel engines of every size from small single cylinder engines up through large two-stroke marine engines. Fifty-eight well-known experts from industry and academia collaborated on this handbook. In addition to the fundamentals and design of diesel engines, it specifically treats in detail the increasingly important subjects of energy efficiency, exhaust emission, exhaust gas aftertreatment, injection systems, electronic engine management and conventional and alternative fuels. This handbook is an indispensable companion in the field of diesel engines. It is geared toward both experts working in research and development and the industry and students studying engineering, mechatronics, electrical engineering or electronics. Anyone interested in learning more about technology and understanding the function and interaction of the complex system of the diesel engine will also find their questions answered.

More on www.springer.com/978-3-540-89082-9
Due April 2010
2010. Approx. 700 p. 730 illus., 100 in color.
978-3-540-89082-9 ▶ 199,95 €

L. Yun, A. Bliault, J. Doo

**WIG Craft and Ekranoplan**

**Ground Effect Craft Technology**

WIGs (Wing in Ground) are advanced hybrid air cushion crafts and they offer the combination of speed, fuel efficiency, and ride smoothness. WIG rides above the surface like an airplane on a dynamic air cushion that is produced by the vessel’s forward motion. The adoption of WIG has been slow due to the complicated technology issues surrounding the vessel; it is a hybrid vehicle that combines marine and aviation theory, wing theory and air cushion theory, aerodynamic and hydrodynamic theory. “WIG Craft and Ekranoplan: Ground Effect Craft Technology” provides a comprehensive overview of the design, development and building of WIG vessels. Drawing upon years of practical experience and using numerous examples and illustrative applications, Liang Yun, Alan Bliault and Johnny Doo discuss: Basic principles of WIG craft technology State of the art overview of WIG craft technology in the United States, Russia, Germany, China and Australia Material and structural design of WIG craft Lift and propulsion systems of WIG craft WIG Craft and Ekranoplan: Ground Effect Craft Technology will be of interest to naval engineers, aviation engineers, naval architects, and mechanical engineers interested in the development and research of wing in ground (WIG) and high performance marine vehicles.

More on www.springer.com/978-1-4419-0041-8
Due January 2010
2010. XV, 443 p. 74 illus.
978-1-4419-0041-8 ▶ 129,95 €
Biomedical Engineering

Medical Imaging Informatics

Medical Imaging Informatics provides an overview of this growing discipline, which stems from an intersection of biomedical informatics, medical imaging, computer science and medicine. Supporting two complementary views, this volume explores the fundamental technologies and algorithms that comprise this field, as well as the application of medical imaging informatics to subsequently improve healthcare research. Clearly written in a four part structure, this introduction follows natural healthcare processes, illustrating the roles of data collection and standardization, context extraction and modeling, and medical decision making tools and applications. Medical Imaging Informatics identifies core concepts within the field, explores research challenges that drive development, and includes current state-of-the-art methods and strategies.

More on www.springer.com/978-1-4419-0384-6

Due January 2010
2010. XXV, 551 p. 50 illus.
978-1-4419-0384-6 ► 129,95 €

Computational Electrophysiology

A First Course in “in Silico” Medicine vol.2

Biological systems inherently possess much ambiguity or uncertainty. Computational electrophysiology is the one area, from among the vast and rapidly growing discipline of computational and systems biology, in which computational or mathematical models have succeeded. This book provides a practical and quick guide to both computational electrophysiology and numerical bifurcation analysis. Bifurcation analysis is a very powerful tool for the analysis of such highly nonlinear biological systems. Bifurcation theory provides a way to analyze the effect of a parameter change on a system and to detect a critical parameter value when the qualitative nature of the system changes. Included in this work are many examples of numerical computations of bifurcation analysis of various models as well as mathematical models with different abstraction levels from neuroscience and electrophysiology. This volume will benefit graduate and under-

graduate students as well as researchers in diverse fields of science.

More on www.springer.com/978-4-431-53861-5

Due February 2010
978-4-431-53861-5 ► approx. 55,95 €

Computational Surgical and Dual Training

The new and emerging field of computational surgery will improve the efficiency and quality of surgery and will give patients access to very complex surgical operations that require extreme precision and minimum intrusion. In order to effectively deploy computational surgery techniques in life threatening cases such as inoperable cancer tumors that have invaded critical artery tissues or the nervous system, surgeons will have to become very familiar with computing methods, such as image analysis, augmented reality and robotics. Computational Surgery and Dual Training provides the necessary background in computer and surgical techniques that will enable computer scientists/biomedical engineers and surgeons to work together to improve interventional procedures and surgeries. The book brings together contributions from leading minds in the field, who also: Provide a foundation in surgical methods for biomedical engineers who wish to do research in the surgical area. Include material on surgery applications and biomedical modeling Offer a detailed discussion of imaging and optimization in computational surgery. Computational Surgery and Dual Training is the perfect book for biomedical engineers and active surgeons interested in learning more about these developing methods.


Due January 2010
978-1-4419-1122-3 ► 129,95 €

Computational Cardiovascular Mechanics

Modeling and Applications in Heart Failure

Computational Cardiovascular Mechanics promotes the application of patient-specific cardiovascular mechanics models to clinical medicine, which aid medical diagnosis and enhance treatment for cardiovascular disease. Organized in a two-part structure, this volume presents a comprehensive overview of computational modeling from both solid mechanics and fluid dynamics perspectives. Part I covers chapters devoted to various techniques involving finite element modeling of ventricular mechanics and computational fluid dynamics, with a focus in cardiovascular mechanics. Part II covers heart failure applications which utilize techniques in solid mechanics and fluid dynamics. In the former, both diagnostic (i.e., global and regional indices of myocardial contractility) as well as therapeutic approaches (surgical ventricular remodeling procedures, passive ventricular constraint devices, ventricular implantation of biomaterials and cardiac resynchronization therapy) are discussed. In the latter, the fluid mechanics of heart valves is simulated, as are surgical procedures and heart failure-related devices in the form of coronary artery bypass grafting and ventricular assist devices. Computational Cardiovascular Mechanics is a vital resource for cardiovascular disease researchers who want to learn how to apply computational fluid and/or solid mechanics to the diagnosis and treatment of heart failure.


Due February 2010
2010. XVI, 436 p. 186 illus., 8 in color.
978-1-4419-0729-5 ► 129,95 €
Parameters. The present book focuses on the influence of context in these measurements. The everyday-life contexts of future products and machines will be always specific, especially in comparison to the standard laboratory situation. Context can impact the experience measurements and influence the occurrence and characteristics of certain signals. On the other hand, independent knowledge of the context could be very valuable for the interpretation of experience measurements. This book provides an overview of the present knowledge on the impact of context, and advocates the need for a joint understanding of its role in the measurement of experience. The authors comprise many experienced researchers on this topic with a wide variety of backgrounds, including business and academia, covering a broad range of context situations.

Due April 2010
2010. IV, 156 p. (Philips Research Book Series, 12)
978-90-481-3257-7 ► approx. 99,95 €

Irreversible Electroporation

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

More on www.springer.com/978-3-642-05419-8
Due January 2010
978-3-642-05419-8 ► 99,95 €
Earthquake Resistant Buildings
Dynamic Analyses, Numerical Computations, Codified Methods, Case Studies and Examples

This concise work provides a general introduction to the design of buildings which must be resistant to the effect of earthquakes. A major part of this design involves the building structure which has a primary role in preventing serious damage or structural collapse. Much of the material presented in this book examines building structures. Due to the recent discovery of vertical components, it examines not only the resistance to lateral forces but also analyses the disastrous influence of vertical components. The work is written for Practicing Civil, Structural, and Mechanical Engineers, Seismologists and Geoscientists. It serves as a knowledge source for graduate students and their instructors.

More on www.springer.com/978-3-540-93817-0
Due February 2010
2010, 1, 900 p.
978-3-540-93817-0 ► approx. 299,00 €

Circuits and Systems

Forthcoming
I. Ahmed

 Pipelined ADC Design and Enhancement Techniques

Pipelined ADCs have seen phenomenal improvements in performance over the last few years. As such, when designing a pipelined ADC a clear understanding of the design tradeoffs, and state of the art techniques is required to implement today's high performance low power ADCs. Written for both researchers and professionals, Pipelined ADC Design and Enhancement Techniques provides: i.) A tutorial discussion, for those new to pipelined ADCs, of the basic design and tradeoffs involved in designing a pipelined ADC ii.) A detailed discussion of four novel silicon tested pipelined ADC topologies geared towards those looking to gain insight into state-of-the-art design in the area. The ADCs detailed include: - An 11-bit 45MS/s ADC which rapidly digitally calibrates in the background both DAC and gain errors - A 10-bit ADC with power scalable between 50MS/s (35mW) to 1kS/s (15µW) - A 10-bit ADC for use in sub-sampled systems with a technique to eliminate the front-end sample-and-hold - A 10-bit, 50MS/s ADC which uses a capacitive charge pump based approach to enable a very small power consumption of 9.5mW.

Due March 2010
978-90-481-8651-8 ► 99,95 €

ESL Models and their Application
Electronic System Level Design and Verification in Practice

ESL Models and their Application: Electronic System Level Design and Verification in Practice Grant Martin Brian Bailey This book arises from experience the authors have gained from years of work as industry practitioners in the field of Electronic System Level (ESL) design and verification. At the heart of all things related to Electronic Design Automation (EDA), the core issue is one of models: what are the models used for, what should the models contain, and how should they be written and distributed. Issues such as model interoperability and transportability become central factors that may decide which models and tools are successful and those that cannot get sufficient traction in the industry to survive. Through a set of real examples taken from recent industry experience, this book distills the state-of-the-art of System-Level models and provides practical guidance to readers that can be put into use. This book is an invaluable tool that will aid readers in their own designs, reduce risk in development projects, expand the scope of design projects, and improve developmental processes and project planning. Provides insight to all phases of ESL model design and flow for novices, students, researchers, managers, and experienced hardware and software designers and architects; Includes extensive, realistic examples from industrial ESL design flows; Focuses on the models that are the cornerstone of those flows and provides concrete examples showing how they are created, how they are used and the how they get transplanted. This book is a must-have for anyone needing to understand the essentials of system-level models: their purpose, their contents, and how they get distributed.

More on www.springer.com/978-1-4419-0964-0
Due February 2010
2010, X, 390 p. 177 illus. (Embedded Systems,)
978-1-4419-0964-0 ► approx. 79,95 €
Dynamic Reconfigurable Architectures and Transparent Optimization Techniques

A.C. Beck Fl., L. Carro

3-Dimensional VLSI

Y. Deng, W.P. Maly

Security in Embedded Devices

C.H. Gebotys

Circuits and Systems 9

A comprehensive study on new techniques to cope with the aforementioned limitations. First, characteristics of reconfigurable systems are discussed in detail, and a large number of case studies is shown. Then, a detailed analysis of several benchmarks demonstrates that such architectures need to attack a diverse range of applications with very different behaviors, besides supporting code compatibility. This requires the use of dynamic optimization techniques, such as Binary Translation and Trace reuse. Finally, works that combine both reconfigurable systems and dynamic techniques are discussed and a quantitative analysis of one of them, the DIM architecture, is presented.


Due February 2010

2010. Approx. 300 p. 300 illus.
978-3-642-04156-3  ► 99,95 €

On and Off-Chip Crosstalk Avoidance in VLSI Design

On- and Off-Chip Crosstalk Avoidance in VLSI Design Chunjie Duan, Brock J. LaMeres and Sunil P. Khatri

An important aspect of the security design in devices ranging from typical wireless devices such as PDAs through to contactless smartcards to satellites. Provides must-have content for both security engineers and embedded systems designers; Describes numerous case studies, including contactless smartcards, PDA security, and satellite security, illustrating various aspects of secure, embedded design; Covers security fundamentals, embedded

Due February 2010

2010. Approx. 200 p. 50 illus.
978-3-642-04156-3  ► 99,95 €

Security in Embedded Devices Cathy Gebotys

Although security is prevalent in PCs, wireless communications and other systems today, it is expected to become increasingly important and widespread in many embedded devices. For some time, typical embedded system designers have been dealing with tremendous challenges in performance, power, price and reliability. Now they must also deal with definition of security requirements, security design and implementation. Given the limited number of security engineers in the market, large background of cryptography with which these standards are based upon, and difficulty of ensuring the implementation will be secure from attacks, security design remains a challenge. This book provides the foundations for understanding embedded security design, outlining various aspects of security in devices ranging from typical wireless devices such as PDAs through to contactless smartcards to satellites. Provides must-have content for both security engineers and embedded systems designers; Describes numerous case studies, including contactless smartcards, PDA security, and satellite security, illustrating various aspects of secure, embedded design; Covers security fundamentals, embedded

Due February 2010

2010. Approx. 300 p. 300 illus.
978-3-642-04156-3  ► 99,95 €
CMOS Capacitive Sensors for Lab-on-Chip Applications
A Multidisciplinary Approach

Lab-on-Chip (LoC) is a multidisciplinary approach toward the miniaturization, integration and automation of biological assays. A biological laboratory contains various pieces of equipment used for performing a variety of biological protocols. The engineering aspect of LoC design is aiming to embed all these components in a single chip for single-purpose applications. LoC is a young discipline which is expected to subsequently expand over the next few years, stimulated by considerable development of applications in the mechanical, biochemical and electrical engineering domains. Among various microelectronic devices employed for LoC applications, CMOS capacitive sensors have received a significant interest for several applications including DNA detection, antibody-antigen recognition and bacteria growth monitoring. The main components of CMOS capacitive biosensors including sensing electrodes, bio-functionalized sensing layer, interface circuitries and microfluidic packaging are verbosely explained in chapters 2-6 after a brief introduction on CMOS based LoCs in Chapter 1. CMOS Capacitive Sensors for Lab-on-Chip Applications is written in a simple pedagogical way. It emphasizes practical aspects of fully integrated CMOS biosensors rather than mathematical calculations and theoretical details. By using CMOS Capacitive Sensors for Lab-on-Chip Applications, the reader will have circuit design methodologies, main important biological capacitive interfaces and the required microfluidic fabrication procedures to create capacitive biosensor through standard CMOS process.

Design and Verification of Microprocessor Systems for High-Assurance Applications

Design and Verification of Microprocessor Systems for High-Assurance Applications is written in a simple pedagogical way. It emphasizes practical aspects of fully integrated CMOS biosensors rather than mathematical calculations and theoretical details. By using CMOS Capacitive Sensors for Lab-on-Chip Applications, the reader will have circuit design methodologies, main important biological capacitive interfaces and the required microfluidic fabrication procedures to create capacitive biosensor through standard CMOS process.

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Converters provides a strong theoretical basis and on TDC applications in phase-locked-loops and analog converter principle, resolution, power, area, conversion time, high resolution, high linearity, low-power, variability, noise, and variability. Advanced TDC architectures are described that address the challenges of signed time interval measurement, long measurement time, high resolution, high linearity, low-power, variability and calibration, low mismatch among multiple measurements, and suitability for design automation. Resolution enhancement techniques such as pulse-shrinking, Vernier delay-line, local passive interpolation, gated delay-lines, and time amplification are introduced and discussed with respect to operating principle, resolution, power, area, conversion time, susceptibility to variations, and suitability for implementation and mass production. Finally, an overview on TDC applications in phase-locked-loops and analog-to-digital converters is given. Time-to-Digital Converters provides a strong theoretical basis and comprises a unique in-depth overview on TDC architectures and conversion principles.


As more and more electronics devices are becoming portable, leakage power is becoming a major concern in the design of VLSI circuits today. Traditionally, dynamic (switching) power has dominated the total power consumption of an IC. However, due to current scaling trends, leakage power has now become a major component of the total power consumption in VLSI circuits. Leakage power reduction is especially important in portable/hand-held electronics such as cell-phones and PDAs. This book presents techniques aimed at reducing and exploiting leakage power in digital VLSI ICs. The first part of this book presents several approaches to reduce leakage in a circuit. The second part of this book shows readers how to turn the leakage problem into an opportunity, through the use of sub-threshold logic, with adaptive body bias to make the designs robust to variations. The third part of this book presents design and implementation details of a sub-threshold IC, using the ideas presented in the second part of this book. Provides a variety of approaches to control and exploit leakage, including implicit approaches to find the leakage of all input vectors in a design, techniques and application-level techniques. The book is intended for researchers, designers, and students in the electronic design automation community.


The leakage of all input vectors in a design, techniques and application-level techniques. The book is intended for researchers, designers, and students in the electronic design automation community.


Forthcoming

C. Huang

Robust Computing with Nano-scale Devices

Progresses and Challenges

Although complementary metal-oxide semiconductor (CMOS) technology will continue dominating the digital electronic circuits for the next 10-15 years, a number of grand challenges have emerged as the transistor size scales down. The rising costs of semiconductor mask and fabrication pose economic barriers to lithography. The quantum effects and increasing leakage power begin setting physical limits on continuous CMOS feature size shrinking. The research advances of innovative nano-scale devices have created great opportunities to surpass the barriers faced by CMOS technology, which include nanowires, carbon nanotube transistors, programmable molecular switches, resonant tunneling diodes, quantum dots, etc. However, the success of many nanotechnologies relies on the self-assembly fabrication process to fabricate circuits. The stochastic self-assembly fabrication, unfortunately, has low reliability with defect densities several orders of magnitude higher than conventional CMOS technology. Robust Nano-Computing focuses on various issues of robust nano-computing, defect-tolerance design for nano-technology at different design abstraction levels. It addresses both redundancy- and configuration-based methods as well as fault detecting techniques through the development of accurate computation models and tools. The contents present an insightful view of the ongoing researches on nano-electronic devices, circuits, architectures, and design methods, as well as provide promising directions for future research.


S. Hensler

Time-to-Digital Converters

With ongoing technology scaling high resolution in the voltage domain becomes increasingly troublesome. Time domain resolution, however, is continuously improving as digital circuits become faster in each new technology generation. Time-to-Digital Converters describes the fundamentals of time-to-digital converters (TDC) based on analog and digital conversion principles. An in-depth theoretical investigation is provided with respect to quantization, linearity, noise, and variability. Advanced TDC architectures are described that address the challenges of signed time interval measurement, long measurement time, high resolution, high linearity, low-power, variability and calibration, low mismatch among multiple measurements, and suitability for design automation. Resolution enhancement techniques such as pulse-shrinking, Vernier delay-line, local passive interpolation, gated delay-lines, and time amplification are introduced and discussed with respect to operating principle, resolution, power, area, conversion time, susceptibility to variations, and suitability for implementation and mass production. Finally, an overview on TDC applications in phase-locked-loops and analog-to-digital converters is given. Time-to-Digital Converters provides a strong theoretical basis and comprises a unique in-depth overview on TDC architectures and conversion principles.

to find the minimum leakage vector of a design (with and without circuit modification), ASIC approaches to drastically reduce leakage, and methods to find the optimal reverse bias voltage to maximally reduce leakage. Presents a variation-tolerant, practical design methodology to implement sub-threshold logic using closed-loop adaptive body bias (ABB) and Network of PLAs (NPLA) based design. In addition, asynchronous micropipelining techniques are presented, to substantially reclaim the speed penalty of sub-threshold design. Validates the proposed ABB and NPLA sub-threshold design approach by implementing a BFSK transmitter design in the proposed design style. Test results from the fabricated IC are provided as well, indicating that a power improvement of 20X can be obtained for a 0.25um process (projected power improvements are 100X to 500X for 65nm processes).

