Advances in Electrical Engineering and Computational Science

Advances in Electrical Engineering and Computational Science contains sixty-one revised and extended research articles written by prominent researchers participating in the conference. Topics covered include Control Engineering, Network Management, Wireless Networks, Biotechnology, Signal Processing, Computational Intelligence, Computational Statistics, Internet Computing, High Performance Computing, and industrial applications. Advances in Electrical Engineering and Computational Science will offer the state of the art of tremendous advances in electrical engineering and computational science and also serve as an excellent reference work for researchers and graduate students working with/on electrical engineering and computational science.

Features
► Offers the state of the art of tremendous advances in electrical engineering and computational science
► Serves as an excellent reference work for researchers and graduate students working with/on electrical engineering and computational science
► Contains revised and extended research articles written by prominent researchers

From the contents

Fields of interest
Electronics and Microelectronics, Instrumentation; Computer Communication Networks

Target groups
Researchers and graduate students working on electrical engineering and computational science

Type of publication
Monograph

Due June 2009

► € (D) 128,35 | € (A) 131,95 | sFr 199,50

Distributed Autonomous Robotic Systems 8

The International Symposia on Distributed Autonomous Robotic Systems (DARS) started at Riken, Japan in 1992. Since then, the DARS symposia have been held every two years. The 9th DARS symposium, which was held during November 17–19 in Tsukuba, Japan, hosted 84 participants from 13 countries. The 48 papers presented there were selected through rigorous peer review with a 50% acceptance ratio. Along with three invited talks, they addressed the spreading research fields of DARS, which are classifiable along two streams: theoretical and standard studies of DARS, and interdisciplinary studies using DARS concepts. The former stream includes multi-robot cooperation (task assignment methodology among multiple robots, multi-robot localization, etc.), swarm intelligence, and modular robots. The latter includes distributed sensing, mobilization, ambient intelligence, and multi-agent systems interaction with human beings.

Features
► Post-conference proceedings of the 9th conference on Distributed Autonomous Robotic Systems to be held Nov. 17-19, 2008 in Tsukuba, Japan

Contents
Distributed Sensing.- Mobility.- Ambient Intelligence.- Swarm Intelligence.- Multi-Robot Cooperation.- Practical Control of Modular Robots.- Multi-Robot Systems.- Human-Robot Interaction.

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

Target groups
Researchers, graduate students and professionals in robotics

Type of publication
Monograph

Due May 2009

2009. Approx. 500 p. Hardcover
► € (D) 160,45 | € (A) 164,95 | sFr 249,00
ISBN 978-3-642-00643-2

Soft Computing Based Modeling in Intelligent Systems

The book includes soft computing implementations of intelligent systems models. The recent popularity of fuzzy systems, neural networks and evolutionary computation, considered as related in AI, are now widely used to build intelligent systems. Professor Lotfi A. Zadeh has suggested the term “Soft Computing” for all new techniques working in these new areas of AI. Soft Computing techniques are tolerant to imprecision, uncertainty and partial truth. Due to the large variety and complexity of the domain, the constituting methods of Soft Computing are not competing for a comprehensive ultimate solution. Instead they are complementing each other, for dedicated solutions adapted to each specific problem. Hundreds of concrete applications are already available in many domains. Model based approaches offer a very challenging way to integrate a priori knowledge into procedures.

Features
► Contains the extended works originally presented at the IEEE International Workshop SOFA 2005

From the contents

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

Target groups
Engineers, researchers, and graduate students in computational intelligence

Type of publication
Monograph

Due April 2009

2009. Approx. 250 p. (Studies in Computational Intelligence, Volume 196) Hardcover
► approx. € (D) 106,95 | € (A) 109,95 | sFr 166,00
ISBN 978-3-642-00447-0
Structural Optimization with Uncertainties

This monograph is devoted to the exposition of new ways of formulating problems of structural optimization with incomplete information and techniques of solution. We recall here some research results concerning the optimum shape and structural properties of the bodies subjected to external loadings. We study problems of optimal design with incomplete information, accounting for the interaction between the structure and its environment, properties of materials, existence of initial damages and damage accumulation. This study is devoted to overcoming corresponding mathematical difficulties cause by raising local functionals. Most of the book is devoted to the minimax approach using worst case scenario, i.e. so called guaranteed approach. But the probabilistic approach, that does not guarantee the result, is also described in the monograph, because it gives more "optimistic" results.

Features
► Contains material that is not discussed in any of the other published books
► In this context the monograph truly complements corresponding developments in probabilistic optimal design
► Especially it is concerned with the mixed probabilistic-guaranteed approach to structural optimization with uncertainties and optimal design, based on modern fracture mechanics

Fields of interest
Numerical and Computational Methods in Engineering; Calculus of Variations and Optimal Control; Optimization; Computer-Aided Engineering (CAD, CAE) and Design

Target groups
Researchers and post doctoral students, engineers in mechanical engineering, applied mathematics, and scientific computing

Type of publication
Monograph

Due October 2009
► * € (D) 106,95 | € (A) 109,95 | sFr 166,00

Iterative-Interpolation Super-Resolution Image Reconstruction
A Computationally Efficient Technique

This book presents a novel and hybrid, computationally efficient, reconstruction scheme for solving the problem of super-resolution restoration of high-resolution images from sequences of geometrically warped, aliased and under-sampled low-resolution images. The scheme proposed is referred as the Iterative-Interpolation Super-Resolution (IISR) technique. The optimization-based technique for super-resolution is reinvestigated for comparative analysis to evaluate the accuracy and efficiency of the IISR technique. The significant influence of the regularization term over the fidelity of reconstruction is also analysed. The IISR technique addresses the problem of super-resolution image enhancement in terms of maintaining highest fidelity of reconstruction and a low computational cost to achieve maximum applicability of super-resolution to the real-world applications.