More on www.springer.com/978-1-4419-0949-7

Due January 2010

978-1-4419-0949-7 ▶ 99,95 €

Forthcoming

Y.S. Lin, C. Kao, H. Kuo, J. Chen

VLSI Design for Video Coding
H.264/AVC Encoding from Standard Specification to Chip

Back Cover Copy VLSI Design for Video Coding
By: Youn-Lin Chao-Yang Kao Jian-Wen Chen Hung-Chih Kuo
High definition video requires substantial compression in order to be transmitted or stored economically. Advances in video coding standards from MPEG-1, MPEG-2, MPEG-4 to H.264/AVC have provided ever increasing coding efficiency, at the expense of great computational complexity which can only be delivered through massively parallel processing. This book presents VLSI architectural design and chip implementation for high definition H.264/AVC video encoding with a complete FPGA prototype. It serves as an invaluable reference for anyone interested in VLSI design for video coding. It presents state of the art VLSI architectural design and chip implementation for high definition H.264/AVC video encoding. It employs massively parallel processing to deliver 1080pHD, with efficient design that can be prototyped via FPGA; It presents the fundamental and current status of research of compound semiconductor metal-oxide-semiconductor field-effect transistors (MOSFETs) that are envisioned as a future replacement of silicon in digital circuits. The material covered begins with a review of specific properties of III-V semiconductors and available technologies making them attractive to MOSFET technology, such as band-engineered heterostructures, effect of strain, nanoscale control during epitaxial growth. Due to the lack of thermodynamically stable native oxides on III-V’s (such as SiO2 on Si), high-k oxides are the natural choice of dielectrics for III-V MOSFETs. The key challenge of the III-V MOSFET technology is a high-quality, thermodynamically stable gate dielectric that passes the interface states, similar to SiO2 on Si. Several chapters give a detailed description of materials science and electronic behavior of various dielectrics and related interfaces, as well as physics of fabricated devices and MOSFET fabrication technologies. Topics also include recent progress and understanding of various materials systems; specific issues for electrical measurement of gate stacks and FETs with low and wide bandgap channels and high interface trap density; possible paths of integration of different semiconductor materials on Si platform.

More on www.springer.com/978-1-4419-1546-7

Due February 2010

2010. Approx. 500 p. 100 illus.
978-1-4419-1546-7 ▶ approx. 129,95 €

Forthcoming

A.M. Shkel

Inertial Microsensors

This excellent volume lays out methods for the analysis and design of inertial micromachined sensors – a first in the market. The primary focus is, of course, on accelerometers and gyroscopes. Micro accelerometers are a type of solid-state sensors used for measurement of linear acceleration, and subsequently velocity and displacement. Micro Gyroscopes, on the other hand, are inertial sensors for direct measurement of either angular orientation or angular velocity. The aim of the book is to provide readers with a solid foundation in the theory of inertial measurement, introduce them to design fundamentals, and provide them with design recipes for implementation of inertial instruments on the micro-scale. All of the discussions in the book are supported by constructive computational examples illustrating the material. Comprehensive illustrations and micro-photographs are included as a visual aid. The purpose of the book is multifold: not only does it offer an overview of the field, introduce fundamental concepts, explicitly define design objectives for each type of inertial sensors, and summarize solutions for achieving the design objectives. It also discusses methods for fabrication, packaging, and testing micromachined accelerometers and gyroscopes.

More on www.springer.com/978-1-4419-0955-8

Due May 2010

978-1-4419-0955-8 ◀ appprox 99,95 €

R.R. Yarlagadda

Analog and Digital Signals and Systems

This is a comprehensive and cohesive presentation of analog and digital signal processing and filtering for electrical engineers. The author covers the principle concepts of analog and digital signals, generalized Fourier series approximations with sinusoidal and non-sinusoidal functions, and analog convolutions and correlations. Signals and linear system interactions, system stability and bandwidths are also discussed. Analysis and design of analog low-pass, high-pass, band-pass, band elimination filters, and delay line filters are discussed using operational ampli-
Civil Engineering (general)

Forthcoming

M.N. Fardis

Advances in Performance-Based Earthquake Engineering

Performance-based Earthquake Engineering has emerged before the turn of the century as the most important development in the field of Earthquake Engineering during the last three decades. It has since then started penetrating codes and standards on seismic assessment and retrofitting and making headway towards seismic design standards for new structures as well. The US has been a leader in Performance-based Earthquake Engineering, but Europeans are major contributors as well. Two Workshops on Performance-based Earthquake Engineering, held in Bled (Slovenia) in 1997 and 2004 are considered as milestones. The ACES Workshop in Corfu (GR) of July 2009 builds on them, attracting as contributors world-leaders in Performance-based Earthquake Engineering from North America, Europe and the Pacific rim (Japan, New Zealand, Taiwan, China). It covers the entire scope of Performance-based Earthquake Engineering: Ground motions for performance-based earthquake engineering; Methodologies for Performance-based seismic design and retrofitting; Implementation of Performance-based seismic design and retrofitting; Advanced seismic testing for performance-based earthquake engineering.

More on www.springer.com/978-90-481-8745-4

Due May 2010

2010. Approx. 480 p. 325 illus. (Geotechnical, Geological, and Earthquake Engineering, 13) 978-90-481-8745-4 ◄ approx. 129,95 €

Forthcoming

I.A. Karnovsky, O. Lebed

Advanced Methods of Structural Analysis

Advanced Methods of Structural Analysis aims to help its readers navigate through the vast field of structural analysis. The book aims to help its readers master the numerous methods used in structural analysis by focusing on the principal concepts, as well as the advantages and disadvantages of each method. The end result is a guide to mastering the many intricacies of the plethora of methods of structural analysis. The book differentiates itself from other volumes in the field by focusing on the following: The theory and application of structural analysis as it applies to trusses, beams and frames. Recent advances that have occurred in the realm of computer-based structural analysis. Stability of elastic systems and plastic behavior of structures. Authors Igor A. Karnovsky and Olga Lebed have crafted a must-read for civil and structural engineers, as well as researchers and students with an interest in perfecting structural analysis. Advanced Methods of Structural Analysis also offers numerous example problems, accompanied by detailed solutions and discussion of the results.


Due January 2010

2010. XXVIII, 540 p. 310 illus. 978-1-4419-0033-3 ◄ 104,95 €

Communications Engineering, Networks

Forthcoming

D. Antolovic

Radiolocation in Ubiquitous Wireless Communication

Radiolocation in Ubiquitous Wireless Communication discusses the application of multi-antenna radiolocation to the environment of fast, widespread wireless communication among portable devices. The book features distinctive information such as a description of a real-time, single packet radiolocation methodology, a detailed description of the architecture of two generations of working prototypes, the question of integrating radiolocation and data reception, and addresses adaptive directional communication with radiolocated sources. A functioning implementation of the transceiver architecture with multi-antenna radiolocation is described in detail. Radiolocation in Ubiquitous Wireless Communication fills a void in the current technical literature by presenting issues involved in locating mobile wireless network agents. This book is a valuable reference for system design engineers in the field of handheld and portable communication, as well as experts in wireless management and security.

More on www.springer.com/978-1-84882-673-1

Due May 2010

2010. VII, 249 p. 67 illus. 978-1-84882-673-1 ◄ 99,95 €

Forthcoming

R. Mauro

Calculation of Roundabouts

Capacity, Waiting Phenomena and Reliability

Roundabouts have become one of the most significant traffic control measures because they are generally statistically safer and more efficient than traditional at grade intersections. This book is dedicated to the evaluation of the operating conditions of roundabouts. In five parts, it thoroughly illustrates the capacity, including reliability, and waiting phenomena parameters, such as the times spent in the system and queue lengths. Fully worked examples are included throughout the chapters, with detailed explanations.


Due January 2010

2010. XXV, 593 p. 100 illus. 978-1-4419-1046-2 ◄ 129,95 €

Forthcoming

P.A. Vesilind

Engineering Peace and Justice

The Responsibility of Engineers to Society

The engineering profession has evolved considerably from the early engineers who were, almost without exception, employed in the making of war or in the defense of nations. Civil engineering emerged in the 18th century, providing an alternative for many engineers, and today there is a strong movement in the development of ‘peace engineering’ – the proactive use of engineering skills in the promotion of peace. Engineering Peace and Justice: The Responsibility of Engineers to Society details the history of the profession, including its ethical commitment to the public good, and shows how engineers have, in the past, served their clients as either military or civilian engineers. As well as presenting a discussion of the evolution of engineering, the book also examines concepts of ethical engineering, including the engineer’s duty to society; engineering’s relationship to war and peace; and the engineer’s commitment to the environment. The final section details some stories of contemporary engineers who have used their technical skills in the promotion of peace, becoming ‘peace engineers’. Engineering Peace and Justice: The Responsibility of Engineers to Society will be of interest to anyone involved in the engineering profession. Students contemplating careers in engineering will also find this book an inspiring guide to more vocational roles in the field.

More on www.springer.com/978-1-84882-673-1

Due May 2010

2010. VII, 249 p. 67 illus. 978-1-84882-673-1 ◄ 99,95 €
practitioner to "see" the theories behind his/her used technologies.
More on www.springer.com/978-3-642-01340-9
Due January 2010
2010. Approx. 350 p. (Signals and Communication Technology.)
978-3-642-01340-9 ▶ 129,95 €

Forthcoming
E. Gaura, L. Girod, J. Busey, M. Allen

Wireless Sensor Networks: Deployments and Design Frameworks
Wireless Sensor Networks: Real-Life Deployments and Design Frameworks brings together the most successful, current deployments of Wireless Sensor Networks (WSNs) including but not limited to specific WSN applications to generic issues covering practical design, implementation and deployment. Chapters cover design frameworks, available software and hardware techniques as well as system components and guidelines towards rapid development and deployment of WSN applications.
More on www.springer.com/978-1-4419-5833-4
Due April 2010
2010. Approx. 300 p. 978-1-4419-5833-4 ▶ approx. 104,95 €

The Regularized Fast Hartley Transform
Optimal Formulation of Real-Data Fast Fourier Transform for Silicon-Based Implementation in Resource-Constrained Environments
When designing high-performance DSP systems for implementation with silicon-based computing technology, the oft-encountered problem of the real-data DFT is typically addressed by exploiting an existing complex-data FFT, which can easily result in an overly complex and resource-hungry solution. The research described in The Regularized Fast Hartley Transform: Optimal Formulation of Real-Data Fast Fourier Transform for Silicon-Based Implementation in Resource-Constrained Environments deals with the problem by exploiting directly the real-valued nature of the data and is targeted at those real-world applications, such as mobile communications, where size and power constraints play key roles in the design and implementation of an optimal solution. The Regularized Fast Hartley Transform provides the reader with the tools necessary to both understand the proposed new formulation and to implement simple design variations that offer clear implementation advantages, both practical and theoretical, over more conventional complex-data solutions to the problem. The highly-parallel formulation described is shown to lead to scalable and device-independent solutions to the latency-constrained version of the problem which are able to optimize the use of the available silicon resources, and thus to maximize the achievable computational density, thereby making the solution a genuine advance in the design and implementation of high-performance parallel FFT algorithms.
Due March 2010
2010. Approx. 200 p. (Signals and Communication Technology.)
978-90-481-3916-3 ▶ 99,95 €

Forthcoming
I. Mezgår

Information and Communication Systems for Networked Enterprises
Infrastructures for Networked Production Systems and Business
Modern information and communication technologies are driving a new digital economy of networked enterprises linked at many levels through modern networking techniques. These enterprises of distributed and independent production units connected by communication networks are flexible and allow geographically distant organisational units to cooperate and react quickly to market demands. This book describes how networked enterprises evolved and surveys the latest wired and wireless communication technologies: those already being used, and what is currently being developed. Unique to the book is an analysis of the life cycle of a networked enterprise, including a description of every technology used. The pros and cons of wireless technologies are explained. This book will be of use to researchers and students in engineering, computer science and management studies as well as managers in industry and those interested in how modern technology is changing the ways organisations perform.
More on www.springer.com/978-1-84628-360-4
Due June 2010
2010. 25 illus. 978-1-84628-360-4 ▶ approx. 99,95 €
Handbook of Information and Communication Security

The Handbook of Information and Communication Security provides I&C professionals, researchers as well as students with quickly retrievable information on relevant security topics. Its main parts are written from a general technological perspective and are applicable to most computer network and telecommunication systems. This presentation is complemented by an extensive description of applications in real implementations as well as legal and political aspects. The combination of the two editors ensures a well-balanced mix of American and European, electrical engineering and computer science views.

More on www.springer.com/978-3-642-04116-7
Due January 2010
2010, XX, 800 p. 250 illus.
978-3-642-04116-7 ► 349,00 €

Forthcoming

Computational Intelligence

Fuzzy Mathematics: Approximation Theory

This monograph belongs to the broader area of Fuzzy Mathematics and it is the first one in Fuzzy Approximation Theory. The chapters are self-contained with lots of applications to teach several advanced courses and the topics covered are very diverse. An extensive background of Fuzziness and Fuzzy Real Analysis is given. The author covers Fuzzy Differentiation and Integration Theory followed by Fuzzy Ostrowski inequalities. Then results on classical algebraic and trigonometric polynomial Fuzzy Approximation are presented. The author develops a complete theory of convergence with rates of Fuzzy Positive linear operators to Fuzzy unit operator, the so-called Fuzzy Korovkin Theory. The related Fuzzy Global Smoothness is included. Then follows the study of Fuzzy Wavelet type operators and their convergence with rates to Fuzzy unit operator. Similarly the Fuzzy Neural Network Operators are discussed followed by Fuzzy Random Korovkin approximation theory and Fuzzy Random Neural Network approximations. The author continues with Fuzzy Korovkin approximations in the sense of Summability. Finally fuzzy sense differences of Fuzzy Wavelet type operators are estimated. The monograph’s approach is quantitative and the main results are given via Fuzzy inequalities, involving Fuzzy moduli of continuity, that is Fuzzy Jackson type inequalities. Then results on classical algebraic and trigonometric polynomial Fuzzy Approximation are presented.

More on www.springer.com/978-3-642-11219-5
Due February 2010
2010. Approx. 530 p. (Understanding Complex Systems, )
978-3-642-10653-8 ► 139,95 €

An Analytical Approach to Optical Burst Switched Networks

Optical burst switching (OBS) is envisioned to be one of the promising technologies to support bandwidth-intensive applications in the future Internet. An Analytical Approach to Optical Burst Switched Networks discusses architectures such as SOBS, Syn-OBS, HiTSOBS and applications of OBS networks in grid computing in metropolitan and access networks. The chapters in the book cover topics including models for the burst traffic considering the self-similar input traffic, models for the blocking probability with limited degrees of wavelength conversion, models for the performance of a network with deflection routing and segmentation capability and stochastic models for the performance of the TCP over OBS networks. The book’s art material on modeling and analysis of OBS networks also helps the reader to gain a broader understanding of these networks. An Analytical Approach to Optical Burst Switched Networks provides extensive and up-to-date coverage on various aspects of OBS. The material is useful for researchers working in the area of high speed networks.

Due February 2010
2010, XVI, 261 p. 55 illus.
978-1-4419-1509-2 ► 99,95 €

Complexity

Polystochastic Models for Complexity

This book is devoted to a domain of highest industrial and scientific interest, the complexity. The complexity understanding and management will be a main source of efficiency and prosperity for the next decades. Complex systems are assemblies of multiple subsystems and are characterized by emergent behavior that results by nonlinear interactions among the subsystems at multiple levels of organization. Evolvability that is the ability to evolve is the method to confront and surpass the successive boundaries of complexity. Evolvability is not biological but should be considered here in the sense that the corresponding systems have, at different levels, characteristics that are naturally associated to the living systems. This monograph is a development of the research program devoted to PSM and applications. The conventional demand for optimal and adaptive technologies and devices is challenged today by the request to build up systems that are, at different degrees, adaptive, cognitive, intelligent and lastly evolvable and autonomous in their environment. PSMs offer an answer to this change in requirement from adaptable to evolvable, from a low dimensional to a higher dimensional insight. The domain of PSM is relatively new and not well established yet. Some of the models and methods presented here are still tentative, and some implications are unexpected and partially verified. The book is a personal view, which is in line with the existing state-of-the-art but contains perspectives that may be considered to some extent as controversial. In spite of inherent difficulties, we are confronted with one of the key field of major practical interest and a promising area of investigation for the general science of complex systems and processes.

More on www.springer.com/978-3-642-10653-8
Due February 2010
2010. Approx. 530 p. (Understanding Complex Systems, )
978-3-642-10653-8 ► 139,95 €
Forthcoming
B. Bouchon-Meunier, L. Magdalena, M. Ojeda-Aciego, J. Verdegay, R.R. Yager

Foundations of Reasoning under Uncertainty
This volume draws on papers presented at the 2008 Conference on Information Processing and Management of Uncertainty (IPMU), held in Málaga, Spain, organized by the University of Málaga. The conference brought together some of the world's leading experts in the study of uncertainty. Since its first edition, held in 1986, the focus of IPMU conferences has been on the development of foundations and technology needed for the construction of intelligent systems. Over the years, IPMU has grown steadily in visibility and importance, and has evolved into a leading conference in its field, embracing a wide variety of methodologies for dealing with uncertainty and imprecision, and this explains the unusually wide variety of concepts, methods and techniques which are discussed in the book. The growth in importance of IPMU reflects the fact that as we move further into the age of machine intelligence and mechanized decision-making, the issue of how to deal with uncertain information becomes an issue of paramount concern.

More on www.springer.com/978-3-642-10726-9

Due January 2010
2010. Approx. 280 p. (Studies in Fuzziness and Soft Computing, 246)
978-3-642-10694-1 ► 99,95 €

Forthcoming
P. Brox, I. Castillo, S.S. Solano

Fuzzy Logic-Based Algorithms for Video De-Interlacing
The 'Fuzzy Logic' research group of the Microelectronics Institute of Seville is composed of researchers who have been doing research on fuzzy logic since the beginning of the 1990s. Mainly, this research has been focused on the microelectronic design of fuzzy logic-based systems using implementation techniques which range from ASICs to FPGAs and DSPs. Another active line was the development of a CAD environment, named Xfuzzy, to ease such design. Several versions of Xfuzzy have been and are being currently developed by the group. The addressed applications had basically belonged to the control field domain. In this sense, several problems without a linear control solution had been studied thoroughly. Some examples are the navigation control of an autonomous mobile robot and the level control of a dosage system. This book is organized in five chapters. In Chapter 1, some basic concepts are explained to completely understand the contribution of the algorithms developed in this research work. The evaluation of how motion is present and how it influences on de-interlacing is studied in Chapter 2. The design options of the proposed fuzzy motion-adaptive de-interlacing algorithm is studied in Chapter 3. A spatial interpolator that adapts the interpolation to the presence of edges in a fuzzy way is developed in Chapter 4. A temporal interpolator that adapts the strategy of the interpolation to possible repetition of areas of fields is presented in Chapter 5. Using both interpolators in the fuzzy motion-adaptive algorithm described in Chapter 3 clearly improves the de-interlaced results.

More on www.springer.com/978-3-642-10726-9

Due January 2010
978-3-642-10694-1 ► 99,95 €

Forthcoming
Z.W. Geem

Recent Advances In Harmony Search Algorithm
Nowadays, music-inspired phenomenon-mimicking harmony search algorithm is fast growing with many applications. One of key success factors of the algorithm is the employment of a novel stochastic derivative which can be used even for discrete variables. Instead of traditional calculus-based gradient, the algorithm utilizes musician’s experience as a derivative in searching for an optimal solution. This can be a new paradigm and main reason in the successes of various applications. The goal of this book is to introduce major advances of the harmony search algorithm in recent years. The book contains 14 chapters with the following subjects: State-of-the-art in the harmony search algorithm structure; robotics (robot terrain and manipulator trajectory); visual tracking; web text data mining; power flow planning; fuzzy control system; hybridization (with Taguchi method or SQP method); groundwater management; irrigation; logistics; timetabling; and bioinformatics (RNA structure prediction). This book collects the above-mentioned theory and applications, which are dispersed in various technical publications, so that readers can have a good grasp of current status of the harmony search algorithm and foster new breakthroughs in their fields using the algorithm.

More on www.springer.com/978-3-642-04316-1

Due February 2010
2010. Approx. 180 p. (Studies in Computational Intelligence, 278)
978-3-642-04316-1 ► 99,95 €

Forthcoming
X. Huang

Portfolio Analysis
From Probabilistic to Credibilistic and Uncertain Approaches
The most salient feature of security returns is uncertainty. The purpose of the book is to provide systematically a quantitative method for analyzing return and risk of a portfolio investment in different kinds of uncertainty and present the ways for striking a balance between investment return and risk such that an optimal portfolio can be obtained. In classical portfolio theory, security returns were assumed to be random variables, and probability theory was the main mathematical tool for handling uncertainty in the past. However, the world is complex and uncertainty is varied. Randomness is not the only type of uncertainty in reality, especially when human factors are included. Security market, one of the most complex markets in the world, contains almost all kinds of uncertainty. The security returns are sensitive to various factors including economic, social, political and very importantly, people’s psychological factors. Therefore, other than strict probability method, scholars have proposed some other approaches including imprecise probability, possibility, and interval set methods, etc., to deal with uncertainty in portfolio selection since 1990s. In this book, we want to add to the tools existing in science some new and unorthodox approaches for analyzing uncertainty of portfolio returns. When security returns are fuzzy, we use credibility which has self-duality property as the basic measure and employ credibility theory to help make selection decision such that the decision result will be consistent with the laws of contradiction and excluded middle. Being aware that one tool is not enough for solving complex practical problems, we further employ uncertain measure and uncertainty theory to help select an optimal portfolio when security returns behave neither randomly nor fuzzily.

More on www.springer.com/978-3-642-11213-3

Due February 2010
978-3-642-11213-3 ► 99,95 €

Forthcoming
J. Koronacki, Z.W. Ras, S.T. Wierzchon, J. Kacprzyk

Advances in Machine Learning I
Dedicated to the Memory of Professor Ryszard S. Michalski
This is the first volume of a large two-volume editorial project we wish to dedicate to the memory of the late Professor Ryszard S. Michalski who passed away in 2007. He was one of the fathers of machine learning, an exciting and relevant, both from the practical and theoretical points of view, area in modern computer science and information technology. His research career started in the mid-1960s in Poland, in the Institute of Automation, Polish Academy of Sciences in Warsaw, Poland. He left for the USA in 1970, and since then had worked there at various universities, notably, at the University of Illinois at Urbana – Champaign and finally, until his untimely death, at George Mason University. We, the editors, had been lucky to be able to meet and collaborate with Ryszard for years, indeed some of us knew him when he was still in Poland. After he started working in the USA, he was a frequent visitor to Poland, taking part at many conferences until his death. We had also witnessed with a great personal pleasure honors and awards he had received over the years, notably when some years ago he was elected Foreign Member of the Polish Academy of Sciences among some top scientists and scholars from all over the world, including Nobel prize winners. Professor Michalski's research results influenced very strongly the development of machine learning, data mining, and related areas. Also, he inspired many established and younger scholars and scientists all over the world. We feel very happy that so many top scientists from all over the world agreed to pay the last tribute to Professor...
Michalski by writing papers in their areas of research. These papers will constitute the most appropriate tribute to Professor Michalski, a devoted scholar and researcher. Moreover, we believe that they will inspire many newcomers and younger researchers in the area of broadly perceived machine learning, data analysis and data mining. The papers included in the two volumes, Machine Learning I and Machine Learning II, cover diverse topics, and various aspects of the fields involved. For convenience of the potential readers, we will now briefly summarize the contents of the particular chapters.

More on www.springer.com/978-3-642-05176-0
Due January 2010
2010, XX, 524 p. (Studies in Computational Intelligence, 262) 978-3-642-05176-0 ▶ 169,95 €

Forthcoming
J. Koronacki, Z.W. Ras, S.T. Wierzchon, J. Kacprzyk

Advances in Machine Learning II
Dedicated to the memory of Professor Ryszard S. Michalski

This is the second volume of a large two-volume editorial project we wish to dedicate to the memory of the late Professor Ryszard S. Michalski who passed away in 2007. He was one of the fathers of machine learning, an exciting and relevant, both from the practical and theoretical points of view, area in modern computer science and information technology. His research career started in the mid-1960s in Poland, in the Institute of Automation, Polish Academy of Sciences in Warsaw, Poland. He left for the USA in 1970, and since then had worked there at various universities, notably, at the University of Illinois at Urbana – Champaign and finally, until his untimely death, at George Mason University. We, the editors, had been lucky to be able to meet and collaborate with Ryszard for years, indeed some of us knew him when he was still in Poland. After he started working in the USA, he was a frequent visitor to Poland, taking part at many conferences until his death. We had also witnessed with a great personal pleasure honors and awards he had received over the years, notably when some years ago he was elected Foreign Member of the Polish Academy of Sciences among some top scientists and scholars from all over the world, including Nobel prize winners. Professor Michalski’s research results influenced very strongly the development of machine learning, data mining, and related areas. Also, he inspired many established and younger scholars and scientists all over the world. We feel very happy that so many top scientists from all over the world agreed to pay the last tribute to Professor Michalski by writing papers in their areas of research. These papers will constitute the most appropriate tribute to Professor Michalski, a devoted scholar and researcher. Moreover, we believe that they will inspire many newcomers and younger researchers in the area of broadly perceived machine learning, data analysis and data mining. The papers included in the two volumes, Machine Learning I and Machine Learning II, cover diverse topics, and various aspects of the fields involved. For convenience of the potential readers, we will now briefly summarize the contents of the particular chapters.

More on www.springer.com/978-3-642-05178-4
Due January 2010
2010, XX, 532 p. (Studies in Computational Intelligence, 263) 978-3-642-05178-4 ▶ 169,95 €

Forthcoming
I. Zelinka, S. Celikovsky, H. Richter, G. Chen

Evolutionary Algorithms and Chaotic Systems

This book discusses the mutual intersection of two interesting fields of research, i.e. deterministic chaos and evolutionary computation. Evolutionary computation which are able to handle tasks such as control of various chaotic systems and synthesis of their structure are explored, while deterministic chaos is investigated as a behavioral part of evolutionary algorithms. This book is targeted for a number of audiences. Firstly, it will be an instructional material for senior undergraduate and entry-point graduate students in computer science, physics, applied mathematics, and engineering, who are working in the area of deterministic chaos and evolutionary algorithms. Secondly, researchers who desire to know how to apply evolutionary techniques on chaos control as well as researchers interested in the emergence of chaos in evolutionary algorithms will find this book a very useful tool and starting point. And finally, this book can be viewed as a resource handbook and material for practitioners who want to apply these methods that solve practical problems to their challenging applications.

More on www.springer.com/978-3-642-10706-1
Due January 2010
2010. Approx. 560 p. (Studies in Computational Intelligence, 267) 978-3-642-10706-1 ▶ 169,95 €

Forthcoming
B. Albers

Continuous Media with Microstructure

The contributions to the book concern various aspects of extension of classical continuum models. These extensions are related to the appearance of microstructures both natural as well as those created by processes. To the first class belong various thermodynamic models of multiphase systems such as porous materials, composites, materials with micro-
scopic heterogeneities. To the second class belong primarily microstructures created by phase transformations. Invited authors cover both fields of thermodynamic modeling and mathematical analysis of such continua with microstructure. In particular the following subjects are covered: thermodynamic modeling of saturated and unsaturated porous and granular media, linear and nonlinear waves in such materials, extensions of constitutive laws by internal variables, higher gradients and nonequilibrium fields, stochastic processes in porous and fractal materials, thermodynamic modeling of composite materials, mathematical analysis of multicomponent systems, phase transformations in solids.

More on www.springer.com/978-3-642-01444-1

Due February 2010

978-3-642-11444-1 ▶ 129,95 €

Cracked Rotors

A Survey on Static and Dynamic Behaviour Including Modelling and Diagnosis

Cracks can develop in rotating shafts and can propagate to relevant depths without affecting consistently the normal operating conditions of the shaft. In order to avoid catastrophic failures, accurate vibration analyses have to be performed for crack detection. The identification of the crack location and depth is possible by means of a model based diagnostic approach, provided that the model of the crack and the model of the cracked shaft dynamical behaviour are accurate and reliable. This monograph shows the typical dynamical behavior of cracked shafts and presents tests for detecting cracks. The book describes how to model cracks, how to simulate the dynamical behaviour of cracked shaft, and compares the corresponding numerical with experimental results. All effects of cracks on the vibrations of rotating shafts are analyzed, and some results of a numerical sensitivity analysis of the vibrations to the presence and severity of the crack are shown. Finally the book describes some crack identification procedures and shows some results in model based crack identification in position and depth. The book is useful for upper university courses in mechanical and energetic engineering, but also for skilled technical people employed in power generation industries.

More on www.springer.com/978-3-642-01484-0

Due January 2010

978-3-642-01484-0 ▶ 99,95 €

Bounding Uncertainty in Civil Engineering

Theoretical Background

Taking an engineering approach rather than a mathematical one, Random Sets in Civil Engineering is a gentle introduction to the subject that does not require advanced mathematical knowledge. Basic ideas and methods are presented and demonstrated with the aid of simple worked-out examples and suggested problems. Connections are clarified to the more general theory of imprecise probabilities and to other non classical models of uncertainty and approximate reasoning in decision making (e.g., fuzzy sets and evidence theory). In the second part of the book, the application of the new methods is demonstrated for selected examples with real case-histories from civil engineering: reliability analysis of structures, soil and rock slopes, rock mass characterization, optimization of tunnel reinforcement and lining, evaluation of seismic vulnerability of buildings and damage scenarios in urban areas. The book serves as a reference for practicing engineers involved in planning, design, construction and management of civil infrastructures, as well as a graduate-level textbook. Readers interested in uncertainty modelling will find general solutions and algorithms, which may also be applied to problems in other fields beyond engineering.

More on www.springer.com/978-3-642-11189-1

Due February 2010

978-3-642-11189-1 ▶ 129,95 €

Forthcoming

S. Ghosh, D. Dimiduk

Computational Methods for Microstructure-Property Relationships

Computational Methods for Microstructure-Property Relationships introduces state-of-the-art advances in computational modeling approaches for materials structure-property relations. This volume represents an important body of collected works by well known professionals in the field. The collection aims at establishing the necessity of a robust integrated computational mechanics and computational materials science framework, together with an experimental validation protocol, that treats heterogeneous materials at microstructural and continuum scales. Selectively encompassing both computational mechanics and computational materials science disciplines, this volume offers an analysis of current techniques and selected topics important to industry researchers, such as deformation, creep and fatigue of primarily metallic materials. The work enables researchers to understand the issues and challenges involved in predicting performance and failure in materials, with a focus on the engineering structure – materials interaction. Researchers, engineers and professionals involved with predicting performance and failure of materials will find Computational Methods for Microstructure-Property Relationships a valuable reference.

More on www.springer.com/978-1-4419-0642-7

Due June 2010

2010. Approx. 600 p. 100 illus.
978-1-4419-0642-7 ▶ approx. 119,95 €

Forthcoming

A. Maceri

Theory of Elasticity

The "Theory of Elasticity" moves freely within a unified mathematical framework that provides the analytical tools for calculating stresses and deformations in a strained elastic body. All the elastic problems can be exactly analyzed employing the classical mathematical analysis, with the lone exception of the unilateral problems for which it is mandatory to use functional analysis. This book focuses on the practical application of the theoretical results. It gives to engineers, in a simple form, a clear indication of the necessary fundamental knowledge of the theory of elasticity. The author develops the subjects in a classical way, but in light of the modern mathematical theory of the elasticity and with more accented reference to the connections with thermodynamics. To give a clear justification of the fundamental equations of thermoelasticity, he applies a technique of analysis proper of selected examples with real case-histories from civil engineering: reliability analysis of structures, soil and rock slopes, rock mass characterization, optimization of tunnel reinforcement and lining, evaluation of seismic vulnerability of buildings and damage scenarios in urban areas. The book serves as a reference for practicing engineers involved in planning, design, construction and management of civil infrastructures, as well as a graduate-level textbook. Readers interested in uncertainty modelling will find general solutions and algorithms, which may also be applied to problems in other fields beyond engineering.

More on www.springer.com/978-3-642-11391-8

Due March 2010

978-3-642-11391-8 ▶ 199,95 €
with it offers a deeper understanding of tribology. It deals with the associated phenomena of contact, adhesion, capillary forces, friction, lubrication, and wear from one consistent viewpoint. The author goes into (1) methods of rough estimation of tribological quantities, (2) methods for analytical calculations which attempt to minimize the necessary complexity, (3) the crossover into numerical simulation methods. With these methods the author conveys a consistent view of tribological processes in various scales of magnitude (from nanotribology to earthquake research). Also, system dynamic aspects of tribological systems, such as squeal and its suppression as well as other types of instabilities and spatial patterns are investigated. This book contains problems and worked solutions for individual chapters in which the reader can apply the theory to practical situations and deepen the understanding of the material.

More on www.springer.com/978-3-642-03445-9

Due February 2010

978-3-642-03445-9 ► 99,95 €

Forthcoming

I.G. Vardoulakis, D. Eftaxiopoulos

Engineering Continuum Mechanics
With Applications from Fluid Mechanics, Solid Mechanics, and Traffic Flow

This is a book designed for an introductory course in mathematical modeling in engineering. The content of the book will be mainly built on the three main principles of Mechanics: Conservation of Mass, Conservation of Linear and Angular Momentum, Conservation of Energy. Mainly one dimensional problems, which lead to the formulation and solution of elementary partial differential equations, w.r.t. the spatial coordinate x and time t, will be treated. The principle of Mass conservation will be used for the formulation of the continuity equation for hydromechanics and specifically for Traffic Flow. The Conservation of Momentum Principle will be explained using examples from the reference volume method and from waves in inviscid fluids. An elementary discussion on the Navier - Stokes equation, with applications from the boundary layer theory, will be presented. Finally, the principle of Energy Conservation will be used for the formulation of the elementary theory of heat transfer in fluids and solids. As an application of the theory, a brief introduction is given to the continuum mechanics of fluid-infiltrated granular media, in the last section of the book. The book will be used for teaching Continuum Mechanics to undergraduate students of engineering faculties. The underlying theory will be presented in a simple way and mainly through the use of examples of natural phenomena. Special attention will be laid upon the use of the computer for the solution of physical problems. Numerous worked examples will be included.

More on www.springer.com/978-3-540-25204-7

Due January 2010

978-3-540-25204-7 ► approx. 59,95 €

Control

P. Albertos, I. Mareels

Feedback and Control for Everyone
This well structured, intriguing and motivating book presents the basic ideas and understanding of control, signals and systems for readers interested in engineering and science. Through a series of examples that are regularly revisited from different perspectives, the book explores both the theory and the practice of control. "Feedback and Control for Everyone" is indeed intended for everyone, but more specifically everyone interested in getting a feel for the role control and feedback play in our environment. Control and feedback are pervasive and are literally found everywhere in our engineered or biological environment. The book focuses on the main ideas and opens the scientific mind to feedback, control and systems dynamics. The exposition of ideas does not assume any mathematical knowledge beyond what typically is taught at an intermediate mathematics level at high school. Appealing to examples and intuition, the authors guide the reader to the essential ingredients to describe, analyze and synthesize successfully feedback. Each chapter ends with comments and references that enable the interested reader to explore the exposed subject material in a deeper manner. "Feedback and Control for Everyone" is written for: * understanding basic concepts on systems dynamics and control * realizing the strong connection between technical and human/social dynamics * motivating further reading and study about control systems * showing the power of abstraction to infer properties of complex systems based on simplified mathematical models * emphasizing the interplay between communication, computers and control in this Digital Era * creating bridges among different sciences and technologies such as engineering, physics, biology, biochemistry, or systems dynamics.

More on www.springer.com/978-3-642-03445-9

Due January 2010

978-3-642-03445-9 ► 29,95 €

Forthcoming

G. Chesi, K. Hashimoto

Visual Servoing via Advanced Numerical Methods

The text of Visual Servoing via Advanced Numerical Methods has its roots in an invited session presented at the IEEE International Conference on Robotics and Automation at Kobe in May 2009. The work presented here has been much expanded and gives a comprehensive overview of the state of the art in this important area of robotics. The latest contributions from well-known experts in visual servoing provide the reader with solutions to the fundamental and specific problems that have to be solved in using camera-derived feedback to control robotic motion and make it imitative of the actions of human beings. These solutions are based on dedicated numerical methods the development of which has been facilitated by recent progress in video devices, computer hardware and optimisation techniques. The book is organised into three parts reflecting the uses of image processing and computer vision; control, optimal and robust control; and stability, performance and robustness analysis in visual servoing.


Due April 2010

2010. XXVI, 422 p. 458 illus., 209 in color. With online files/ update. (Lecture Notes in Control and Information Sciences, 412)
978-1-84996-088-5 ► approx. 119,95 €

Forthcoming

P.J. Dolci, C. Camadas-de-Wit, H. Béchart

Dry Clutch Control for Automotive Applications

The comfort of a car as perceived by the driver can be as important to its commercial success as its performance and fuel efficiency. Modern engines deliver increased torque and there is a current trend to reduce transmission-shaft stiffness, both phenomena militating against maintaining, let alone increasing, ride comfort. Dry Clutch Control for Automotive Applications analyses the control of a part of the powertrain which has a key role in ride comfort during starting and gear-shifting manoeuvres. The mechanical conception of the various elements in the driveline has long since been optimised so this book takes a more holistic system-oriented view of the problem featuring: a comprehensive description of the driveline elements and their operation paying particular attention to the clutch; a non-linear model of the driveline for simulation and a simplified model for control design, complete with a stand-alone driver automaton for closed loop simulation; a detailed analysis of the engagement operation and the related comfort criteria; different control schemes aiming at meeting these criteria; friction coefficient and unknown input clutch torque observers; practical implementation issues and solutions based on the hands-on experience of implementing optimal engagement strategies on two Renault prototypes. Dry Clutch Control for Automotive Applications will be essential reading for automotive engineers work-
on model design and contains much to interest the
academic researcher with its combination of theo-
retical results and application in the important and
widely studied field of automotive engineering and
control.