Features
► Latest research in the area of computationally efficient and intelligent image super-resolution techniques
► Concise overview about advanced intelligent image super-resolution techniques

From the contents

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

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

Type of publication
Monograph

Due May 2009
2009. Approx. 140 p. (Studies in Computational Intelligence, Volume 195) Hardcover
► * € (D) 106,95 | € (A) 109,95 | sFr 166,00
ISBN 978-3-642-00384-4

Aerospace Structural Analysis

This is a textbook for teaching structural analysis of aerospace structures. It can be used for 3rd and 4th year students in aerospace engineering, as well as for 1st and 2nd year graduate students in aerospace and mechanical engineering.

Features
► A unified treatment of the various topics
► Unique structural analysis software will be available with the book

Fields of interest
Structural Mechanics; Theoretical and Applied Mechanics; Continuum Mechanics and Mechanics of Materials

Target groups
Undergraduate and graduate students studying structural analysis in aerospace and mechanical engineering

Type of publication
Graduate/Advanced undergraduate textbook

Due November 2009
► * € (D) 74,85 | € (A) 76,95 | sFr 116,50

Engineering

Due October 2009
► * € (D) 106,95 | € (A) 109,95 | sFr 166,00

Engineering

Due May 2009
2009. Approx. 140 p. (Studies in Computational Intelligence, Volume 195) Hardcover
► * € (D) 106,95 | € (A) 109,95 | sFr 166,00
ISBN 978-3-642-00384-4

Engineering

Due November 2009
► * € (D) 74,85 | € (A) 76,95 | sFr 116,50
A Brief Illustrated History of Machines and Mechanisms

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. Once the analytical field has been marked out, the chosen descriptive method is basically graphic. This historical compendium attempts to give a wide-angle view of historical development without making an in-depth analysis of each of the examples presented. Moreover, 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.

Features
- Can be considered a novelty in the area of History of Science and Technology, since it addresses attention to technical contents with commented illustrations in the historical developments of Mechanism Design over time.
- An illustrated history of machines and mechanisms which gives a complete panorama of the many aspects and subjects that contributed to the developments of machines and related disciplines.

From the contents

Fields of interest
- Engineering Design; Machinery and Machine Elements; Archaeology.

Target groups
- Students and scholars interested in the history of mechanical engineering.

Type of publication
- Monograph.

Due September 2009

- approx. * € (D) 85,55 | € (A) 87,95 | sFr 133,00

Handbook of Maintenance Management and Engineering

The Handbook of Maintenance Management and Engineering covers a wide range of topics in maintenance management and engineering. It includes extensive references to the theoretical foundations, recent research and future directions of this important subject. Using applications and examples which reflect the growing importance of maintenance, this book presents readers with an inter-disciplinary perspective on topical issues which affect any company engaged in discrete and process industry, no matter how large or small. Contributors to the book are maintenance experts with both academic and industrial backgrounds, who are able to offer a comprehensive analysis of the subject matter, including both quantitative treatment and discussion of management issues.

Features
- Will satisfy the need for such a book which has been felt by maintenance experts in industry and academia.
- Provides a comprehensive treatment of maintenance including quantitative treatment and management issues.
- All contributors to the book are maintenance experts.

From the contents
- Maintenance Organization.
- Maintenance Productivity and Performance Management.
- Failure Statistics.
- Failure Mode and Effect Analysis.
- Maintenance Control.
- Guidelines for Budgeting and Costing Planned Maintenance Services.
- Simulation Based Approaches for Maintenance Strategies Optimization.

Fields of interest
- Quality Control, Reliability, Safety and Risk;
- Engineering Economics, Organization, Logistics, Marketing;
- Industrial Chemistry/Chemical Engineering.

Target groups
- Industry practitioners, researchers in maintenance management and engineering, and graduate students in mechanical and industrial engineering.

Type of publication
- Handbook.

Due May 2009

- approx. * € (D) 139,05 | € (A) 142,95 | sFr 216,00
- ISBN 978-1-84882-471-7

Production Development
Design and Operation of Production Systems

The need for developing the area of industrial production is greater than ever. Outsourcing is not the only answer to the target of reducing product cost. Continuously developing production is a way of both controlling costs and of utilizing production as a competitive means in the business strategy. Production development is about improving existing production systems and developing new ones. The production system should be developed in integration with the product as a part of the overall product realization process, and not in sequence after the product has been designed. “Production Development” takes an holistic perspective on the production system and its design process during the whole system life-cycle. A working procedure of how to design and realize the production system is presented, together with a number of related production development aspects. “Production Development” can be used as reference book for teachers and students, or as a manual for professionals within the field of production.

Features
- Provides a broad overview on the subject of production development.
- Contains industry case descriptions and examples.

Fields of interest

Target groups
- Postgraduate and PhD students in operations management, industrial engineering, manufacturing/production engineering, production development, logistics, engineering management, product development or engineering economics.

Type of publication
- Monograph.

Due June 2009

2009. Approx. 375 p. 110 illus. Hardcover
- approx. * € (D) 139,05 | € (A) 142,95 | sFr 216,00
- ISBN 978-1-84882-484-7
- ISBN 978-1-84882-477-6
Static Timing Analysis for Nanometer Designs
A Practical Approach

The book covers topics such as cell timing and power modeling; interconnect modeling and analysis, delay calculation, crosstalk, noise and the chip timing verification using static timing analysis. For each of these topics, the book provides a theoretical background as well as detailed examples to elaborate the concepts. The static timing analysis topics covered start from verification of simple blocks useful for a beginner to this field. The topics then extend to complex nanometer designs with in-depth treatment of concepts such as modeling of on-chip variation, clock gating, half-cycle paths, as well as timing of source-synchronous interfaces such as DDR. The impact of crosstalk on timing and noise is covered as is the usage of hierarchical design methodology.