More on www.springer.com/978-1-84996-067-0
Due April 2010

2010. Approx. 160 p. 50 illus. (Advances in Industrial
Control, )
978-1-84996-067-0  ➤ approx. 79,95 €

Forthcoming
L. Guo, H. Wang

Stochastic Distribution Control
System Design
A Convex Optimization Approach

Stochastic distribution control (SDC) systems are
widely seen in practical industrial processes, the aim
of the controller design being generation of output
probability density functions for non-Gaussian sys-
tems. Examples of SDC processes are: particle-size
distribution control in chemical engineering, flame-
distribution control in energy generation and com-
bustion engines, steel and film production, papermak-
ing and general quality data distribution control for
various industries. SDC is different from well-devel-
oped forms of stochastic control like minimum-vari-
ance and linear-quadratic-Gaussian control, in which
the aim is limited to the design of controllers for
the output mean and variances. An important recent
development in SDC-related problems is the estab-
ishment of intelligent SDC models and the intensive
use of linear-matrix-inequality-based (LMI-based)
convex optimization methods. Within this theoretic-
ical framework, control parameter determination can
be designed and stability and robustness of closed-
loop systems can be analyzed. Stochastic Distribution
Control System Design describes the new framework
of SDC system design and provides a comprehen-
sive description of the modelling of controller design
tools and their real-time implementation. The book
starts with a review of current research on SDC and
moves on to some basic techniques for modelling and
controller design of SDC systems. This is followed
by a description of controller design for fixed-con-
trol-structure SDC systems, PDF control for gen-
eral input- and output-represented systems, filtering
designs, and fault detection and diagnosis (FDD) for
SDC systems. Many new LMI techniques being devel-
oped for SDC systems are shown to have indepen-
dent theoretical significance for robust control and
FDD problems. This monograph will be of interest
to academic researchers in statistical, robust and pro-
cess control, and FDD, process and quality control
engineers working in industry and as a reference for
graduate control students. Advances in Industrial
Control aims to report and encourage the transfer of
technology in control engineering. The rapid develop-
ment of control technology has an impact on all areas
of the control discipline. The series offers an opportu-
nity for researchers to present an extended exposition
of new work in all aspects of industrial control.

More on www.springer.com/978-1-84996-029-8
Due February 2010

2010. XVI, 182 p. 62 illus. (Advances in Industrial Control, )
978-1-84996-029-8  ➤ 99,95 €

Forthcoming
L. Re, F. Allgöwer, L. Gielmo, C. Guardiola, I. Kolmanovsky

Automotive Model Predictive
Control
Models, Methods and Applications

The proceedings of the Automotive Model Predic-
tive Control: Models, Methods and Applications
workshop investigates whether constrained predic-
tive control is reasonable in automotive control and
what is necessary for its application. The workshop,
held at the University of Linz on 9th – 10th Febru-
ary 2009 brought together workers from academia
and industry from three key automotive branches:
modeling, control and the application. The workshop
included three keynote presentations, each of them
contributing to the solution of an essential question.
• Which problems in automotive applications need
constrained optimal control? • Models of emissions
for modern engines for model based control? • Indus-
trial methods and requirements for control schemes?
The results of testing control strategies on a dynami-
cal engine test bench give a feeling for the necessary
computing power, the model plant mismatch, etc. and
thus for the real application of control laws in produc-
tion cars.

More on www.springer.com/978-1-84996-070-0
Due April 2010

2010. VIII, 312 p. 152 illus. (Lecture Notes in Control and
Information Sciences, 402)
978-1-84996-070-0  ➤ approx. 99,95 €

Forthcoming
D. Sbarbaro, R. del Villar

Advanced Control and
Supervision of Mineral Processing
Plants

Modern mineral processing plants are required to
be safe and profitable and to minimize their envi-
ronmental impact. The consequent quest for higher
operational standards at reduced cost is leading the
industry towards automation technologies as cap-
it-al-effective means of attaining these objectives.
Advanced Control and Supervision of Mineral Pro-
cessing Plants describes the use of dynamic models
of major items of mineral processing equipment in
the design of control, data reconciliation and soft-
sensing schemes; through examples, it illustrates tools
integrating simulation and control system design for
comminuting circuits and flotation columns. Full cov-
erage is given to the design of soft sensors based on
either single-point measurements or more complex
measurements like images. The chief issues concern-
ing steady-state and dynamic data reconciliation and
their employment in the creation of instrument archi-
tecture and fault diagnosis are surveyed. In considera-
tion of the widespread use of distributed control and
information management systems in mineral pro-
cessing, the book describes the current platforms and
tools available for implementing such advanced
systems. Applications of the techniques described
in real mineral processing plants are used to high-
light their benefits; information for all of the exam-
ples, together with supporting MATLAB® code can
be found at www.springer.com/ISBN. The provision
of valuable tools and information on the use of mod-
ern software platforms and methods will benefit engi-
eers working in the mineral processing industries,
and control engineers and academics interested in
the real industrial practicalities of new control ideas.
The book will also be of interest to graduate students
in chemical, metallurgical and electronic engineering
looking for applications of control technology in the
treatment of raw materials. Advances in Industrial
Control aims to report and encourage the transfer of
technology in control engineering. The rapid develop-
ment of control technology has an impact on all areas
of the control discipline. The series offers an opportu-
nity for researchers to present an extended exposition
of new work in all aspects of industrial control.

More on www.springer.com/978-1-84996-105-9
Due January 2010

(Advances in Industrial Control, )
978-1-84996-105-9  ➤ approx. 79,95 €

Forthcoming
M. Tomas-Rodriguez, S.P. Banks

Linear, Time-varying
Approximations to Nonlinear
Dynamical Systems
with Applications in Control and Optimization

Linear, Time-varying Approximations to Nonlinear
Dynamical Systems introduces a new technique for
analysing and controlling nonlinear systems. This
method is general and requires only very mild con-
ditions on the system nonlinearities, setting it apart
from other techniques such as those – well-known
– based on differential geometry. The authors cover
many aspects of nonlinear systems including stability
theory, control design and extensions to distributed
parameter systems. Many of the classical and modern
control design methods which can be applied to lin-
ear, time-varying systems can be extended to nonlin-
ear systems by this technique. The implementation
of the control is therefore simple and can be done with
well-established classical methods. Many aspects of
nonlinear systems, such as spectral theory which is
important for the generalisation of frequency domain
methods, can be approached by this method.

More on www.springer.com/978-1-84996-100-4
Due April 2010

2010. Approx. 315 p. 80 illus. (Lecture Notes in Control and
Information Sciences, 411)
978-1-84996-100-4  ➤ approx. 99,95 €
**Fault Tolerant Control Design for Hybrid Systems**

This book intends to provide the readers a good understanding on how to achieve Fault Tolerant Control of Hybrid Systems. The book can be used as a reference for the academic research on Fault Tolerant Control and Hybrid Systems or in Ph.D. study of control theory and engineering. The knowledge background for this monograph would be some undergraduate and graduate courses on Fault Diagnosis and Fault Tolerant Control theory, linear system theory, nonlinear system theory, Hybrid Systems theory and Discrete Event System theory.

More on [www.springer.com/978-3-642-10680-4](http://www.springer.com/978-3-642-10680-4)

Due January 2010
2010. Approx. 195 p. (Lecture Notes in Control and Information Sciences, 397)
978-3-642-10680-4 ▶ 79,95 €

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**Algorithmic Foundations of Robotics VIII**

**Selected Contributions of the Eighth International Workshop on the Algorithmic Foundations of Robotics**

This volume is the outcome of the eighth edition of the biennial Workshop on Algorithmic Foundations of Robotics (WAFR). Edited by G.S. Chirikjian, H. Choset, M. Morales and T. Murphey, the book offers a collection of a wide range of topics in advanced robotics, including networked robots, distributed systems, manipulation, planning under uncertainty, minimization, geometric sensing, geometric computation, stochastic planning methods, and medical applications. The contents of the forty-two contributions represent a cross-section of the current state of research from one particular aspect: algorithms, and how they are inspired by classical disciplines, such as discrete and computational geometry, differential geometry, mechanics, optimization, operations research, computer science, probability and statistics, and information theory. Validation of algorithms, design concepts, or techniques is the common thread running through this focused collection. Rich by topics and authoritative contributors, WAFR culminates with this unique reference on the current developments and new directions in the field of algorithmic foundations.

More on [www.springer.com/978-3-642-00311-0](http://www.springer.com/978-3-642-00311-0)

Due January 2010
978-3-642-00311-0 ▶ 149,95 €

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**Feedback Control Systems for Micro- and Nano-Scales**

**MEMS to Atoms**

The use of control and control systems are an essential part of functioning integrated systems. Similar to macro-scale machines and processes, control systems can play a major role in improving the performance of micro- and nano-scale systems, and in enabling new capabilities that would otherwise not be possible. However, the majority of problems at these scales present many new challenges that go beyond the current state-of-the-art in control engineering. This is a result of the multidisciplinary nature of micro/nanotechnology, which requires the merging of control engineering with physics, biology and chemistry.

More on [www.springer.com/978-1-4419-5831-0](http://www.springer.com/978-1-4419-5831-0)

Due June 2010
2010. Approx. 350 p. 75 illus. (MEMS Reference Shelf, ) 978-1-4419-5831-0 ▶ approx. 99,95 €

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**Spatial Filtering for the Control of Smart Structures**

**An Introduction**

This book develops and details rigorous design methodologies and performance measures for the control of modern Smart Structures. The spatially distributed/continuum or distributed parameter nature of such structures makes it difficult to apply modern lumped parameter control philosophy and techniques to such designs. While there exist a substantial amount of technical literature on the Control of Dis-
Piezoelectric-Based Vibration Control
From Macro to Micro/Nano Scale Systems

Piezoelectric-Based Vibration Control: From Macro to Micro/Nano Scale Systems covers a comprehensive understanding and physical principles in piezoelectric materials and structures used in a variety of vibration-control systems. With its self-contained and single-source style, this book provides a widespread spectrum of discussions ranging from fundamental concepts of mechanical vibration analysis and control to piezoelectric actuators and sensors. Starting from an elementary level in mechanical vibrations, this book offers the reader a detailed discussion of vibration of continuous systems as a single-source book. Provides actual actuator and sensor configurations, along with illustrative hands-on problems and examples that can be applied by the reader, and covers advanced topics in piezoelectric-based micro/nano actuators and sensors with applications ranging from precision mechatronics to molecular recognition and functional nanostructures. Piezoelectric-Based Vibration Control: From Macro to Micro/Nano Scale Systems, with its easy-to-follow format, is a must-read for all engineers working in the areas of vibration control and piezoelectric systems, undergraduate students interested in fundamental of vibrations and control, up to graduate students and researchers working on advanced piezoelectric-based vibration-control systems.

More on www.springer.com/978-3-642-03803-7

Due January 2010
2010. XV, 209 p. 96 illus. 978-3-642-03803-7 ► 99,95 €

Forthcoming

N. Jalili

Semantic Labeling of Places with Mobile Robots

During the last years there has been an increasing interest in the area of service robots. Under this category we find robots working in tasks such as elderly care, guiding, office and domestic assistance, inspection, and many more. Service robots usually work in indoor environments designed for humans, with offices and houses being some of the most typical examples. These environments are typically divided into places with different functionalities like corridors, rooms or doorways. The ability to learn such semantic categories from sensor data enables a mobile robot to extend its representation of the environment, and to improve its capabilities. As an example, natural language terms like corridor or room can be used to indicate the position of the robot in a more intuitive way when communicating with humans. This book presents several approaches to enable a mobile robot to categorize places in indoor environments. The categories are indicated by terms which represent the different regions in these environments. The objective of this work is to enable mobile robots to perceive the spatial divisions in indoor environments in a similar way as people do. This is an interesting step forward to the problem of moving the perception of robots closer to the perception of humans. Many approaches introduced in this book come from the area of pattern recognition and classification. The applied methods have been adapted to solve the specific problem of place recognition. In this regard, this work is a useful reference to students and researchers who want to introduce classification techniques to help solve similar problems in mobile robotics.

More on www.springer.com/978-3-642-11209-6

Due January 2010
2010. Approx. 140 p. (Springer Tracts in Advanced Robotics, 61) 978-3-642-11209-6 ► 79,95 €

Forthcoming

O. Martínez Mozos

Efficient Modeling and Control of Large-Scale Systems

The complexity and dynamic order of controlled engineering systems is constantly increasing. Complex large scale systems (where “large” reflects the system’s order and not necessarily its physical size) appear in many engineering fields, such as, microelectromechanics, manufacturing, aerospace, civil engineering and power engineering. Modeling of these systems often result in very high-order models imposing great challenges to the analysis, design and control problems. Efficient modeling and control of large-scale systems will compile state-of-the-art contributions on recent novel analytical and computational methods for addressing the model reduction, performance analysis and feedback control design for such systems. Also addressed will be new theoretical developments, novel computational approaches and illustrative applications to various fields.

More on www.springer.com/978-1-4419-5756-6

Due February 2010
2010. Approx. 350 p. 978-1-4419-5756-6 ► approx. 129,95 €

Forthcoming

M. Otake

Electroactive Polymer Gel Robots
Modelling and Control of Artificial Muscles

The monograph written by Mihoko Otake combines ideas from chemistry and physics, material science and engineering for the revolutionary development of the so-called gel robots. Electroactive polymers are introduced to build new types of muscular-like actuators for deformable robots. The coverage spans from modelling and design to the development, control and experimental testing. A number of methods are proposed for describing the shapes and motions of such systems. The results are demonstrated for bean-shaped gels curling around an object and starfish-shaped gel robots turning over.

More on www.springer.com/978-3-540-23955-0

Due January 2010

Forthcoming

K.K. Tan, A.S. Putra

Drives and Control for Industrial Automation

Drives and Control for Industrial Automation presents the material necessary for an understanding of servo control in automation. Beginning with a macroscopic view of its subject, treating drives and control as parts of a single system, the book then pursues a detailed discussion of the major components of servo control: sensors, controllers and actuators. Throughout, the mechatronic approach – a synergistic integration of the components – is maintained, in keeping with contemporary practice. The authors’ holistic approach does not preclude the reader from learning in a step-by-step fashion – each chapter contains material that can be studied separately without compromising understanding. Drives are described in several chapters organized according to the way they are usually classified in industry, each comprised of its actuators and sensors. The controller is discussed alongside. Topics of recent and current interest – piezoelectricity, digital communications and future trends – are detailed in their own dedicated
chapters. Drives and Control for Industrial Automation is primarily written for engineers and researchers interested in the applications of sensors, actuators and control systems in the automated environment. The discussion is thorough with the basics laid out succinctly but in sufficient detail to be useful to non-expert readers so students will also find this monograph a profitable source of information. Advances in Industrial Control aims to report and encourage the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control.

More on www.springer.com/978-1-84882-424-9

Due January 2010
2010. XIV, 204 p. 122 illus. (Advances in Industrial Control, )
978-1-84882-424-9 ▶ 99,95 €

A. Whitbrook

Programming Mobile Robots with Aria and Player
A Guide to C++ Object-Oriented Control

Programming Mobile Robots with Aria and Player provides a comprehensive guide to creating object-oriented C++ programs for robots using the Player and Aria APIs within a Linux environment. A basic knowledge of object-oriented techniques is assumed, but the text is written in a user-friendly style, and is equally suitable for researchers with previous experience of robot control, or for students completely new to the field. The book is fully supported throughout with examples, diagrams, sample programs, and configuration files. MobileRobot’s Pioneers are used as vehicles throughout the book, but most of the techniques and programs that are demonstrated for Player are directly applicable to the wide number of other makes and models that the API supports. In addition, the Aria section is also appropriate for other robots made by MobileRobots. The book discusses how to install the various pieces of software needed and also describes how to: • configure robots; • control robots remotely; • program each individual sensor and actuator; and • set up and control robots, in both the real world and in a simulated environment (either through Player’s Stage plug-in or Aria’s MobileSim simulator). Programming Mobile Robots with Aria and Player serves as a complete text for undergraduate and postgraduate robotics programming modules, and is also an invaluable reference source for students, teachers and researchers.

More on www.springer.com/978-1-84882-863-6

Due January 2010
2010. XII, 117 p. 33 illus., 5 in color. With CD-ROM.
978-1-84882-863-6 ▶ 69,95 €

A.I. Zecevic, D.D. Siljak

Control of Complex Systems
Structural Constraints and Uncertainty

Control of Complex Systems: Structural Constraints and Uncertainty focuses on control design under information structure constraints, with a particular emphasis on large-scale systems. The complexity of such systems poses serious computational challenges and severely restricts the types of feedback laws that can be used in practice. This book systematically addresses the main issues, and provides a number of applications that illustrate potential design methods, most which use Linear Matrix Inequalities (LMIs), which have become a popular design tool over the past two decades. Authors Aleksandar I. Zecevic and Dragoslav D. Siljak use their years of experience in the control field to also: Address the issues of large-scale systems as they relate to robust control and linear matrix inequalities Discuss a new approach to applying standard LMI techniques to large-scale systems, combining graphic-theoretic decomposition techniques with appropriate low-rank numerical approximations and dramatically reducing the computational effort Providing numerous examples and a wide variety of applications, ranging from electric power systems and nonlinear circuits to mechanical problems and dynamic Boolean networks Control of Complex Systems: Structural Constraints and Uncertainty will appeal to practicing engineers, researchers and students working in control design and other related areas. The Communications and Control Engineering series reports major technological advances which have potential for great impact in the fields of communication and control. It reflects research in industrial and academic institutions around the world so that the readership can exploit new possibilities as they become available.

More on www.springer.com/978-1-4419-1116-2

Due January 2010
978-1-4419-1116-2 ▶ 99,95 €

Forthcoming
W. Zhu

Virtual Decomposition Control
Toward Hyper Degrees of Freedom Robots

Driven by the need to achieve superior control performances for robots with hyper degrees of freedom, the virtual decomposition control approach is thoroughly presented in this book. This approach uses subsystem (such as links and joints of a complex robot) dynamics to conduct control design, while guaranteeing the stability and convergence of the entire complex robot without compromising the rigorousness of the system analysis. The central concept of this approach is the definition of the virtual stability. The stability of the entire complex robot is mathematically equivalent to the virtual stability of every subsystem. This fact allows us to convert a large problem to a few simple problems with mathematical certainty. This book comprises fourteen chapters. The first five chapters form the foundation of this approach. The remaining nine chapters are relatively independent. Starting from Chapter 6, each chapter deals with a particular
type of systems including motor/transmission assemblies, hydraulic robots, coordinated multiple robots, space robots, humanoid robots, adaptive teleoperation, and modular robot manipulators. At the end, the extensions of this approach to distributed-parameter systems and to electrical circuits are given, paving the way for other applications to follow. This book is intended for practitioners, researchers, and graduate students who have acquired fundamental knowledge on robotics and control systems and have been committed to achieving the best control performances on complex robotics systems and beyond.