Features
- Provides a reference for engineers in the field of static timing analysis for semiconductors
- Discusses the underlying theoretical background as well as in-depth coverage of timing verification using static timing analysis
- Covers topics such as CMOS logic gates, cell library, timing arcs, waveform slew, and cell capacitance, among others

Contents

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

Target groups
Professionals in the field of chip design and timing verification of ASICs

Type of publication
Professional book

Tuning Metaheuristics
A Machine Learning Perspective

The importance of tuning metaheuristics is widely acknowledged in scientific literature. However, there is very little dedicated research on the subject. Typically, scientists and practitioners tune metaheuristics by hand, guided only by their experience and by some rules of thumb. Tuning metaheuristics is often considered to be more of an art than a science.

This book lays the foundations for a scientific approach to tuning metaheuristics. The fundamental intuition that underlies Birattari’s approach is that the tuning problem has much in common with the problems that are typically faced in machine learning. By adopting a machine learning perspective, the author gives a formal definition of the tuning problem, develops a generic algorithm for tuning metaheuristics, and defines an appropriate experimental methodology for assessing the performance of metaheuristics.

Features
- Presents a machine learning approach to metaheuristics

Contents
Introduction.- Background and state of the art.- Statement of the tuning problem.- F-Race for tuning metaheuristics.- Experiments and applications.- Some considerations on the experimental methodology.- Conclusions.

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

Target groups
Engineers, researchers, and graduate students in computational intelligence and computer science

Type of publication
Monograph

Flugzeugtriebwerke
Grundlagen, Aero-Thermodynamik, ideale und reale Kreisprozesse, Thermische Turbomaschinen, Komponenten, Emissionen und Systeme


Pluspunkte
- Es gibt kein vergleichbares Buch
- In der dritten Auflage werden auch die neueren Triebwerkstypen wie das „Wärmetauschertriebwerk“ vorgestellt
- Grundlagen der Technik und Beispiele bekannter Triebwerkstypen werden detailliert dargestellt

Fachgebiet
KFZ- und Flugzeugbau

Zielgruppen
Ingenieure, Wissenschaftler, Flugzeugführer in der Ausbildung

Kategorie
Handbuch

VDI
Technik und Informatik

Erscheint Mai 2009
Technology Guide
Principles, Applications, Trends
Organized by: L. Behlau

Use this technology guide to find descriptions of today's most essential global technologies, clearly structured and simply explained in over 100 expert contributions, gain an understanding of the principles behind each technology, – the latest applications, the challenges ahead, and future trends, see how and where technologies and topics are interlinked, with cross-references and further sources of information and broaden your general knowledge of technology, presented in a comprehensive reference format that invites even the casual reader to explore the stimulating innovative ideas it contains.

Features
▶ Short overview about technological trends

Contents
Materials science and Nanotechnology.- Bioengineering and Biomechanics.- Computational intelligence.- Health care technologies.- Electronics and Microtechnologies.- Communications and information technologies.- Optical Technologies and Lasers.- Human-machine interaction and robotics.- Media and knowledge management.- Energy and resources.- Production and industrial engineering.- Mobility and Transport.- Aerospace technologies.- Automation and control.

Fields of interest
Mechanical Engineering; Industrial and Production Engineering; Technology Management

Target groups
Decision makers in companies, public sector, media, and politics

Type of publication
Professional book

The Seventh Landing
Going Back to the Moon, This Time to Stay

It's been thirty-five years since people last trod the dusty plains of the Moon. Over the course of six landings from 1969 to 1972, twelve men explored, four-wheeled, dug and hiked across the lunar surface. Now, NASA has plans for a seventh landing on the Moon. This time, they want to stay. NASA's plans, dubbed the Constellation architecture, involve the largest launch vehicle ever built, new types of propulsion, and a six-person vehicle to ferry crews from Earth to the Moon. But NASA's plans go far beyond Luna. Eventually, the lessons learned on the Moon's outpost at Shackleton Crater will teach us how to live – permanently – on the most Earthlike world in our solar system, Mars. NASA will have company: plans for future lunar exploration are being drawn by Europe, Japan, China and India.

While specific hardware and mission details will be in flux for some time, the overarching goals, strategies and inspiration for the seventh landing will not change.

Features
▶ Features spectacular original artwork depicting the Moon from its widely published author-artist
▶ Each chapter moves from a general description of the latest plans and goals to the specific nuts-and-bolts of engineering and science, using the most up-to-date information from interviews and research
▶ Mission scenarios are presented in an engaging “You are there” format

Contents
Introduction: Doing it right.- What came before.- The modern view.- Getting there the second time around.- Homemakers.- Lunar science.- Going beyond.- A permanent settlement beyond the cradle.

Fields of interest
Popular Science in Astronomy; Extraterrestrial Physics, Space Sciences

Target groups
Students and the general public interested in popular science, astronautics, engineering, and planetary science

Type of publication
Popular science

Optimizing Wireless Communication Systems

This book is a comprehensive collection of advanced concepts divided into two main parts: resource allocation and adaptive transceivers for link optimization. These two research areas are at the core of the recent advances in wireless communication systems. Each chapter covers a relevant, timely, topic and is developed with two focuses. First there is a tutorial and survey that reviews the state of the art in that topic. This is followed by an in depth treatment of the topic including current research topics, case studies and performance results. The material is for a research-oriented audience, involved with cutting-edge research in wireless communications.

Features
▶ Includes information on physical and MAC layers, cross-layer design, resource allocation, radio resource management, and MIMO systems
▶ Covers state-of-the-art MIMO-OFDM adaptive transceivers
▶ Contains extensive literature review, concepts explanation, case studies and performance results on topics such as channel estimation, limited-feedback operation, cross-layer for MAC-PHY layers, and space-time pre-coding

From the contents

Fields of interest
Communications Engineering, Networks; Signal Processing; Circuits and Systems

Target groups
Students, researchers, and engineers in the field of wireless communication

Type of publication
Monograph

Due June 2009

2009. Approx. 600 p. 950 illus. in color. Hardcover
▶ * (D) 85,55 | (A) 87,95 | sFr 133,00
ISBN 978-3-540-88545-2

Due August 2009

2009. Approx. 200 p. 85 illus., 75 in color. Hardcover
▶ approx. * (D) 24,56 | (A) 25,25 | sFr 38,50

Due June 2009

▶ * (D) 181,85 | (A) 186,95 | sFr 282,50

Due June 2009

▶ * (D) 181,85 | (A) 186,95 | sFr 282,50
Distinguished Figures in Mechanism and Machine Science
Their Contributions and Legacies, Part 2

This is the second volume of a series of edited books whose aim is to collect contributed papers in a frame that can be a sort of dictionary of personalities in MMS (Mechanism and Machine Science). The papers will illustrate personalities by recognizing persons and their activity, by looking mainly at technical developments in the historical evolution of the fields that today are grouped in MMS. Thus, emphasis will be addressed also to biographical notes to describe efforts and experiences of people who have contributed to the technical achievements whose survey is the core of each contributed paper. It is a unique perspective for technical experts to go further in-depth into the historical background of their topics of expertise. This second volume of the dictionary project has been possible thanks to the invited authors who have enthusiastically shared the initiative and prepared the papers with joint characteristics of survey and historical notes.

Features
- Totally new approach to the subject matter in its attention to the technical aspects of the historical figures and developments

Fields of interest
Engineering Design; Machinery and Machine Elements; History of Science

Target groups
Students and scholars with interest in the history of mechanical engineering

Type of publication
Contributed volume

Theorie der Produktionsplanung und -steuerung
Im Sommer keine Kirschpralinen?


Pluspunkte
- Zum ersten Mal bottom up-Darstellung von einem Modell der Produktion und nicht top down von einer konventionellen ERP-Gliederung ausgehend
- Detaillierte Anwendungskonzepte und Fallbeispiele

Inhalt

Fachgebiete
Produktion und Fertigung; Produktion/Logistik

Zielgruppen
Industriepraktiker, Forscher, Entwickler

Kategorie
Fachbuch

Engineering

Due June 2009

- * € (D) 85,55 | € (A) 87,95 | sFr 133,00

Intelligence

Due April 2009

2009. XII, 1508 S. 150 Abb. (VDI-Buch) Geb.
- * € (D) 299,00 | € (A) 307,38 | sFr 464,00
ISBN 978-3-642-00632-4

Foundations in Grammatical Evolution for Dynamic Environments

Due April 2009

Dynamic environments abound, encompassing many real-world problems in fields as diverse as finance, engineering, biology and business. A vibrant research literature has emerged which takes inspiration from evolutionary processes to develop problem-solvers for these environments. ‘Foundations in Grammatical Evolution for Dynamic Environments’ is a cutting edge volume illustrating current state of the art in applying grammar-based evolutionary computation to solve real-world problems in dynamic environments. The book provides a clear introduction to dynamic environments and the types of change that can occur. This is followed by a detailed description of evolutionary computation, concentrating on the powerful Grammatical Evolution methodology. It continues by addressing fundamental issues facing all Evolutionary Algorithms in dynamic problems, such as how to adapt and generate constants, how to enhance evolvability and maintain diversity.

Features
- Reports recent research results of Grammatical Evolution in Dynamic Environments

From the contents
Grammatical Evolution.- Survey of EC in Dynamic Environments.- GE in Dynamic Environments.- Constant Creation and Adaptation in Grammatical Evolution.- Constant Creation with meta-Grammars.- Controlled Static Trading with GE.- Adaptive Dynamic Trading with GE.

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

Target groups
Researchers, engineers, graduate students in computational intelligence, computer science interested in grammatical evolution and/or the application of evolutionary methods in dynamic environments, computational finance

Type of publication
Monograph

VDI

Technik und Informatik

Erscheint April 2009

2009. XII, 1508 S. 150 Abb. (VDI-Buch) Geb.
- * € (D) 106,95 | € (A) 109,95 | sFr 166,00
ISBN 978-3-642-00313-4
Mechanics and physics of precise vacuum mechanisms

In this book the Russian expertise in the field of the design of precise vacuum mechanics is summarized. A wide range of physical applications of mechanism design in electronic, optical-electronic, chemical, and aerospace industries is presented in a comprehensible way.

Topics treated include the method of microparticles flow regulation and its determination in vacuum equipment and mechanisms of electronics; precise mechanisms of nanoscale precision based on magnetic and electric rheology; precise harmonic rotary and not-coaxial nut-screw linear motion vacuum feedthroughs with technical parameters considered the best in the world; elastically deformed vacuum motion feedthroughs without friction couples usage; the computer system of vacuum mechanisms failure predicting. This English edition incorporates a number of features which should improve its usefulness as a textbook without changing the basic organization or the general philosophy of presentation of the subject matter of the original Russian work.

Features
► English edition makes Russian expertise in this field available to the rest of the world

Fields of interest
Engineering Design; Engineering, general

Target groups
Engineers, scientists, PhD and graduate students working in the field of design and computation of vacuum machinery

Type of publication
Monograph

Test Pattern Generation using Boolean Proof Engines

In Test Pattern Generation using Boolean Proof Engines, we give an introduction to ATPG. The basic concept and classical ATPG algorithms are reviewed. Then, the formulation as a SAT problem is considered. As the underlying engine, modern SAT solvers and their use on circuit related problems are comprehensively discussed. Advanced techniques for SAT-based ATPG are introduced and evaluated in the context of an industrial environment. The chapters of the book cover efficient instance generation, encoding of multiple-valued logic, usage of various fault models, and detailed experiments on multi-million gate designs. The book describes the state of the art in the field, highlights research aspects, and shows directions for future work.

Features
► The first book giving a detailed overview on SAT-based ATPG ► All techniques are validated on industrial designs ► A comprehensive introduction to Boolean Satisfiability

Contents
1 Introduction. 2 Preliminaries. 3 Boolean Satisfiability. 4 SAT-based ATPG. 5 Learning Techniques. 6 Multiple-valued Logic. 7 Improved Circuit-to-CNF Conversion. 8 Branching Strategies. 9 Integration into Industrial Flow. 10 Delay Faults. 11 Summary and Outlook. Bibliography. Index.