More on www.springer.com/978-3-642-10723-8
Due March 2010
2010. Approx. 460 p. (Springer Tracts in Advanced Robotics, 60)
978-3-642-10723-8 ▶ 119,95 €

Forthcoming
P. Di Barba

Multiobjective Shape Design in Electricity and Magnetism
Multiobjective Shape Design in Electricity and Magnetism is entirely focused on electric and magnetic field synthesis, with special emphasis on the optimal shape design of devices when conflicting objectives are to be fulfilled. Direct problems are solved by means of finite-element analysis, while evolutionary computing is used to solve multiobjective inverse problems. This approach, which is original, is coherently developed throughout the whole manuscript. The use of game theory, dynamic optimisation, and Bayesian imaging strengthens the originality of the book. Covering the development of multiobjective optimisation in the past ten years, Multiobjective Shape Design in Electricity and Magnetism is a concise, comprehensive and up-to-date introduction to this research field, which is growing in the community of electricity and magnetism. Theoretical issues are illustrated by practical examples. In particular, a test problem is solved by different methods so that, by comparison of results, advantages and limitations of the various methods are made clear. Topics covered include: Maxwell equations and boundary-value problems; Pareto optimality; static optimisation; game theory; dynamic optimisation; Bayesian imaging. Multiobjective Shape Design in Electricity and Magnetism collects the long-lasting experience matured by the author during his research activity both at the university and in cooperation with industrial laboratories.

Due December 2009
2010. XVI, 313 p. (Lecture Notes in Electrical Engineering, 47)
978-90-481-3079-5 ▶ 99,95 €

Energy Technology (general)

Mars
Prospective Energy and Material Resources
The manned mission is seen as a first step towards a Mars surface exploration base-station and, later, establishing permanent settlement. The location and use of Mars’s natural resources is vital to enable cost-effective long-duration human exploration and exploitation missions as well as subsequent human colonization. Planet resources include various crust-lodged materials, a low-pressure natural atmosphere, assorted forms of utilisable energy, lower gravity than Earth’s, and ground placement advantages relative to human operability and living standards. Power resources may include using solar and wind energy, importation of nuclear reactors and the harvesting of geothermal potential. In fact, a new branch of human

T.M. Adams, R.A. Layton

Introductory MEMS
Fabrication and Applications
Introductory MEMS: Fabrication and Applications is a practical introduction to MEMS for advanced undergraduate and graduate students. Part I introduces the student to the most commonly used MEMS fabrication techniques as well as the MEMS devices produced using these techniques. Part II focuses on MEMS transducers: principles of operation, modeling from first principles, and a detailed look at commercialized MEMS devices, in addition to microfluidics. Multiple field-tested laboratory exercises are included, designed to facilitate student learning about the fundamentals of microfabrication processes. References, suggested reading, review questions, and homework problems are provided at the close of each chapter. Introductory MEMS: Fabrication and Applications is an excellent introduction to the subject, with a tested pedagogical structure and an accessible writing style suitable for students at an advanced undergraduate level across academic disciplines.

Due February 2010
2010. XV, 444 p. 50 illus., 25 in color.
978-0-387-09510-3 ▶ approx. 66,95 €

Forthcoming
C. Ioannis D., O. Schwelb, N. Uzunoglu

Photonic Microresonator Research and Applications
Photonic Microresonator Research and Applications explores advances in the fabrication process that enable nanometer waveguide separations. The technology surrounding the design and fabrication of optical microresonators has matured to a point where there is a need for commercialization. Consequently, there is a need for device research involving more advanced architectures and more esoteric operating principles. This volume discusses these issues, while also: Showing a reader how to design and fabricate microresonators Discussing microresonators in photonic crystals, microsphere circuits, and sensors, and provides application oriented examples Covering the latest in microresonator research with contributions from the leading researchers Photonic Microresonator Research and Applications would appeal to researchers and academics working in the optical sciences.

More on www.springer.com/978-1-4419-1743-0
Due April 2010
2010. Approx. 320 p. (Springer Series in Optical Sciences, 156)
978-1-4419-1743-0 ▶ 169,95 €

Forthcoming
M. Sheplak, P.V. Loeppert

Microelectroacoustics: Sensing and Actuation
MEMS (microelectromechanical systems) products utilize robust processes from the semiconductor industry to make a wide variety of electronic devices smaller, more reliable and cheaper to manufacture. In the field of electro acoustic systems MEMS are now being deployed to develop miniaturized electro acoustic devices. The applications of electro acoustic systems range from miniaturized condenser microphones to speakers, hearing aids, ultrasonic transducers, proximity sensing, and biomedical imaging.

Due June 2010
2010. Approx. 500 p. (MEMS Reference Shelf, )
978-0-387-32471-5 ▶ approx. 99,35 €
Advanced Power MOSFETs Concepts

During the last decade many new concepts have been proposed for improving the performance of power MOSFETs. The results of this research are dispersed in the technical literature among journal articles and abstracts of conferences. Consequently, the information is not readily available to researchers and practicing engineers in the power device community. There is no cohesive treatment of the ideas to provide an assessment of the relative merits of the ideas. Advanced Power MOSFETs Concepts provides an in-depth treatment of the physics of operation of advanced power MOSFETs. Analytical models for explaining the operation of all the advanced power MOSFETs will be developed. The results of numerical simulations will be provided to give additional insight into the device physics and validate the analytical models. The results of two-dimensional simulations will be provided to corroborate the analytical models and give greater insight into the device operation.

More on www.springer.com/978-3-642-03628-6
Due January 2010
978-3-642-03628-6  129,95 €

Forthcoming
B.J. Baliga

Emerging Techniques in Power System Analysis

"Emerging Techniques in Power System Analysis" identifies the new challenges facing the power industry following the deregulation. The book presents emerging techniques including data mining, grid computing, probabilistic methods, phasor measurement unit (PMU) and how to apply those techniques to solving the technical challenges. The book is intended for engineers and managers in the power industry, as well as power engineering researchers and graduate students. Zhaoyang Dong is an associate professor at the Department of Electrical Engineering, The Hong Kong Polytechnic University, China. Pei Zhang is program manager at the Electric Power Research Institute (EPRI), USA.

More on www.springer.com/978-3-642-04281-2
Due January 2010
978-3-642-04281-2  119,95 €

Holistic Engineering Education Beyond Technology

Holistic Engineering Education: Beyond Technology is a compilation of coordinated and focused essays from world leaders in the engineering profession who are dedicated to a transformation of engineering education and practice. The contributors define a new and holistic approach to education and practice that captures the creativity, interdisciplinarity, complexity, and adaptability required for the profession to grow and truly serve global needs. With few exceptions today, engineering students and professionals continue to receive a traditional, technically-based education and training using curriculum models developed for early 20th century manufacturing and machining. While this educational paradigm has served engineering well, helping engineers create awe-inspiring machines and technologies for society, the coursework and expectations of most engineering programs eschew breadth and intellectual exploration to focus on consistent technological precision and study. Why this dichotomy? While engineering will always need precise technological skill, the 21st century innovation economy demands a new professional perspective that recognizes the value of complex systems thinking, cross-disciplinary collaborations, economic and environmental impacts (sustainability), and effective communication to global and community leaders, thus enabling engineers to consider “the whole patient” of society’s needs. The goal of this book is to inspire, lead, and guide this critically needed transformation of engineering education. "Holistic Engineering Education: Beyond Technology points the way to a transformation of engineering education and practice that will be sufficiently robust, flexible, and systems-oriented to meet the grand challenges of the 21st century with their ever-increasing scale, complexity, and transdisciplinary nature.” -- Charles Vest, Pres-
Engineering Design

Forthcoming

E. Bautista Paz, M. Ceccarelli, J. Echávarri Otero, J.L. Muñoz Sanz

A Brief Illustrated History of Machines and Mechanisms

This book illustrates the historical development of machines and mechanisms more from a technical point of view rather than a strictly history of science point of view since the authors are mechanical engineers who are interested and motivated to examine the most significant facts in their own area of knowledge of the Theory of Machines and Mechanisms. A full understanding of the historical development of technology also needs the help of experts in technical matters who can appreciate and reassess bygone achievements in the light of their own technical knowledge. More collaboration between science historians and technical experts is needed, as is currently the case in the field of Industrial Archaeology. Thus, this book is also an attempt to set out a technical approach to the historical development of machines and mechanisms, with enough technical detail to prevent its understanding being purely historical. This work deals with mechanical manufacturing processes in history, examined through the machines associated with those processes. A tool is only included if it is part of a machine tool, with devices made up of moving parts. The chosen descriptive method is basically graphic. At the beginning of each chapter there is a global reference to the period embraced, the most relevant facts, and the most significant treaties in the context of machine history. Following this introduction each chapter contains a series of sections on the types of machines that are representative of the period analysed together with illustrations to accompany the text. A fairly extensive bibliography enables the reader to pursue their own further research and historical analysis.


Due February 2010

2010. Approx. 270 p. With online files/update. (History of Mechanism and Machine Science, 10)
978-90-481-2511-1 ▶ 79,95 €

Bond Graph Methodology

Development and Analysis of Multidisciplinary Dynamic System Models

Nowadays, engineering systems are becoming increasingly complex and, for design purposes, must be considered as multidisciplinary systems made up of components from different engineering disciplines. With regard to the systematic development and the analysis of models, interdisciplinarity methodologies supported by software become more and more important. Bond graphs are a graphical description formalism particularly suited for multidisciplinary systems and used by modellers across the world. Bond Graph Methodology gives a comprehensive, in-depth representation of the state of the art, including recent results gathered from research articles, dissertations and contributions by the author on a number of topics. The structured and rigorous presentation systematically covers model development, analysis of models, numerical computation of models and modern software that can be used for a bond graph approach. The book also includes a range of case studies illustrating various applications of the methodology and provides a glossary. Bond Graph Methodology addresses fundamentals, as well as advanced topics, e.g., models of variable structure, bond graphs for sensitivity analysis and generation of equations for the study of robustness. The compilation and presentation of the material has been inspired by the author’s extensive experience in research and teaching. A useful text for advanced courses in modelling, simulation and control, Bond Graph Methodology can also be used for self-study. It has been designed to serve readers interested in the subject of bond graph modelling and those with expertise in related areas, as well as members of the worldwide community of bond graph modellers.

More on www.springer.com/978-1-84882-881-0

Due January 2010

2010. XXII, 662 p. 480 illus.
978-1-84882-881-0 ▶ 169,95 €

Mechatronics in Action

Case Studies in Mechatronics Education and Applications

Mechatronics is a broad-based engineering discipline that is concerned with the integration of engineering concepts at the system level. As such, its impact is seen not in specific sections of technology, but in
the way in which the technologies are integrated and merged at the system level from design to implementation. Mechatronics in Action’s case-study approach therefore provides the most effective means of illustrating how mechatronics can make products and systems more flexible, more responsive and possess higher levels of functionality than would otherwise be possible. The series of case studies serves to illustrate how a mechatronic approach has been used to achieve enhanced performance through the transfer of functionality from the mechanical domain to electronics and software. Educationally, case-based learning forms an important part of mechatronics course design and Mechatronics in Action not only provides readers with access to a range of case studies, and the experts’ view of these, but also offers case studies in course design and development to support tutors in making the best and most effective use of the technical coverage provided. Mechatronics in Action provides, in an easily accessible form, a means of increasing the understanding of the mechatronic concept, while giving both students and tutors substantial technical insight into how this concept has been developed and used.

More on www.springer.com/978-1-84996-079-3

Due May 2010

978-1-84996-079-3 ▶ 99,95 €

The Design Guidelines Collaborative Framework: A Design for Multi-X Method for Product Development

S. Filippi, I. Cristofolini

The Design Guidelines Collaborative Framework describes a knowledge-based ‘design for multi-X’ method, aimed at improving and assisting the work of designers, manufacturers, and inspectors in the areas of product redesign and process reconfiguration. Designers are not necessarily experts in manufacturing and verification processes; likewise, manufacturers and inspectors may not be experts in design. For this reason, the Design Guidelines Collaborative Framework (DGLs-CF) constitutes a meeting point for all three parties, where their knowledge is formalized, expanded upon, and put at the designers’ disposal, thereby maximizing the user-friendliness of the results. The DGLs-CF is characterized by the homogeneous union of different algorithms, clear interfaces among the modules that implement them, and clear roles assigned to the different actors. These elements, together with a strong adherence to the ISO GPS standards, make the DGLs-CF the perfect environment for researchers, experts in different fields, and industrial partners to formalize their knowledge, and develop and implement their own algorithms and procedures. The Design Guidelines Collaborative Framework uses the simple IDEF0 formalism to describe the DGLs-CF framework in a top-down way, in order to facilitate readers’ comprehension, and their adoption and development of the framework. Several case studies on the application of the DGLs-CF in industrial environments show the framework’s effectiveness and robustness. Industrial and academic researchers will find this book a useful guide to the DGLs-CF and mechanical engineers will be quick to appreciate the streamlined approach it describes.

More on www.springer.com/978-1-84882-771-4

Due January 2010

2010. XIV, 186 p. 52 illus.
978-1-84882-771-4 ▶ 99,95 €
Engineering Economics, Organization, Logistics, Marketing

Forthcoming
T.T. Allen

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

The Toyota Production System, or lean production, has long been regarded as critical to business success in many industries. Over the last ten years, instruction in six sigma has been increasingly linked with learning about the elements of lean production. Introduction to Engineering Statistics and Lean Sigma builds on the success of its first edition (Introduction to Engineering Statistics and Six Sigma) to reflect the growing importance of the "lean sigma" hybrid. As well as providing detailed definitions and case studies of all six sigma methods, Introduction to Engineering Statistics and Lean Sigma forms one of few sources on the relationship between operations research techniques and lean sigma. Readers will be given the information necessary to determine which sigma methods to apply in which situation, and to predict why and when a particular method may not be effective. Methods covered include: • control charts and advanced control charts, • failure mode and effects analysis, • Taguchi methods, • gauge R&R, and • genetic algorithms. The second edition also greatly expands the discussion of Design For Six Sigma (DFSS), which is critical for many organizations that seek to deliver desirable products which work first time. It incorporates recently emerging formulations of DFSS from industry leaders and offers more introductory material on the design of experiments, and on two level and full factorial experiments, to help improve student intuition-building and retention. The emphasis on lean production, combined with recent methods relating to Design for Six Sigma (DFSS), makes Introduction to Engineering Statistics and Lean Sigma a practical, up-to-date resource for advanced students, educators, and practitioners.

Due March 2010
2010. XX, 539 p. 149 illus. 978-1-84996-016-8 ▶ 169,95 €

Forthcoming
Y.V. Lun, K. Lai, T.E. Cheng

Shipping and Logistics Management

The term 'shipping' has evolved from its original relationship to ships and seaborne trade, to encompass any mode of transport that moves goods between two points. The implication of the extended meaning of 'shipping' is that the shipping industry has become more complex, as well as more dynamic. Traditionally, the theory and knowledge of shipping management and operations are transferred in the workplace, from practitioners to newcomers; little has been systematically organized and published in books. Shipping and Logistics Management serves to consolidate the knowledge its authors have acquired from being educators and observers of the shipping industry. Against the background of a global business environment, it explains how the shipping market functions, examining the strategic and operational issues that affect entrepreneurs in this industry. The authors discuss global trends and strategies in the shipping business, looking at the role of logistics service providers and at how the use of information technology can help shipping operations. Shipping and Logistics Management also aims to answer several important questions in the shipping industry, including: • What are the shipping markets? • How are freight rates determined? • What are the shipping cost structures? • What are the patterns of sea transport? and • How do companies in the shipping industry operate? An invaluable source of information for researchers and advanced, or graduate, students, Shipping and Logistics Management is also a useful reference for shipping practitioners and consultants.

More on www.springer.com/978-1-84882-996-1
Due May 2010
2010. IV, 356 p. 44 illus. 978-1-84882-996-1 ▶ 129,95 €

Forthcoming
A.C. Lyons, A.E. Coronado M.

Customer-driven Supply Chains
Strategies for Lean and Agile Supply Chain Design

The supply chain has become key to the survival of organisations in different industries. Organisations in dynamic business environments demand supply chains that support the satisfaction of customer needs. The principles of lean thinking have now been transferred to the supply chain, making imperative the development of new approaches to supply chain management. This book reviews the concept of lean thinking and in relation to other initiatives to do with supply chain management. Industrial case studies illustrate the principles of lean supply chains. A series of diagrams illustrate critical concepts and supply chain architectures. The importance of transferring lean principles from the organisational level to the supply chain level is emphasised. Mass customisation, agility, information sharing and the bullwhip effect are discussed. A methodology for measuring the performance of supply chains is introduced. This book will be of value to students and researchers in this field, and industry practitioners.

More on www.springer.com/978-1-84628-875-3
Due February 2010
2010. Approx. 220 p. 43 illus. (Decision Engineering, ) 978-1-84628-875-3 ▶ approx. 85,95 €

W. Schmeisser, H. Mohnkopf, M. Hartmann, G. Metze

Innovation performance accounting
Financing Decisions and Risk Assessment of Innovation Processes

For successful innovation in business the responsible managers need a consistent view of the individual processes as well as an assessment of key projects in all phases of the development. Generating new ideas, fast examination of its feasibility requires skilled methods for evaluation of these ideas, plans and especially costs and revenues.. Business models, calcula-
tion methods and some assessments of certain options are presented by the authors. The ability to identify risks and appropriate responses to misperceptions are important milestones in the innovation process. From analysis of problems to the introduction of market-ready solutions, legal requirements, business demands and risk management systems are discussed. Concepts promoting uniform, binding rules for ratings in the innovation process are treated. The identification of target pricing, target costing and litigation, the evaluation of the solution to calculate risk aspects as tasks in financial management and innovation controlling are part of the content. The authors demonstrate that any innovation in different industries requires a strategic and financial project management. Monetary assessment of the individual processes, a detailed patent portfolio and accounts management for innovation processes are of enormous importance. The book is completed by applications of the Berlin Balanced Scorecard Concept with practical examples from the innovation projects in pharmaceutical and technical business.

More on www.springer.com/978-3-642-01352-2
Due March 2010
2010. XX, 480 p. 180 illus.
978-3-642-01352-2 ▶ 129,95 €

Engineering Fluid Dynamics

H. Bockhorn, D. Mewes, W. Peukert, H. Warncke

Micro and Macro Mixing

Analysis, Simulation and Numerical Calculation

The homogenization of single phase gases or liquids with chemical reactive components by mixing belongs to one of the oldest basic operations applied in chemical engineering. The design of equipment for mixing processes is still derived from measurements of the mixing time which is related to the applied methods of measurement and the special design of the test equipment itself. This book was stimulated by the Priority Program on “Flow Mixing” financially supported by the Deutsche Forschungsgemeinschaft (DFG). Results are improved modern methods for experimental research and visualization, for simulations and numerical calculations of mixing and chemical reactions in micro and macro scale of time and local coordinates. The results are aimed to improve the precision of efficiencies and selectivities of chemical reactions in macroscopic scale. The book should give an understanding of the influence of the construction of different mixing equipment on to the momentum, heat and mass transfer as well as reaction processes running on microscopic scales of time and local coordinates. Newly developed methods of measurement are adjusted to the scales of the selected special transport and conversion processes. They allow a more detailed modeling of the mixing processes by the formulation of an appropriate set of momentum-, heat- and mass balance equations as well as boundary conditions in time and local coordinates together with constitutive equations and reaction kinetics equations as closure laws for numerical and analytical calculations. The improved and more detailed modeling leads to a major progress in predicting mixing processes on the different scales adjusted to transport and reaction processes in molecular, micro- and macro dimensions.