Fields of interest
Circuits and Systems; Electronics and Microelectronics, Instrumentation

Target groups
Persons who work in the area of computer aided design of circuits and systems; those who are interested in new methods to further increase the productivity within the design flow which includes tool developers, researchers, and graduate students, but also CAD engineers interested in background reading

Type of publication
Monograph

Dynamics of Machinery

Dynamic loads and disturbing oscillations increase with higher speed of the machines and more lightweight constructions. Industrial safety standards require better oscillation reduction and noise control.

The book by Drechsler/Holzweissig deals with these topics. It presents the classical areas of modeling, dynamics of rigid bodies, balancing, torsional and bending vibrations, problems of vibration isolation and the dynamic behavior of complex vibrating systems.

Typical dynamic effects, i.e., the gyroscopic effect, the damping of oscillations, resonances of k-th order, subharmonic and nonlinear features or self-excited vibrations are explained with practical examples. Various design features which influence the dynamic behavior are described.

60 exercises with detailed solutions are included. Characteristic dates, guidelines and standards were updated. Software tools for simulation of dynamic procedures are described.

Features
► The combination of vibration theory and their applications ► Successfully solved industrial problems and experiences ► The synopsis of different vibration phenomena in machines and mechanisms ► 60 problems with detailed solutions

From the contents
Dynamics of machinery.- Modeling of machines and determining of characteristics values.- Dynamics of machine consisted of rigid bodies.- Foundation and isolation of vibrations.- Torsional vibrations and oscillators having a chain-structure.- Bending vibrations.- Linear systems with several degrees of freedom.

Fields of interest
Vibration, Dynamical Systems, Control; Numerical and Computational Methods in Engineering

Target groups
Graduate students of mechanical engineering, mechanical engineers

Type of publication
Monograph
**Quasi-Gas Dynamic Equations**

The monograph is devoted to modern mathematical models and numerical methods for solving gas- and fluid-dynamic problems based on them. Two interconnected mathematical models generalizing the Navier–Stokes system are presented; they differ from the Navier–Stokes system by additional dissipative terms with a small parameter as a coefficient. The new models are called the quasi-gas-dynamic and quasi-hydrodynamic equations. Based on these equations, effective finite-difference algorithms for calculating viscous non-stationary flows are constructed and examples of numerical computations are presented. The universality, the efficiency, and the exactness of the algorithms constructed are ensured by the fulfillment of integral conservation laws and the theorem on entropy balance for them.

**Features**
- Presents new models for solving gas- and fluid-dynamic problems
- Shows many examples of numerical computations

**Contents**
- Construction of Gas-Dynamic Equations by Using Conservation Laws
- Foundations of Kinetic Gas Theory
- Quasi-Gas-Dynamic Equations
- Algorithms for Solving the Quasi-Gas-Dynamic Equations on Nonstructured Grids
- Quasi-Hydrodynamic Equations and Flows of Viscous Incompressible Fluids
- Quasi-Gas-Dynamic Equations for Nonequilibrium Gas Flows
- Quasi-Gas-Dynamic Equations for Binary Gas Mixtures
- Appendices

**Fields of interest**
- Engineering Fluid Dynamics; Fluids; Scientific Computing

**Target groups**
- Researchers and advanced students

**Type of publication**
- Monograph

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**Mobile Robot Navigation with Intelligent Infrared Image Interpretation**

Mobile robots require the ability to make decisions such as “go through the hedges” or “go around the brick wall.” Mobile Robot Navigation with Intelligent Infrared Image Interpretation describes in detail an alternative to GPS navigation: a physics-based adaptive Bayesian pattern classification model that uses a passive thermal infrared imaging system to automatically characterize non-heat generating objects in unstructured outdoor environments for mobile robots. The resulting classification model complements an autonomous robot’s situational awareness by providing the ability to classify smaller structures commonly found in the immediate operational environment.

**Features**
- Describes a model which will allow mobile robots to “see beyond vision” using infrared imaging; to autonomously assess the physical nature of surrounding structures for making decisions without the need for interpretation by humans

**Contents**
- Data Acquisition
- Thermal Feature Generation
- Thermal Feature Selection
- Adaptive Bayesian Classification Model
- Conclusions and Future Research Directions

**Fields of interest**
- Artificial Intelligence (incl. Robotics); Pattern Recognition

**Target groups**
- Researchers and developers of advanced mobile robots, including those in academic, industry and military sectors; advanced undergraduates studying robot sensor interpretation, pattern classification and infrared physics

**Type of publication**
- Monograph

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**Energy Resources and Systems**

This is a comprehensive book that addresses renewable, non-renewable, and future energy sources and their utilization. All current and potential future energy sources are discussed in great details including the type of energy, methods of converting the energy to useful forms, the engineering design issues associated with the energy conversion system, the efficiency of the conversion process, the economics of the conversion system, the risks associated with its use, the environmental impact and how it can be applied to meet the energy needs of the world. Current and future energy policy is discussed.

At the end of most of the chapters there are problems to assist instructors. Also, there are a number of worked out problems for the students within the text. This work comprises four volumes. This, Volume I provides a general overview of various topics including the interrelationship between energy, economy, gross domestic product, and population.

**Features**
- In-depth and fairly exhaustive treatment of hot topic
- May be used as course text or as reference

**Fields of interest**
- Energy Economics

**Target groups**
- Researchers in the area of renewable energy, fuel cell, energy systems, energy storage; specialists and professionals from nuclear engineering, mechanical engineering, electrical engineering (power), chemical engineering, oil and gas industry, petroleum industry, building construction, lighting industry

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

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Learning from Design Failures

Learn from past mistakes to avoid repeating them in the future: more easily said than done. Especially in Japan, where keeping face has great social value, failures tend to be hidden and left unexplained. Yotaro Hatamura and 40 others who studied in his laboratory put together this eye-opening book that analyzes more than 100 cases of failures, with the information arranged so that readers can easily understand what happened, why, and how not to repeat the mistakes. The cases covered here range from those from the writers own experience to catastrophes well known worldwide. The book lays the foundation for what is now called Shippaigaku, the way to research accidents, scandals, and other failures to uncover the root cause, reveal the scenario that led to the unwanted event, describe what happened so readers can clearly repeat the steps in their mind, and propose ways to avoid those mistakes in the future. Engineering designers and managers will shape their knowledge into real skills by learning from others failures.