More on www.springer.com/978-3-642-04548-6
Due January 2010
2010. XII, 348 p. (Heat and Mass Transfer, )
978-3-642-04548-6 ▶ 129,95 €

Forthcoming

S.B. Hazra

Large-Scale PDE-Constrained Optimization in Applications

This book results from the authors work done on simulation based optimization problems at the Department of Mathematics, University of Trier, and reported in his postdoctoral thesis (“Habilitationsschrift”) accepted by the Faculty-IV of this University in 2008. The focus of the work has been to develop mathematical methods and algorithms which lead to efficient and high performance computational techniques to solve such optimization problems in real-life applications. Systematic development of the methods and algorithms are presented here. Practical aspects of implementations are discussed at each level as the complexity of the problems increase, supporting with enough number of computational examples. It consists of two parts: first part deals with time dependent optimization problems with applications in environmental engineering and the second part deals with steady state optimization problems, in which the PDEs are solved using semi-iterative or pseudo-time-stepping techniques, with applications in aerodynamics. This book will be useful for scientists and engineers who are looking for efficient numerical methods for PDE-constrained optimization problems. It will be helpful for graduate and Ph.D. students in computational mathematics, aerospace engineering, mechanical engineering, civil engineering and computational engineering during their training and research. This also will provide exciting research and development areas involving realistic applications.

More on www.springer.com/978-3-642-01501-4
Due January 2010
2010. XXII, 202 p. (Lecture Notes in Applied and Computational Mechanics, 49)
978-3-642-01501-4 ▶ 99,95 €

Forthcoming

C.E. Needham

Blast Waves

The primary purpose of this text is to document many of the lessons that have been learned during the author’s more than forty years in the field of blast and shock. The writing therefore takes on an historical perspective, in some sense, because it follows the author’s experience. The book deals with blast waves propagating in fluids or materials that can be treated as fluids. It begins by distinguishing between blast waves and the more general category of shock waves. It then examines several ways of generating blast waves, considering the propagation of blast waves in one, two and three dimensions as well as through the real atmosphere. One section treats the propagation of shocks in layered gases in a more detailed manner. The book also details the interaction of shock waves with structures in particular reflections, progressing from simple to complex geometries, including planar structures, two-dimensional structures such as ramps or wedges, reflections from heights of burst, and three-dimensional structures. Intended for those with a basic knowledge of algebra and a solid grasp of the concepts of conservation of mass and energy, the text includes an introduction to blast wave terminol-
Flows of Reactive Fluids

Heterogeneous and reactive flows are important in many areas, including aeronautics and space, the chemical industry, nuclear engineering, gas and electricity production, and the automotive industry. Reactive flows present heterogeneous variations or variations of concentration, temperature, speed, and sources of transfer phenomena such as thermal conduction, diffusion, or viscosity. The existence of these multiple phenomena coupled with convection makes the study of these flows difficult. The modeling of heterogeneous and reactive flows has progressed mainly with advances in aerospace, which gave birth to a new science called aerothermodynamics, as well as through progress made in chemical and process engineering. The methods implemented, the phenomena studied, and the aims for each field differed, but the results obtained have considerably enriched knowledge of reactive flows. This work examines basic concepts and methods necessary to study heterogeneous and reactive flows in areas such as fluid mechanics, thermodynamics, and chemistry. Selected subjects treated include: Equations of state, Transfer phenomena and chemical kinetics, Balance equations of reactive flows, Nondimensional numbers and similarity, Coupled phenomena, Elements of turbulent flows, Chemical reactors, Boundary layers and fluid layers, Reactive and nonreactive waves, Interfacial phenomena, Elements of multiphase flows. The book presents tools of interest to graduate students, researchers in mathematical physics, and engineers who wish to investigate problems of reactive flows. Portions of the text may be used in courses on the physics of liquids or in seminars on mechanics.


Forthcoming
R. Prud’homme

Engineering Thermodynamics, Heat and Mass Transfer

This book is a generalist textbook; it is designed for anybody interested in heat transmission, including scholars, designers, and students. Two criteria constitute the foundation of Annaratone’s books, including the present one. The first one consists of indispensable scientific rigour without theoretical exasperation. The inclusion in the book of some theoretical studies, even if admirable for their scientific rigor, would have strengthened the scientific foundation of this publication, yet without providing the reader with further applicable know-how. The second criterion is to deliver practical solution to operational problems. This criterion is fulfilled through equations based on scientific rigor, as well as a series of approximated equations, leading to convenient and practically acceptable solutions, and through diagrams and tables. When a practical case is close to a well defined theoretical solution, corrective factors are shown to offer simple and correct solutions to the problem. After a brief introduction in Chapter 1, heat transfer by conduction in both steady and unsteady state is examined in Chapter 2 as well as Chapter 3. Chapter 4 develops the dimensional analysis as an indispensable premise to Chapter 5 with its focus on heat transfer by convection. Chapter 6 analyzes heat transfer by radiation including radiation by flame. Chapter 7 illustrates the required behavior when examining heat transfer in heat exchangers, as well as tube banks. Chapter 8 discusses pressure drops in detail. Appendix A shows a series of Tables relative to thermal characteristics of the materials. Appendix B includes a series of Tables about the corrective factors to be adopted to obtain the real value of the mean temperature difference in design computation. Appendix C includes a series of Tables about the corrective factors to be adopted to obtain the real value of the exit temperature of the heating fluid in verification computation.

More on www.springer.com/978-3-642-03931-7

Forthcoming
D. Annaratone

Engineering Heat Transfer

This book is a generalist textbook; it is designed for anybody interested in heat transmission, including scholars, designers, and students. Two criteria constitute the foundation of Annaratone’s books, including the present one. The first one consists of indispensable scientific rigour without theoretical exasperation. The inclusion in the book of some theoretical studies, even if admirable for their scientific rigor, would have strengthened the scientific foundation of this publication, yet without providing the reader with further applicable know-how. The second criterion is to deliver practical solution to operational problems. This criterion is fulfilled through equations based on scientific rigor, as well as a series of approximated equations, leading to convenient and practically acceptable solutions, and through diagrams and tables. When a practical case is close to a well defined theoretical solution, corrective factors are shown to offer simple and correct solutions to the problem. After a brief introduction in Chapter 1, heat transfer by conduction in both steady and unsteady state is examined in Chapter 2 as well as Chapter 3. Chapter 4 develops the dimensional analysis as an indispensable premise to Chapter 5 with its focus on heat transfer by convection. Chapter 6 analyzes heat transfer by radiation including radiation by flame. Chapter 7 illustrates the required behavior when examining heat transfer in heat exchangers, as well as tube banks. Chapter 8 discusses pressure drops in detail. Appendix A shows a series of Tables relative to thermal characteristics of the materials. Appendix B includes a series of Tables about the corrective factors to be adopted to obtain the real value of the mean temperature difference in design computation. Appendix C includes a series of Tables about the corrective factors to be adopted to obtain the real value of the exit temperature of the heating fluid in verification computation.

More on www.springer.com/978-3-642-03931-7

Forthcoming
D. Annaratone

Wastewater Hydraulics

The second, enlarged edition of this established reference integrates many new insights into wastewater hydraulics. This work serves as a reference for researchers but also is a basis for practicing engineers. It can be used as a textbook for graduate students, although it has the characteristics of a reference book. It addresses mainly the sewer hydraulician but also general hydraulic engineers who have to tackle many a problem in daily life, and who will not always find an appropriate solution. Each chapter is introduced with a summary to outline the contents. To illustrate application of the theory, examples are presented to
explain the computational procedures. Further, to relate present knowledge to the history of hydraulics, some key dates on noteworthy hydraulicians are quoted. A historical note on the development of wastewater hydraulics is also added. References are given at the end of each chapter, and they are often helpful starting points for further reading. Each notation is defined when introduced, and listed alphabetically at the end of each chapter. This new edition includes in particular sideweirs with throttling pipes, drop shafts with an account on the two-phase flow features, as well as conduit choking due to direct or undular hydraulic jumps.

More on www.springer.com/978-3-642-11382-6
Due March 2010

978-3-642-11382-6 ▶ 99,95 €

R. Szymkiewicz

Numerical Modeling in Open Channel Hydraulics

This book offers a comprehensive approach to the numerical modeling of open channel flow, based on the author’s own research in this field, as well as his experience as a lecturer. It provides the reader with: Coverage of the most important problems of open channel hydraulics, including steady and unsteady flow in a single channel and in a channel network, transport of dissolved substance, transport of energy and more; Unified derivation of the governing equations for all problems, based on the fundamental laws of mass, momentum and energy conservation; Comprehensive presentation of the numerical methods applied in open channel flow modeling, with particular regard to the solution of hyperbolic and parabolic partial differential equations, which govern many important flow and transport processes; Detailed description of the numerical algorithms applied to solve particular problems, with many examples of solutions; Accuracy analysis of the numerical algorithms using the modified equation approach; New insights into numerical solution of some classical problems of open channel hydraulics, e.g. steady varied flow in a channel of arbitrary geometry. In-depth analysis of the simplified flood routing models and their unphysical properties, including a proposition of an alternative Instantaneous Unit Hydrograph, valid for all simplified models. Written in accessible language, Numerical Modeling in Open Channel Hydraulics contains information useful for higher level undergraduate and postgraduate students of civil and environmental engineering faculties, as well as scientists and practitioners in the field of hydraulic engineering, especially those using existing numerical codes or developing their own ones.

Due March 2010

S. Bangsow

Manufacturing Simulation with Plant Simulation and Simtalk

Usage and Programming with Examples and Solutions

This book provides the first comprehensive introduction to Plant Simulation. It supports new users of the software to get started quickly, provides an excellent introduction how to work with the embedded programming language SimTalk and even helps advanced users with examples of typical modeling tasks. The book focuses on the basic knowledge required to execute simulation projects with Plant Simulation which is an excellent starting point for real life projects.

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978-3-642-05073-2 ▶ 79,95 €

Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management

Enterprise networks offer a wide range of new business opportunities, especially for small and medium-sized enterprises that are usually more flexible than larger companies. In order to be successful, however, performances and expected benefits have to be carefully evaluated and balanced: enterprises must ensure they become a member of the right network for the right task and must find an efficient, flexible, and sustainable working practice. A promising approach to finding such a practice is to combine analytical methods and knowledge-based approaches, in a distributed context. Artificial intelligence (AI) techniques have been used to refine decision-making in networked enterprise processes, integrating people, information and products across the network boundaries. Artificial Intelligence Techniques

Forthcoming
V.P. Astakhov

Geometry of Single-Point Turning Tools and Drills

Fundamentals and Practical Applications

Tools for metal cutting have many shapes and features, each of which is described by its angles or geometries. The selection of the right cutting tool geometry is critical because it directly affects the integrity of the machined surface, tool life, power needed for machining, and thus the overall machining efficiency. Geometry of Single-Point Turning Tools and Drills outlines clear objectives of cutting tool geometry selection and optimization, using multiple examples to provide a thorough explanation. The establishment of clear bridges between cutting theory, tool geometry, and shop practice, reveals individual and combined influences of the parameters of cutting tool geometry on cutting tool performance and on the outcomes of a machining operation. The three basic systems of considerations of tool geometry – namely, tool-in-hand, tool-in-machine (holder) and tool-in-use – are covered, and the transformations between these systems are established. Geometry of Single-Point Turning Tools and Drills addresses several urgent problems that many present-day tool manufacturers, tool application specialists, and tool users, are facing. It is both a practical guide, offering useful, practical suggestions for the solution of common problems, and a useful reference on the most important aspects of cutting tool design, application, and troubleshooting practices. Covering emerging trends in cutting tool design, cutting tool geometry, machining regimes, and optimization of machining operations, Geometry of Single-Point Turning Tools and Drills is an indispensable source of information for tool designers, manufacturing engineers, research workers, and students. The Springer Series in Advanced Manufacturing publishes the best teaching and reference material to support students, educators and practitioners in manufacturing technology and management. This international series includes advanced textbooks, research monographs, edited works and conference proceedings covering all subjects in advanced manufacturing. The series focuses on new topics of interest, new treatments of more traditional areas and coverage of the applications of information and communication technology (ICT) in manufacturing.

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Due May 2010
2010. XXII, 564 p. 451 illus. (Springer Series in Advanced Manufacturing,) 978-1-84996-052-6 ▶ 169,95 €
for Networked Manufacturing Enterprises Management addresses prominent concepts and applications of AI technologies in the management of networked manufacturing enterprises. The aim of this book is to align latest practices, innovation and case studies with academic frameworks and theories, where AI techniques are used efficiently for networked manufacturing enterprises. More specifically, it includes the latest research results and projects at different levels addressing quick-response system, theoretical performance analysis, performance and capability demonstration. The role of emerging AI technologies in the modelling, evaluation and optimisation of networked enterprises’ activities at different decision levels is also covered. Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management is a valuable guide for postgraduates and researchers in industrial engineering, computer science, automation and operations research. The Springer Series in Advanced Manufacturing publishes the best teaching and reference material to support students, educators and practitioners in manufacturing technology and management. This international series includes advanced textbooks, research monographs, edited works and conference proceedings covering all subjects in advanced manufacturing. The series focuses on new topics of interest, new treatments of more traditional areas and coverage of the applications of information and communication technology (ICT) in manufacturing.

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Forthcoming
J.P. Davim

Surface Integrity in Machining

In machining, a surface can be defined as a border between a machined component and its environment. The term ‘surface integrity’ is used to describe the attributes of a machined surface and its relationship to functional performance. Surface Integrity in Machining describes the fundamentals and recent advances in the study of surface integrity in machining processes. In general, surface integrity can be divided into two aspects: the external topography of surfaces (surface finish); and the microstructure, mechanical properties and residual stresses of internal subsurface layers. Performance characteristics that are usually sensitive to surface integrity include; fatigue strength, fracture strength, corrosion rate, and tribological behavior (such as friction, wear and lubrication, and dimensional accuracy). Surface Integrity in Machining gathers together research from international experts in the field. Topics covered include: the definition of surface integrity and its importance in functional performance; surface topography characterization and evaluation; microstructure modification and the mechanical properties of subsurface layers; residual stresses; surface integrity characterization methods; and surface integrity aspects in machining processes. A useful reference for researchers in tribology and materials, mechanical and materials engineers, and machining professionals, Surface Integrity in Machining can be also used as a textbook by advanced undergraduate and postgraduate students.

More on www.springer.com/978-1-84882-873-5
Due February 2010
2010. XII, 231 p. 212 illus. 978-1-84882-873-5 ▶ 99,95 €

Forthcoming
M. Yoshimura

System Design Optimization for Product Manufacturing

Product manufacturing is currently one of the most important activities that people perform, as it directly or indirectly affects the daily life and economic well-being of countless people around the world. It is likely to continue to have a profound effect on world economies by providing a large source of employment and, ideally, by creating products that positively affect the lives of numerous people. For manufacturing to be successful in the long run, a broad range of factors must be taken into account when products are designed and developed. Product manufacturing today requires skilled decision-making in situations that are more complex and demanding than ever before, and the use of optimal system technologies has become essential. Readers of System Design Optimization for Product Manufacturing will learn about detailed concepts and practical technologies that enable successful product design and manufacture. These concepts and technologies are based on system optimization methodologies that consider a broad range of mechanical, as well as human, factors. System Design Optimization for Product Manufacturing explains the methodologies behind current and future product manufacture. Its detailed explanations of key concepts are relevant not only for product design and manufacture, but also for other business fields. These core concepts and methodologies can be applied to practically any field where informed decision-making is important, and where a range of often conflicting factors must be carefully weighed and considered. System Design Optimization for Product Manufacturing can be used as a fundamental reference book by both engineers and students in the fields of manufacturing, design engineering, and product development.

More on www.springer.com/978-1-84996-007-6
Due February 2010
2010. XVII, 202 p. 114 illus. 978-1-84996-007-6 ▶ 99,95 €

Mechanical Engineering (general)

Shock Wave Science and Technology Reference Library, Vol. 5

Non-Shock Initiation of Explosives

The sensitivity of an explosive is not a well defined property of the material but rather a complex pattern of behavior. Unlike the response to strong, planar shocks which is for the most part predictable and reproducible, explosives’ response to multidimensional and weaker stimuli is much more complicated. The present volume is the first compendium to assemble in a single text our present knowledge about the vast range of non-shock ignition mechanisms and responses, where initiation is not prompt, and involves a series of steps that may or may not lead to a steady detonation. The 11 extensive chapters in this volume are: • Context and Complexity of Non-Shock Initiation (B. W. Asay) • Transport Phenomena for Non-Shock Initiation Processes (L. Perry) • The Chemical Kinetics of Solid Thermal Explosions (B. F. Henson) • Classical Theory of Thermal Criticality (L. G. Hill) • Deflagration Phenomena in Energetic Materials (S. I. Jackson) • Mechanical and Thermal Damage (G. R. Parker and P. J. Rae) • Cook-off (B. W. Asay) • The Deflagration-to-Detonation Transition (J. M. McAfee) • Friction (P. M. Dickson) • Impact and Shear Ignition by Non-Shock Mechanisms (J. E. Kennedy) • Spark and Laser Ignition (J. E. Kennedy) Each chapter is self-contained and can be read independently of the others, though, they are thematically interrelated. They offer a timely reference, for postgraduate students as well as professional scientists and engineers, by laying out the foundations and discussing the latest developments including yet unresolved challenging problems.

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2010. XVI, 617 p. 2 illus. in color. 978-3-540-87952-7 ▶ 139,95 €
Forthcoming

W. Ding

Self-Excited Vibration Theory, Paradigm and A General Research Approach

Based on a systematic understanding of its theoretical foundations, this book offers a method for analyzing any type of self-excited vibration (SEV). After summarizing the research results of various SEV phenomena, including chatter, shimmy, rotor whirl, flutter, gallop, and SEV of man-made control systems, the author constructs a general constitutive mechanism of SEV, as well as a common research program and detailed analysis technique. All of these will help the reader independently analyze any new SEV phenomena. Dr. Wenjing Ding is the Director of the Dynamics and Vibration Division of the Engineering Mechanics Department of Tsinghua University, China.

More on www.springer.com/978-3-540-69740-4
Due January 2010

978-3-540-69740-4  ► approx. 169,00 €

Microwaves, RF and Optical Engineering

Electromagnetic Field Theory for Engineers and Physicists

This established, didactically excellent textbook unifies intuitiveness with extraordinary precision of its terminology and the derivation of concepts. It was developed as a manuscript to teach students in electrical engineering, and has served to do so for thousands of students over two decades. Discussed is the electromagnetic field theory and its mathematical methods. Maxwell’s equations are presented and explained. It follows a detailed discussion of electrostatics, vector calculus, boundary elements, boundary elements, image charge methods, and Monte-Carlo methods to field theory problems. He offers an outlook on fundamental issues in physics including quantum mechanics. Some of these issues concern still unanswered questions. A chapter dedicated to the theory of special relativity, which allows to simplify a number of field theory problems, complements this book. This book’s usefulness is not limited to engineering students, but can also be very helpful for physicists and other branches of science.

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978-3-540-76305-5  ► 79,95 €

Forthcoming

R. Noé

Essentials of Modern Optical Fiber Communication

This concise introduction into optical fiber communication. It covers the important aspects from the physics of optical wave propagations to the essentials of Receivers and Amplifiers. This combination of a solid coverage of the necessary fundamentals with an in-depth discussion of recent relevant research results provides the reader with the necessary theory of optical fiber systems. It serves both, graduate students and professionals. The book includes many worked examples, problems and provides lecturers with a solutions manual.