Fields of interest
Engineering Design; Quality Control, Reliability, Safety and Risk; Technology Management

Target groups
Engineering designers and managers

Type of publication
Monograph

Design of Observer-based Compensators

From the Time to the Frequency Domain

Design of Observer-based Compensators facilitates and adds transparency to design in the frequency domain which is not as well-established among control engineers as time domain design. The presentation of the design procedures starts with a review of the time domain results; therefore, the book also provides quick access to state space methods for control system design. Frequency domain design of observer-based compensators of all orders is covered. The design of decoupling and disturbance rejecting controllers is presented, and solutions are given to the linear quadratic and the model matching problems. The pole assignment design is facilitated by a new parametric approach in the frequency domain. Anti-windup control is also investigated in the framework of the polynomial approach. The discrete-time results for disturbance rejection and linear quadratic control are also presented.

Features
- Shows the reader how to interconvert time- and frequency-domain representations of the same control system
- The same state-space framework copes equally well with single-input, single-output and multiple-input, multiple-output systems

Contents

Fields of interest
Systems Theory, Control

Target groups
Academics studying control theory; libraries

Type of publication
Monograph

Hybridfahrzeuge
Ein alternatives Antriebskonzept für die Zukunft


Pluspunkte
- Aktueller Forschungsstand zum Thema alternative Antriebe

Inhalt

Fachgebiete
KFZ- und Flugzeugbau

Zielgruppen
Forscher und Entwickler im Automobilsektor

Kategorie
Fachbuch

Hybridfahrzeuge
Ein alternatives Antriebskonzept für die Zukunft


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KFZ- und Flugzeugbau

Zielgruppen
Forscher und Entwickler im Automobilsektor

Kategorie
Fachbuch
Biomechanical Modelling at the Molecular, Cellular and Tissue Levels

Contents
J.D. Humphrey: Need for a Continuum Biochomechanical Theory of Soft Tissue and Cellular Growth and Remodeling
H. Schmid and P.J. Hunter: Multi-scale Modelling of the Heart
R. W. Ogden: Anisotropy and Nonlinear Elasticity in Arterial Wall Mechanics

Fields of interest
Biomedical Engineering; Continuum Mechanics and Mechanics of Materials

Target groups
Researchers

Type of publication
Contributed volume

E. Hornbogen, Universität Potsdam; B. Skrotzki, BAM Berlin

Mikro- und Nanoskopie der Werkstoffe

Das Buch gibt eine Einführung in die mikroskopische Strukturanalyse von Werkstoffen, vor allem von Metallen, aber auch von Halbleitern, Keramiken, Polymeren und Verbundwerkstoffen. Die verschiedenen mikroskopischen Methoden werden systematisch und vergleichend erörtert. Im Mittelpunkt stehen die Methoden der Transmissionselektronenmikroskopie einschließlich der Beugung zur Analyse der Struktur der Phasen sowie die Spektroskopie für die quantitative Bestimmung der Atomarten. Weitere Methoden sind insbesondere die Lichtmikroskopie und die Rasterelektronenmikroskopie.

Das Buch eignet sich für Studierende der Werkstoffwissenschaften ebenso wie für Naturwissenschaftler und Ingenieure, die einen Einstieg in das Gebiet der Mikroskopie von metallischen, keramischen und polymeren Werkstoffen suchen. Jedes Kapitel enthält zahlreiche Abbildungen und weiterführende Literaturhinweise.

Die 3. Auflage wurde gründlich neu bearbeitet und aktualisiert.

Pluspunkte
- Das einzige deutschsprachige Buch zum Thema

Aus dem Inhalt
Systematik und Methoden zur Kennzeichnung des Aufbaus der Werkstoffe.
- Herstellung von Proben.
- Elektronenbeugung.
- Durchstrahlung von amorphen Stoffen und perfekten Kristallen.
- Abbildung von Stapelfehlern und Korngrenzen.
- Abbildung von Versetzungen.

Fachgebiete
Strukturmechanik; Festkörperphysik; Spektroskopie

Zielgruppen
Studierende Werkstoffwissenschaften, Ingenieure und Naturwissenschaftler

Kategorie
Weiterführendes Lehrbuch

Vibro-Impact Dynamics of Ocean Systems and Related Problems

The aim of this International Symposium on Dynamics of Vibro-Impact Systems is to provide a forum for the discussion of recent developments in the theory and industrial applications of vibro-impact ocean systems. A special effort has been made to invite active researchers from engineering, science, and applied mathematics communities. This symposium has indeed updated engineers with recent analytical developments of vibro-impact dynamics and at the same time allowed engineers and industrial practitioners to alert mathematicians with their unresolved issues. The symposium was held in Troy, Michigan, during the period October 1-3, 2008. It included 28 presentations.

Features
- Presents Recent research in Vibro-Impact Dynamics and Applications

From the contents
Nonlinear Dynamics of an Impact Object on an Oscillating Plate.
- Elastic Identification of Composite Materials from Vibration Test Data of Thin and Thick Plates.
- Ship Roll Motion under Stochastic Agencies Using Path Integral Method.
- Control of Instabilities Induced by Low-velocity Collisions in a Vibro-impacting System with Friction.
- Random Vibrations with Inelastic Impacts.

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

Target groups
Researchers and graduate students in applied mechanics

Type of publication
Monograph
Engineering

M. Itskov, RWTH Aachen, Germany

Tensor Algebra and Tensor Analysis for Engineers

There is a large gap between the engineering course in tensor algebra on the one hand and the treatment of linear transformations within classical linear algebra on the other hand. The aim of this modern textbook is to bridge this gap by means of the consequent and fundamental exposition. The book is addressed primarily to engineering students with some initial knowledge of matrix algebra. Thereby the mathematical formalism is applied as far as it is absolutely necessary. Numerous exercises provided in the book are accompanied by solutions enabling an autonomous study. The last chapters of the book deal with modern developments in the theory of isotropic and anisotropic tensor functions and their applications to continuum mechanics and might therefore be of high interest for PhD-students and scientists working in this area.

This second edition is completed by some additional examples and exercises. The text and formulae are thoroughly revised and improved where necessary.

Fields of interest
Numerical and Computational Methods in Engineering; Continuum Mechanics and Mechanics of Materials; Mathematical Methods in Physics

Target groups
Graduate students in mechanical engineering, structural engineering, materials science; undergraduate students in applied mathematics; researchers in continuum mechanics, mechanical engineering, structural engineering, materials science

Type of publication
Graduate/Advanced undergraduate textbook

K. H. John, Forchheim; M. Tiegelkamp, Pyrbaum

SPS-Programmierung mit IEC 61131-3

Konzepte und Programmiersprachen, Anforderungen an Programmiersysteme, Entscheidungshilfen


Features
► Compact and illustrated introduction for readers of different levels  ► Numerous exercises with solutions  ► Applications to continuum mechanics  ► Tensor algebra in absolute notation  ► Treatment of tensors on the basis of linear algebra

Pluspunkte
► Neuaufgabe ist auf neustem Stand insbesondere in der Normung  ► Eignet sich als Lehrbuch ebenso wie als Nachschlagewerk  ► Standard-Referenz für die IEC Norm 1131-3

Fachgebiete
Spezielle Anwendersysteme; ; Computergestützte Systeme (CAD, CAE) und Computergestütztes Design

Zielgruppen
Informatiker und Ingenieure in der Automatisierungstechnik

Kategorie
Fachbuch

H. Kuczer, Weyarn, Germany; P. W. Sacher, Taufkirchen, Germany

Reusable Space Transportation Systems

In Reusable 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 Kuczer, 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.

Features
► Explains to the reader the importance of reusable space transportation systems  ► Sets out the consequences for future space exploration of reducing the cost of launching payloads into orbit  ► Reviews in detail the developments of air-breathing engines and their important environmental benefits  ► Provides an insight into the technologies necessary for developing economically viable reusable launch vehicles

Fields of interest
Automotive and Aerospace Engineering

Target groups
Researchers, design engineers, technology development and testing engineers in research institutes and the space industry, programme managers and other decision makers in national and international space agencies and ministries

Type of publication
Monograph

Due May 2009

Only available in print

Jointly published with Praxis Publishing, UK


► € (D) 64,15 | € (A) 65,95 | sFr 99,50
ISBN 978-3-540-89180-7

Springer News 4/2009

Technik

Due April 2009

2nd ed. 2009. Approx. 265 p. Hardcover

► € (D) 48,10 | € (A) 49,45 | sFr 75,00
ISBN 978-3-540-93906-7

成熟

VDI
Axiomatic Fuzzy Set Theory and Its Applications

Features
- First comprehensive, authoritative and up-to-date publication on Axiomatic Fuzzy Set theory
- Covers detailed mathematical proofs and algorithms

Contents

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

Target groups
Researchers, engineers, graduate students in fuzziness, soft computing

Type of publication
Monograph

1V CMOS Gm-C Filters: Design and Applications

T. Lo, MediaTek Inc., Taiwan; C. Hung, National Chiao Tung University, Taiwan

Features
- Discusses the design aspects of transistor and Gm-C filter circuits, with a special focus on 1V circuit implementations. The emphasis is on high linearity voltage-to-current blocks for wireless and wireline applications, and the designs cover up to very high speed specifications.
- Provides a clear introduction of low voltage architectures and yields insight into the influence of circuit non-idealities. The fully CMOS implementation could be useful for wireless and wireline applications. The basic design concepts can be easily constructed through the illustration of this book. This book can be provided for engineers and researchers who are interested in the transconductor and Gm-C filter. It is also a good reference for the course related to analog integrated circuit design.

Fields of interest
Circuits and Systems

Target groups
Graduate students, professors, researchers, engineers working on the wireline or wireless IC design

Type of publication
Monograph

Discontinuous Dynamical Systems in Time-varying Domains

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

“Discontinuous Dynamical Systems in Time-varying Domains” is the first monograph focusing on this topic. While in the classic theory of dynamical systems the focus is on dynamical systems in time-invariant domains, this book presents discontinuous dynamical systems in time-varying domains where the corresponding switchability of a flow to the time-varying boundary in discontinuous dynamical systems is discussed. From such a theory, principles of dynamical system interactions without any physical connections are presented. Several discontinuous systems on time-varying domains are analyzed in detail to show how to apply the theory to practical problems. The book can serve as a reference book for researchers, advanced undergraduate and graduate students in mathematics, physics and mechanics.

Dr. Albert C. J. Luo is a professor at Southern Illinois University Edwardsville, USA. His research is involved in the nonlinear theory of dynamical systems.

Features
- First book on a theory of discontinuous dynamical systems on time-varying domains
- Offers a fundamental theory and methodology in discontinuous dynamical systems

Field of interest
Theoretical and Applied Mechanics

Target groups
Graduate students, researchers in mathematics, physics and mechanics

Type of publication
Monograph

Due July 2009

Distribution rights in China: Higher Education Press
Jointly published with Higher Education Press

2009. Approx. 290 p. 102 illus., 4 in color. (Nonlinear Physical Science) Hardcover
- € (D) 149,75 | € (A) 153,95 | sFr 232,50
  ISBN 978-3-642-00252-4
Constructions of Strict Lyapunov Functions

Converse Lyapunov function theory guarantees the existence of strict Lyapunov functions in many situations, but the functions it provides are often abstract and nonexplicit, and therefore may not lend themselves to engineering applications. Often, even when a system is known to be stable, one still needs explicit Lyapunov functions; however, once an appropriate strict Lyapunov function has been constructed, many robustness and stabilization problems can be solved through standard feedback designs or robustness arguments. Non-strict Lyapunov functions are often readily constructed. This book contains a broad repertoire of Lyapunov constructions for nonlinear systems, focusing on methods for transforming non-strict Lyapunov functions into strict ones. Their explicitness and simplicity make them suitable for feedback design, and for quantifying the effects of uncertainty. Readers will benefit from the authors’ mathematical rigor and unifying, design-oriented approach, as well as the numerous worked examples.