More on www.springer.com/978-3-642-04871-5
Due April 2010

2010. 300 p.
978-3-642-04871-5  ► approx. 59,95 €

Forthcoming

A. Snyder, J. Love

Optical Waveguide Theory

Light-induced fibres: light guiding light. When the refractive index changes with the intensity of light, a number of interesting nonlinear phenomena can occur. In this chapter, we concentrate on “powerful” nonlinear situations, when light guides itself in a homogenous medium without any intervening core-cladding structure. In other words, light itself induces its own guiding structure. This fascinating phenomena has been studied theoretically with many confirming experiments. Light guiding light offers a multitude of devices wherein light becomes the master of its own destiny and allows for the possibility of rewritable circuitry. There are various approaches for describing highly nonlinear phenomena like self-induced waveguides. One is formal and lacks intuition. This approach is to solve Maxwell’s equations from the outset with an intensity-dependent refractive index, completely ignoring the physics of the earlier chapters. The other approach is to build on our earlier chapters, by recognising that a light induced waveguide is a waveguide just like those we have already studied; the only difference being that its refractive index (and hence its V value) is now dependent on the intensity of light.

Due January 2010

978-0-387-74224-3  ► approx. 99,35 €

Forthcoming

A. Stöhr

Optical Millimeter-Wave and Terahertz Generation Technologies and Applications

Optical Millimeter-Wave and Terahertz Generation: Technologies and Applications reviews recent achievements in the rapidly growing area of photonic continuous-wave, millimeter-wave, and Terahertz Signal generation. This book covers all aspects of the emerging and interdisciplinary field in Microwave Photonics in a compact form and is suitable for use as a reference text and in some cases as a graduate level text. A detailed description of the physical phenomena and state-of-the-art photonic components and technologies will be presented. Owing to the unique characteristics of photonic signal generation, the recent technological achievements have fueled several commercial applications. Some of those, including the Photonic Synthesizer, Radio-over-Fiber Communications, Radar and Radio Astronomy, will be presented.

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Due June 2010

978-0-387-09640-7  ► approx. 99,35 €

Subwavelength and Nanometer Diameter Optical Fibers

Subwavelength and Nanometer Diameter Optical Fibers provides a comprehensive and up-to-date coverage of research on nanoscale optical fibers including the basic physics and engineering aspects of the fabrication, properties and applications. The book discusses optical micro/nanofibers that represent a perfect fusion of optical fibers and nanotechnology on subwavelength scale and covers a broad range of topics in modern optical engineering, photonics and nanotechnology spanning from fiber optics, near-field optics, nonlinear optics, atom optics to nanofabrication and microphotonic components/devices. It is intended for researchers and graduate students in the
fields of photonics, nanotechnology, optical engineering and materials science. Dr. Limin Tong is a professor at Department of Optical Engineering and State Key Laboratory of Modern Optical Instrumentation of Zhejiang University, China; Dr. Michael Sumetsky is a researcher at OFS Laboratories, USA.

More on www.springer.com/978-3-642-03361-2
Due February 2010

978-3-642-03361-2 ▶ approx. 159,00 €

Forthcoming
A.A. Youssef, J. Haslett

Nanometer CMOS RFICs for Mobile TV Applications

The RF front-end is the most fundamental building block of any wireless system. Nanometer CMOS RFICs for Mobile TV Applications brings together what IC design engineers need to know for the development of low-cost, wide-dynamic range RF front-ends for today’s fastest growing communication markets. Drawing on their experience from both industry and academia, the authors use the emerging DVB-H mobile TV standard to provide readers with the step-by-step design progression of the described nanometer CMOS RFICs. Nanometer CMOS RFICs for Mobile TV Applications focuses on how to break the trade-off between power consumption and performance (linearity and noise figure) by optimizing the mobile TV front-end dynamic range in three hierarchical levels: the intrinsic MOSFET level, the circuit level, and the architectural level. It begins by discussing the fundamental concepts of MOSFET dynamic range, including nonlinearity and noise. It then moves to the circuit level introducing the challenges associated with designing wide-dynamic range, variable-gain, broadband low-noise amplifiers (LNAs). The book gives a detailed analysis of a new noise-canceling technique that helps CMOS LNAs achieve a sub-2 dB wideband noise figure. Lastly, the book deals with the front-end dynamic range optimization process from the systems perspective by introducing the active and passive automatic gain control (AGC) mechanism. By describing in detail the physical realization of several 65 nm CMOS test chips, this book uncovers the practical challenges inherent in using nanometer CMOS technologies for RF circuit design and provides the solutions needed to overcome those challenges.

More on www.springer.com/978-3-642-03361-2
Due April 2010

978-3-642-03361-2 ▶ 99,95 €

X. Zhang, J. Xu

Introduction to THz Wave Photonics

Introduction to THz Wave Photonics examines the science and technology related to terahertz wave technologies, taking a dual approach between presenting the field’s history while simultaneously providing an overview of existing technology. The latest research in developing THz areas such as electromagnetic waves are presented, along with an introduction to continuous wave THz technology. Authors X.-C. Zhang and Jingzhou Xu place particular emphasis on pulsed THz technology, among many other facets of THz technology including: Complete coverage of THz wave spectroscopy and imaging A discussion of 3D THz wave imaging Applications of THz technology in the security field as related to explosives and hazardous materials THz applications in bio-engineering and biomedicine Introduction to THz Wave Photonics is the perfect book for academic researchers, practicing engineers and students interested in learning more about the subject.

More on www.springer.com/978-1-4419-0977-0
Due January 2010

2010. XII, 248 p.
978-1-4419-0977-0 ▶ 99,95 €

S. Chakraborty

Microfluidics and Microfabrication

Microfluidics and Microfabrication discusses the interconnect between microfluidics, microfabrication and the life sciences. Specifically, this includes fundamental aspects of fluid mechanics in micro-scale and nano-scale confinements and microfabrication. Material is also presented discussing micro-textured engineered surfaces, high-performance AFM probe-based, micro-grooving processes, fabrication with metals and polymers in bio-micromanipulation and microfluidic applications. Editor Suman Chakraborty, Professor at IIT Kharagpur, India, brings together leading minds in both fields who also: Cover the fundamentals of microfluidics in a manner accessible to multidisciplinary researchers, with a balance of mathematical details and physical principles Discuss the explicit interconnection between microfluidics and microfabrication from an application perspective Detail the amalgamation of microfluidics with life sciences Microfluidics and Microfabrication is an ideal book for researchers, engineers and senior-level graduate students interested in learning more about the two fields.

Due January 2010

978-1-4419-1542-9 ▶ approx. 99,95 €

R. Poprawe

Tailored Light 2
Laser Application Technology

The present book covers the application technology of lasers, focusing more on the vast range of processes than on individual applications, in order to motivate and enable future innovations. The physical basics are presented in the first half of the book. The following examination of application categories and their processes is documented by experts from their practical points of view but always refers back to the underlying physical principles. In this way, readers are free to choose their own individual level of depth in understanding this globally relevant field of innovation.

More on www.springer.com/978-3-642-01236-5
Due January 2010

2009, I, 644 p. 350 illus. in color. (RWTHedition, )
978-3-642-01236-5 ▶ 169,95 €
Chemical Vapour Deposition
An Integrated Engineering Design for Advanced Materials

The rapid advancement in chemical vapour deposition (CVD) technology has reached many fields of application, including thin film coating, microelectronics and communications. Chemical Vapour Deposition: An Integrated Engineering Design for Advanced Materials focuses on the application of this technology to engineering coatings and, in particular, to the manufacture of high performance materials, such as fibre reinforced ceramic composite materials, for structural applications at high temperatures. While previous discourses on CVD have had a tendency to focus solely on electronics, this book aims to provide a thorough exploration of the design and applications of advanced materials, and their manufacture in engineering. It addresses a wide range of topics related to CVD theories and applications. From physical fundamentals and principles, to optimisation of processing parameters and other current practices, this book is designed to guide readers through the development of both high performance materials and the design of CVD systems to manufacture such materials. Chemical Vapour Deposition: An Integrated Engineering Design for Advanced Materials introduces integrated design and manufacture of advanced materials to researchers, industrial practitioners, postgraduates and senior undergraduate students. It also features a large body of appendices to provide references for further study. The Engineering Materials and Processes series focuses on all forms of materials and the processes used to synthesise and formulate them as they relate to the various engineering disciplines. The series deals with a diverse range of materials: ceramics; metals (ferrous and non-ferrous); semiconductors; composites, polymers, biomimetics etc. Each monograph in the series is written by a specialist and demonstrates how enhancements in materials and the processes associated with them can improve performance in the field of engineering in which they are used.

More on www.springer.com/978-1-84882-893-3

Due January 2010
2010, XIV, 170 p. 55 illus. (Green Energy and Technology, )
978-1-84996-027-4  ► 99,95 €

Forthcoming
X. Yan, Y. Xu

Power Electronics, Electrical Machines and Networks

While the main focus lies on energy and power supply, the series also covers green solutions in industrial engineering and engineering design. Green Energy and Technology is a monograph series addressing researchers, advanced students and technical consultants, as well as decision makers in industry and politics. The level presentation ranges from instructional to highly technical. Although conventional cogeneration systems have been used successfully in the last two decades, most of them have been large units using mainly hydrocarbon fuels that are becoming increasingly expensive. New cogeneration systems based on fuel cells and sorption air conditioning systems promise to be an energy-saving alternative for situations when cooling, heating and power are needed at low and medium capacities. Cogeneration Fuel Cell-Sorption Air Conditioning Systems examines the thermodynamic principles of fuel cell performance and sorption air conditioning systems, and gives relevant information about the state of the art of these technologies. It also provides the reader with the theoretical bases and knowledge needed to understand the operation of these new cogeneration systems, as well as discussing the design basis and economical evaluation. Topics covered include: • selected fuel cells for cogeneration CHP processes; • state-of-the-art sorption refrigeration systems; • potential applications in demonstration projects; and • profitability assessment of the cogeneration system. Air conditioning and fuel cell engineers; postgraduates and researchers in energy fields; and designers of cooling, heating and power cogeneration systems will find Cogeneration Fuel Cell-Sorption Air Conditioning Systems a useful and informative reference.

More on www.springer.com/978-1-84996-027-4
Due May 2010
2010, XIV, 174 p. 55 illus. (Green Energy and Technology, )
978-1-84996-027-4  ► 99,95 €

Forthcoming
I. Pilatovsky, R. Romero, C. Isaza, S. Gamboa, P. Sebastian, W. Rivera

Cogeneration Fuel Cell-Sorption Air Conditioning Systems

Climate change, environmental impact and declining natural resources are driving scientific research and novel technical solutions. Green Energy and Technology serves as a publishing platform for scientific and technological approaches to green - i.e., environmentally friendly and sustainable - technologies.

M.M. Saha, J. Izykowski, E. Rosolowski

Fault Location on Power Networks

Electric power systems will always be exposed to the failure of their components. When a fault occurs on a line, it is crucial for the fault location to be identified as accurately as possible, allowing the damage caused by the fault to be repaired quickly before the line is put back into service. Fault Location on Power Lines enables readers to pinpoint the location of a fault on power lines following a disturbance. If a fault location cannot be identified quickly and this causes prolonged line outage during a period of peak load, severe economic losses may occur and reliability of service may be questioned. The growth in size and complexity of power systems has increased the impact of failure to locate a fault and therefore height-
ended the importance of fault location research studies, attracting widespread attention among researchers in recent years. Fault location cannot be truly understood, applied, tested and analysed without a deep and detailed knowledge of the interiors of fault locators. Consequently, the nine chapters are organised according to the design of different locators. The authors do not simply refer the reader to manufacturers’ documentation, but instead have compiled detailed information to allow for in-depth comparison. Fault Location on Power Lines describes basic algorithms used in fault locators, focusing on fault location on overhead transmission lines, but also covering fault location in distribution networks. An application of artificial intelligence in this field is also presented, to help the reader to understand all aspects of fault location on overhead lines, including both the design and application standpoints. Professional engineers, researchers, and postgraduate and undergraduate students will find Fault Location on Power Lines a valuable resource, which enables them to reproduce complete algorithms of digital fault locators in their basic forms.

More on www.springer.com/978-1-84882-885-8
Available
978-1-84882-885-8  ▶ 129,95 €

Quality Control, Reliability, Safety and Risk

Forthcoming
J. Faulin, A.A. Juan, S. Martorell, J.E. Ramirez-Marquez

Simulation Methods for Reliability and Availability of Complex Systems

Complex systems have become ubiquitous and are essential to today’s society. The design of reliable complex systems and the determination of their availability are therefore very important tasks for managers and engineers. These tasks, however, can be extremely difficult to achieve, due to the fact that current analytical methods are often too complicated, time-consuming, inefficient, or even inappropriate, when dealing with real-life systems. Simulation Methods for Reliability and Availability of Complex Systems discusses the use of computer simulation-based techniques and algorithms to determine reliability and availability (R&A) levels in complex systems, and to support the improvement of these levels both at the design stage and during the system operating stage. It presents current best practice in the field, as well as: • sharing theoretical or applied models and decision support systems that make use of simulation to estimate and to improve system R&A levels; • forecasting emerging technologies and trends in the use of computer simulation for R&A; and • proposing hybrid approaches to the development of efficient methodologies designed to solve R&A-related problems in real-life systems. Dealing with practical issues, Simulation Methods for Reliability and Availability of Complex Systems is designed to support managers and system engineers in the improvement of R&A, as well as providing a thorough exploration of the techniques and algorithms available for researchers, and for advanced undergraduate and postgraduate students. Springer Series in Reliability Engineering publishes high-quality books in important areas of current theoretical research and development in reliability, and in areas that bridge the gap between theory and application in areas of interest to practitioners in industry, laboratories, business, and government.

More on www.springer.com/978-1-84882-212-2
Due February 2010
2010. XIV, 339 p. 185 illus. (Springer Series in Reliability Engineering, )
978-1-84882-212-2  ▶ 129,95 €

Adaptive Supply Chain Management

The recent transformation of the world’s economic environment necessitates the re-thinking of supply chain management (SCM) goals and decision-making techniques. Adaptive Supply Chain Management develops new viewpoints on the SCM goal paradigm, problem semantics, and decision-making support. Drawing upon years of research and practical experience, and using numerous examples, the authors unite conceptual considerations of supply chains with a constructive level of engineering and solutions to real-world problems. Adaptive Supply Chain Management provides advanced insights into dynamics, complexity, and uncertainty in supply chains from the perspectives of systems analysis, control theory, and operations research. It also considers supply chain adaptability, stability, and crisis-resistance. Particular highlights include: • an understanding of supply chain performance as a composition of profitability and global stability; • the tackling of links between partial SCM problems with regard to different management levels, different supply chain structures, and in supply chain dynamics; • a mathematical approach based on the combined application of control theory, systems analysis, operations research, and agent-oriented modelling; and • supply chains modelled as dynamic multi-structural active systems. Providing readers with a comprehensive view of advanced SCM concepts, constructive mathematical techniques and models, Adaptive Supply Chain Management is an invaluable text for practitioners and researchers who specialize in SCM and operations.

Forthcoming
D. Ivanov, B. Sokolov

Renewable and Green Energy

By M. Beccali, P. Finocchiaro

Solar Air Conditioning

This practical handbook provides the reader with a comprehensive treatment of Solar Air Conditioning (SAC) systems. SAC systems can dramatically reduce the energy demand for cooling buildings using of the solar energy because they exploit the resource when the demand for cooling is the highest. The book gives the basic principles of air handling processes and components in SAC systems. It describes the available SAC cycles. It provides the reader with practical rules for their design and the selection of possible solutions. Performance indicators are described according to the “standards” and the agreement discussed in the scientific community and in International Energy Agency research groups. A specific chapter highlights how to achieve the best results also implementing control system and strategies in the proper way. The book includes specific tools for decision making and design of SAC in order to guide the designer in the choice of the technology according to the application and the climate. Case studies give the opportunity to understand what “to do and not to do”.

More on www.springer.com/978-3-642-01995-1
Due June 2010
2009. Approx. 300 p. (Green Energy and Technology, )
978-3-642-01995-1  ▶ approx. 99,95 €

Methane Gas Hydrate

Climate change, environmental impact and declining natural resources are driving scientific research and novel technical solutions. Green Energy and Technology serves as a publishing platform for scientific and technological approaches to ‘green’ – i.e., environmentally friendly and sustainable - technologies. While the main focus lies on energy and power supply, the series also covers green solutions in industrial engineering and engineering design. Green Energy and Technology is a monograph series addressing researchers, advanced students and technical consultants, as well as decision makers in industry and politics. The level presentation ranges from instructional to highly technical. Gas hydrates are potentially one of the most important energy resources for the future. They represent one of the world’s largest untapped reservoirs of energy and, according to some esti-
Global Warming: Engineering Solutions

Global Warming: Engineering Solutions goes beyond discussing the definition and causes of climate change, and offers concrete solutions for solving global warming. Innovative and forward-thinking engineering solutions are needed to tackle global warming’s threat to the planet, and this book offers numerous methods to address global warming’s identified causes. Drawing upon the collective knowledge of renowned experts, Ibrahim Dincer, Arif Hepbasli, Adnan Midilli and T. Hikmet Karakoc have assembled a wide ranging treatise on engineering solutions to global warming that includes: Ideas for correcting carbon dioxide and other emission pollution. Exploring the relationship between global warming and thermodynamics. Examining the sustainability and practicality of the most prevalent forms of clean energy. Global Warming: Engineering Solutions explores the major threats of global warming from an engineering perspective, explicating practical deployments of systems that could be implemented and work towards staving off global climate change. This book is a must-read for any researchers and engineers interested in gaining an applicable knowledge of how to prevent and control global warming through engineering.


Due January 2010
2010. XII, 685 p. 50 illus. (Green Energy and Technology, ) 978-1-4419-1016-5 ▶ 169,95 €

Forthcoming
J.W. Eerkens

The Nuclear Imperative

A Critical Look at the Approaching Energy Crisis
(More Physics for Presidents)

In this well documented global wake-up call, nuclear physicist Jeff Eerkens explores remedies for the impending energy crisis, when oil and natural gas are depleted. Because burning coal worsens the problem of global warming, alternate energy sources must be instituted. The Nuclear Imperative demonstrates with scientific documentation that solar, wind, and biomass power alone, while helpful, are incapable of supplying and sustaining the enormous quantities of electricity and heat needed for manufacturing portable synthetic fuels (synfuels) to replace our current use of fossil fuels. Instead, it offers a fresh look at uranium-produced energy as the optimal affordable solution. Long misunderstood and irrationally feared because of antiquated beliefs by the general public, modern nuclear power generation is safer, cleaner, and essential for solving the future energy shortfall.

Using a detailed, scientific approach to dispel common myths, The Nuclear Imperative shows that uranium fission power is available for 1,500 years as a prime energy source to provide all the world’s energy needs. Because it takes ten to twenty years to design, test, and build new synfuel-producing reactors and new engines powered by new synfuels, action must be taken soon to prevent a catastrophe thirty years from now when oil runs out. This is the second, corrected and revised edition of this work.


Due February 2010

Energy for a Warming World

A Plan to Hasten the Demise of Fossil Fuels

Climate change, environmental impact and declining natural resources are driving scientific research and novel technical solutions. Green Energy and Technology serves as a publishing platform for scientific and technological approaches to “green” - i.e., environmentally friendly and sustainable - technologies. While the main focus lies on energy and power supply, the series also covers green solutions in industrial engineering and engineering design. Green Energy and Technology is a monograph series addressing researchers, advanced students and technical consultants, as well as decision makers in industry and politics. The level presentation ranges from instructional to highly technical. Energy for a Warming World challenges the commonplace notion that the amount of power which mankind can potentially harness from renewable resources is more than large enough to assuage future demand levels. The presumption of unlimited power from renewables does not take into account the fact that it may not be possible to fully develop this potential, or that the resulting energy may not be available where it is most required. Engineering limitations and deficiencies in production will inevitably undermine the best calculations. By examining the renewables issue from an electrical engineering perspective, and exercising due regard for the limited capability of current and future electrical generation and transmission systems, this book attempts to provide more realistic statistics for the levels of power which could be extracted from sustainable resources in the critical time frame of 30 to 40 years. The engineering logic leads inexorably to the importance of taking a global outlook on the switch to renewable power supply and transmission – an outlook which has some surprising and uncomfortable ramifications for mankind. Energy for a Warming World provides a new perspective on renewable resources for academics and researchers in environmental or electrical power engineering, as well as to students in related areas. Its accessible approach also makes it invaluable to general readers who want a greater understanding of the engineering-based facts behind the global warming debate.

More on www.springer.com/978-1-84882-833-9

Due February 2010
2010. IV, 284 p. 13 illus. (Green Energy and Technology, ) 978-1-84882-833-9 ▶ 99,95 €
for advanced students of mechanical engineering, the book follows a unified geometric approach rather than employing purely numerical or algebraic methods, and makes extensive use of examples and self-study problems. The book can also be used as a self-study reference for advanced robotics researchers and practicing engineers.

More on www.springer.com/978-3-642-05174-6
Due June 2010
2010. Approx. 320 p. 95 illus.
978-3-642-05174-6 ▶ approx. 66.95 €

Forthcoming

T. Kröger

On-Line Trajectory Generation in Robotic Systems
Basic Concepts for Instantaneous Reactions to Unforeseen (Sensor) Events

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

More on www.springer.com/978-3-642-05174-6
Due January 2010
2010. Approx. 250 p. (Springer Tracts in Advanced Robotics, 58)
978-3-642-05174-6 ▶ 79,95 €

Signal, Image and Speech Processing

Speech Processing in Modern Communication
Challenges and Perspectives

More and more devices for human-to-human and human-to-machine communications require some sophisticated algorithms. This is due to the fact that the acoustic environment in which we live in and communicate is extremely challenging. More than ever, the fundamental problems of acoustic echo cancellation, interference and noise suppression, and dereverberation need to be tackled rigorously. Researchers from diverse fields of speech processing contributed chapters addressing their specific topic of study, where research is very active. The topics include: speech enhancement in transient-noise and reverberant environments, single-channel blind source separation of speech and music signals, acoustic echo cancellation in double-talk scenarios, linear and nonlinear system identification in the short-time Fourier transform domain for acoustic echo cancellation, identification of the relative transfer function between sensors for beamforming in reverberant environments, microphone arrays in noisy reverberant environments, beamforming methods for spherical microphone arrays, and broadband source localization. This book has been edited for engineers, researchers, and graduate students who work on speech processing for communication applications. We hope that the readers will find many new and interesting concepts that are presented in this text useful and inspiring.

More on www.springer.com/978-3-642-11129-7
Due January 2010
2010. XVIII, 342 p. (Springer Topics in Signal Processing, 3)
978-3-642-11129-7 ▶ 129,95 €

Forthcoming

R.X. Gao, R. Yan

Wavelets
Theory and Applications for Manufacturing

This book presents a systematic description of the fundamentals on wavelet transform and its applications to the condition monitoring and health diagnosis of rotating machine components and systems, such as bearings, spindles, and gearboxes. Given the widespread utilization of rotating machines in modern manufacturing and the increasing need for condition-based (instead of fix-interval), intelligent maintenance to minimize machine down time and ensure reliable production, it is of critical importance to advance the science base of signal processing in manufacturing. Focusing on wavelet transform as a tool specifically applied and designed for applications in manufacturing the material presented will be appropriate for both academic researchers and practicing engineers working in the field of manufacturing.

More on www.springer.com/978-1-4419-1544-3
Due January 2010
978-1-4419-1544-3 ▶ approx. 99,35 €

Forthcoming

E. Gopi

Mathematical Summary for Digital Signal Processing Applications with Matlab

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

Due January 2010
978-90-481-3746-6 ▶ 99,95 €

Forthcoming

R. Hammoud, F. Porikli, L. Davis

Advanced Tracking Systems
Computational Approaches

Modern visual tracking systems implement a computational process that is often divided into several modules such as localization, tracking, recognition, behavior analysis and classification of events. This book will focus on recent advances in computational approaches for detection and tracking of human
In this way you can get own practical experience with which is included on the accompanying CD-ROM. formed with the image processing software heurisko all topics of this textbook. These exercises are per-
skills, and introduce you to real-world image pro-
that help you to test your understanding, train your
important algorithms. Each chapter includes exercises
examples from applications on PC-based image pro-
mentions the discussion of the general concepts with
matics is given in the Appendix. The book supple-
taking into account the technological improvements
and Image Analysis. In particular, the Image Acquisi-
part V, methods to track head, hand and facial fea-
tures are reviewed. The last two parts cover the topics
of automatic recognition and classification of activity,
gesture, behavior, drowsiness and visual distraction
state of humans.

More on www.springer.com/978-3-642-04932-3

Due April 2010

2010. 350 p. (Augmented Vision and Reality, 2)
978-3-642-04932-3 ▶ approx. 129,95 €

Image Fusion
Theories, Techniques and Applications

This textbook provides a comprehensive introduc-
tion to the theories, techniques and applications of image fusion. It is aimed at advanced undergraduate
and first-year graduate students in electrical engineer-
ning and computer science. It should also be useful to
practicing engineers who wish to learn the concepts
of image fusion and use them in real-life applications.
The book is intended to be self-contained. No previ-
ous knowledge of image fusion is assumed, although
some familiarity with elementary image processing
and the basic tools of linear algebra is recommended. The book may also be used as a supplementary text
for a course on advanced image processing. Apart
from two preliminary chapters, the book is divided
into three parts. Part I deals with the conceptual
ideas and theories which underlie image fusion. Partic-
ular emphasis is given to the concept of a common
representation framework and includes detailed
discussions on the techniques of image registration,
radioradiometric calibration and semantic equivalence.
Part II deals with a wide range of techniques and algo-
rithms which are in common use in image fusion.
Among the topics considered are: sub-space transfor-
mations, multi-resolution analysis, wavelets, ensemble
learning, bagging, boosting, color spaces, image
thresholding, Markov random fields, image similarity
measures and the expectation-maximization algo-

rithms. Together Parts I and II form an integrated and
comprehensive overview of image fusion. Part III
deals with applications. In it several real-life exam-

ples of image fusion are examined in detail, including
panchromatic sharpening, ensemble color image
segmentation and the Simultaneous Truth and Per-
formance algorithm of Warfield et al. The book is
accompanied by a webpage from which supplementary
material may be obtained. This includes support
for course instructors and links to relevant matlab


code.

More on www.springer.com/978-3-642-11215-7

Due January 2010

2010. Approx. 200 p. 978-3-642-11215-7 ▶ 79,95 €

Speech Dereverberation

Speech dereverberation is a signal processing tech-
nique of key importance for successful hands-free
speech acquisition in applications of telecommunica-
tions and automatic speech recognition. Over the last
few years, speech dereverberation has become a hot
research topic driven by consumer demand, the avail-
ability of terminals based on Skype” which encourage
hands-free operation and the development of
promising signal processing algorithms. Speech Dere-
verberation gathers together an overview, a mathe-
matical formulation of the problem and the state-of-
the-art solutions for dereverberation. After consid-
ering how dereverberation performance can be mea-
sured, Speech Dereverberation presents the current
approaches within a unified framework. The back-
ground to the algorithms is explained, together with
relevant mathematical analysis and supporting exam-
ple and simulations. Techniques rooted in speech
e enhancement are included. In addition, a substantial
treatment of multichannel blind acoustic system iden-
tification is provided. System inversion and deconvo-
lution is also included. Speech Dereverberation offers
the reader an overview of the subject area, as well as
an in-depth text on the advanced signal processing
involved. The book benefits the reader by providing
such a wealth of information in one place, defines
the current state of the art and, lastly, encourages further

work on this topic by offering open research questions
to exercise the curiosity of the reader. It is suitable
for students at masters and doctoral level, as well as estab-
lished researchers.

More on www.springer.com/978-1-84996-055-7

Due May 2010

2010. XVIII, 398 p. 126 illus. (Signals and Communication
Technology, ) 978-1-84996-055-7 ▶ approx. 129,95 €

Forthcoming

X. Shi

Blind Signal Processing
Theory and Practice

"Blind Signal Processing: Theory and Practice" not
only introduces related fundamental mathematics,
but also reflects the numerous advances in the field,
such as probability density estimation-based process-
ing algorithms, underdetermined models, complex
value methods, uncertainty of order in the separa-
tion of convolutive mixtures in frequency domains,
and feature extraction using Independent Component
Analysis (ICA). At the end of the book, results from a
study conducted at Shanghai Jiao Tong University in
the areas of speech signal processing, underwater sig-
als, image feature extraction, data compression, and
the like are discussed. This book will be of particular
interest to advanced undergraduate students, gradu-
ate students, university instructors and research scien-
tists in related disciplines. Dr. Xizhi Shi is a Professor
at Shanghai Jiao Tong University.

More on www.springer.com/978-3-642-11346-8

Due February 2010

2010. Approx. 300 p. 139 illus. 978-3-642-11346-8 ▶ approx. 119,95 €

Digital Image Processing

Since the first edition of “Digital Image Processing”
was published in 1991 it has found its way to many
desks and classrooms. The book offers an integral
view of image processing from physical process of
image acquisition to the extraction of the data of
interest. This is also revealed in the renewed structure
of the seventh edition, dividing the contents in three
major parts: Image Acquisition, Image Processing,
and Image Analysis. In particular, the Image Acquisi-
tion Part is strengthened by a new chapter on Sensors
taking into account the technological improvements
of recent years. A reference of fundamental mathema-
tics is given in the Appendix. The book supplement-
men the discussion of the general concepts with
elements from applications on PC-based image pro-
cssing systems and ready-to-use implementations of
important algorithms. Each chapter includes exercises
that help you to test your understanding, train your
skills, and introduce you to real-world image pro-
cessing tasks. An important part of the exercises is a
wealth of interactive computer exercises, which cover
all topics of this textbook. These exercises are per-
fomed with the image processing software heurisko
which is included on the accompanying CD-ROM.
In this way you can get own practical experience with
almost all topics and algorithms covered by this book.

More on www.springer.com/978-3-642-04949-1

Due March 2010

978-3-642-04949-1 ▶ 89,95 €
Forthcoming

Y. You

Audio Coding
Theory and Applications

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


Due June 2010
978-1-4419-1753-9 ▶ approx. 99,35 €

Structural Mechanics

Forthcoming
J. Blauuwendraad

Plates and FEM
Surprises and Pitfalls

This textbook aims to be the bridge between plate theory and FE-software. Structural engineers must translate elastic analysis results into economic structure dimensions and reinforcement, which raises difficulties. Not all engineers are well enough equipped for the increasingly easy-to-use powerful programs. The problem is not lack of FE-knowledge, but rather ignorance of plate behaviour. Therefore, this book starts with classical plate theory for membrane and bending states, and proceeds to FE-practice. This volume can be used for university courses, serving as practical preparation for the engineering profession, and as a guide to structural designers.

More on www.springer.com/978-90-481-3595-0

Due January 2010
978-90-481-3595-0 ▶ 79,95 €

Forthcoming

L. Carlsson, G. Kardomateas

Structural and Failure Mechanics of Sandwich Composites

"Structural and Failure Mechanics of Sandwich Composites" by Leif A. Carlsson and George A. Kardomateas focuses on the important deformation and failure modes of sandwich structures such as face sheet/core debonding, sub-interface core cracking, fatigue strength, failure under impact loading, wrinkling and local buckling as well as global buckling strength and effects of transverse shear. The book also provides the mechanics background necessary for understanding these fracture processes and the response of sandwich beams and plates under a variety of loadings. Furthermore, the book reviews test methods developed for the characterization of the constituent face and core materials, the bond layer, and the sandwich structure. Finally, the book includes new three dimensional elasticity solutions for the structural behavior, which can serve as benchmarks for judging the accuracy of simplified sandwich plate, shell and beam theories. The book will benefit structural and materials engineers and researchers seeking the state-of-the-art and the contemporary advances in the Structural Integrity, the Failure Mechanics and Failure Mechanisms and the Damage Tolerance as well as the Structural Behavior of Sandwich Structures.

More on www.springer.com/978-3-540-25138-5

Due January 2010
2010. XVIII, 258 p. 159 illus. (Springer Series in Geomechanics and Geoenineering, )
978-3-642-01300-3 ▶ 99,95 €

Theoretical and Applied Mechanics (general)

Forthcoming
S. Aleynikov

Spatial Contact Problems in Geotechnics
Boundary-Element Method

The book presents a systematic approach to the numeric solution of a broad class of spatial contact problem in geotechnics. New techniques and efficient computing algorithms are considered on the basis of the boundary element method – a modern method of structural mechanics and theory of elasticity. Their practical application enables complex-shaped foundations to be designed with high reliability, under spatial loads. Much attention is paid to the formulation and analysis of spatial contact models for elastic bases. Along with classical schemes of contact deformation, new contact models are discussed for spatial nonhomogeneous and nonlinearly elastic media, adequately describing the soil properties. The boundary element method was effectively implemented in an originally developed Rostwerk software. The boundary element solutions are compared with the known experimental data as well as with solutions of similar problems by means of other methods and engineering approaches. The proposed boundary element method for solving spatial contact problems is applied to demonstrate the possibility for developing new foundation constructions. A new procedure is described for the determination of the soil deformation modulus, developed from the solution of a contact problem for impression of a conical indenter into an elastic half-space. All the topics under consideration are accompanied by extensive calculation data. The original results are complemented by a detailed review of the world literature. This work is intended for the audience of research workers, design engineers, post-graduate students, undergraduates specializing in structural mechanics, theory of elasticity and geotechnics.

More on www.springer.com/978-3-540-25138-5

Due January 2010
978-3-642-01300-3 ▶ 169,95 €

Strength Analysis in Geomechanics

The book presents a new approach for the solution of geomechanical problems - it explicitly takes into account deformation and fracture in time, which are neglected in classical methods although these properties create important effects. The method reveals the influence of the form of a structure on its ultimate state. It uses the rheological law which accounts for large strains at a non-linear unsteady creep, an influence of a stress state type, an initial anisotropy and damage. The whole approach takes into account five types of non-linearity (physical as well as geometrical ones) and contains several new ideas. For example, it considers the fracture as a process, the difference between the body and an element of the material which only deforms and fails because it is in the structure, the simplicity of some non-linear computations against the consequent linear ones, the dependence of the maximum small strain in dangerous points of the body only on the material. Professor Elsoufi included many new solutions of non-linear geotechnical problems to this second edition.

More on www.springer.com/978-3-642-01300-3

Due January 2010
2010. XVIII, 258 p. 159 illus. (Springer Series in Geomechanics and Geoenineering, )
978-3-642-01300-3 ▶ 99,95 €
Vibration, Dynamical Systems, Control

Forthcoming

N. Kim

Introduction to Nonlinear Finite Element Analysis

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

More on www.springer.com/978-1-4419-1745-4
Due February 2010

2010. Approx. 400 p. 978-1-4419-1745-4 ▶ 79,95 €

Forthcoming

R.N. Jazar

Theory of Applied Robotics

Kinematics, Dynamics, and Control (2nd Edition)

Theory of Applied Robotics: Kinematics, Dynamics, and Control 2E is appropriate for courses in robotics that emphasize kinematics, dynamics, and control. The contents of this book are presented at a theoretical-practical level. It explains robotics concepts in detail, concentrating on their practical use. Related theorems and formal proofs are provided, as are real-life applications. Students, researchers, and practicing engineers alike will appreciate this user-friendly presentation of a wealth of robotics topics, most notably orientation, velocity, and forward kinematics. The second edition includes updated and expanded exercise sets and problems, new coverage includes, Components and Mechanisms of a Robotic Systems with actuators, sensors and controllers and updated and expanded material on Kinematics including geometric kinematics, Derivative Kinematics, velocity kinematics, and new coverage on sensing and control including position sensors, speed sensors and acceleration sensors.

Due April 2010


Forthcoming

K. Popp, W. Schiehlen

Ground Vehicle Dynamics

“Ground Vehicle Dynamics” is devoted to the mathematical modelling and dynamical analysis of ground vehicle systems composed of the vehicle body, the propulsion, guidance and suspension devices and the corresponding guideway. Automobiles on uneven roads and railways on flexible tracks are prominent representations of ground vehicle systems. All these different kinds of systems are treated in a common way by means of analytical dynamics and applied control. As a particular result of this integrated approach the state equations of the global systems are obtained including the complete interactions between the sub-systems considered as independent modules. In addition to a detailed modelling of vehicles as multibody systems, the contact theory for rolling wheels and the modelling of guideways by Finite Element systems and stochastic processes as well as the fundamentals of vehicle dynamics for longitudinal, lateral and vertical motions and vibrations of automobiles and railways are presented.

More on www.springer.com/978-3-540-24038-9
Due January 2010

2010. Approx. 350 p. 978-3-540-24038-9 ▶ 129,95 €

Forthcoming

H.A. Talebi, F. Abdollahi, R.V. Patel, K. Khorasani

Neural Network-Based State Estimation of Nonlinear Systems Application to Fault Detection and Isolation

This series aims to report new developments in the fields of control and information sciences – quickly, informally and at a high level. The type material considered for publication includes: 1. Preliminary drafts of monographs and advanced textbooks 2. Lectures on a new field, or presenting a new angle on a classical field. Research reports 4. Reports of meetings, provided they are a) of exceptional interest and b) devoted to a specific topic. The timeliness of subject material is very important. Information for Authors Manuscripts should be written in English and be no less than 100, preferably no more than 500 pages. The manuscript in its final and approved version must be submitted in camera-ready form. Authors are encouraged to use LATEX together with the corresponding Springer LATEX macro packages. The corresponding electronic files are also required for the production process, in particular the online version. Detailed instructions for authors can be found on the engineering site of our homepage: springer.com/series/642. Manuscripts should be sent to one of the series editors, Professor Dr.-Ing. M. Thomas, Institut für Regelungstechnik, Technische Universität, Appelstraße 11, 30167 Hannover, Germany, or Professor M. Morari, Institut für Automatik, ETH/ETL I 29, Physikstrasse 3, 8092 Zürich, Switzerland, or directly to the Engineering Editor, Springer-Verlag, Tiergartenstraße 17, 69121 Heidelberg, Germany.

More on www.springer.com/978-1-4419-1437-8
Due January 2010

2010. XIX, 154 p. 100 illus. (Lecture Notes in Control and Information Sciences, 395) 978-1-4419-1437-8 ▶ 79,95 €

Forthcoming

O. Vahid, F. Golnaraghi

Friction-Induced Vibration in Lead Screw Drives

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


Due March 2010


978-1-4419-1751-5  ▶ approx. 125,25 €
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