Features
- Provides the reader with a user-friendly framework for building Lyapunov functions in novel settings
- Helps the reader with feedback design and in quantifying the effects of system uncertainty

Contents

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

Target groups
Academic researchers and graduate students in applied mathematics, control theory and control engineering; libraries

Type of publication
Monograph

Recent Advances in Boundary Element Methods

This volume, dedicated to Professor Dimitri Beskos, contains contributions from leading researchers in Europe, the USA, Japan and elsewhere, and addresses the needs of the computational mechanics research community in terms of timely information on boundary integral equation-based methods and techniques applied to a variety of fields. The contributors are well-known scientists, who also happen to be friends, collaborators as past students of Dimitri Beskos. Dimitri is one of the BEM pioneers who started his career at the University of Minnesota in Minneapolis, USA, in the 1970s and is now with the University of Patras in Patras, Greece. The book is essentially a collection of both original and review articles on contemporary Boundary Element Methods (BEM) as well as on the newer Mesh Reduction Methods (MRM), covering a variety of research topics.

Features
- State of the art in boundary element and meshless methods
- Up-to-date coverage of most specialties in solid and fluid mechanics
- Specialized information gathered in the appropriate context
- New developments and contemporary problems in mechanics
- References to work done in BEM over the last two decades

Fields of interest
Numerical and Computational Methods in Engineering; Civil Engineering; Structural Mechanics

Target groups
Researchers in academia and industry and graduate students focusing on solid and fluid mechanics as used in civil, mechanical and aerospace engineering

Type of publication
Collection of essays
Constraint-Handling in Evolutionary Optimization

This book is the result of a successful special session on constraint-handling techniques used in evolutionary algorithms within the Congress on Evolutionary Computation (CEC) in 2007, with the aim of putting together recent studies on constrained numerical optimization using evolutionary algorithms and other bio-inspired approaches. The book covers six main topics: The first two chapters refer to swarm-intelligence-based approaches. Differential evolution, a very competitive evolutionary algorithm for constrained optimization, is studied in the next three chapters. Two different constraint-handling techniques for evolutionary multiobjective optimization are presented in the two subsequent chapters. Two hybrid approaches, one with a combination of two nature-inspired heuristics and the other with the mix of a genetic algorithm and a local search operator, are detailed in the next two chapters.

Features
▶ Recent research in Constraint-Handling in Evolutionary Optimization

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

Target groups
Engineers, researchers, and graduate students in computational intelligence and computer science and evolutionary computation

Type of publication
Monograph

Engineering Acoustics
An Introduction to Noise Control
Translated by: S. Zimmermann, R. Ellis

'Engineering acoustics' is a teaching textbook that can serve as a tool for self-study and as a compendium for lectures as well. One of the author’s goals is not only to describe how the topic develops but also why a specific way is chosen. The explanations do not restrict themselves to mathematical formulas. Only the illustrative explanation relying on the reader’s imagination creates comprehension. This book represents the foundations of what nowadays seems necessary to make our environment quieter - in buildings as well as in the open air. Fundamental chapters on the physics and perception of sound precede those on noise reduction methods. A chapter dealing with microphones, loudspeakers, and acoustical antennae is included as well as a chapter on the fundamentals of signal and system theory. Practice exercises with solutions serve for the application of the entire content.

Features
▶ Advanced textbook for mechanical, civil and electrical engineering students
▶ New in second edition: chapters on active sound and vibration control as well as fundamentals of signal and system theory
▶ Now 101 practice exercises with solutions included

From the contents

Fields of interest
Vibration, Dynamical Systems, Control; Acoustics; Noise Control

Target groups
Engineers, physicists and students in all disciplines concerned with acoustics

Type of publication
Graduate/Advanced undergraduate textbook

Handbuch für die Programmierung mit LabVIEW mit Studentenversion LabVIEW 8

Mit dem vorliegenden Handbuch für die Programmierung mit LabVIEW werden Sie in die systematische Software-Entwicklung mit LabVIEW eingeführt. Das Buch gibt eine geschlossene Darstellung in die Programmierung mit LabVIEW, beginnend mit einer grundlegenden Einführung bis hin zur Behandlung von Software-Projekten, die auch die Realisierung umfangreicher Software-Projekte ermöglichen.

▶ Das vorliegende Buch stellt einen weiteren Meilenstein in der Evolution von LabVIEW dar. [...] Ich wünsche diesem Buch eine begeisterte Aufnahme und eine kritische Reflexion}

Plustipunkte
▶ Das fundierte Werk zur aktuellen Version – vom Einsteiger zum LabVIEW-Ingenieur
▶ Als Lehrbuch und Nachschlagewerk verwendbar
▶ Mit einer Vielzahl von Abbildungen und Beispielen und mit zweisprachigem Index
▶ Schnelleinstieg für Leser mit Vorkenntnissen

Fachgebiete
Elektrotechnik und Informationstechnik; Informatik, allgemein

Zielgruppen
Studierende der Ingenieurwissenschaften an FHs und THs mit den Anwendungsbereichen: Messtechnik, Regelungstechnik, Nachrichtentechnik, Mechatronik, Automatisierungstechnik Bio- und Nanotechnologie; Studierende der Informatik an FHs; Studierende naturwissenschaftlicher Fachrichtungen an FHs und THs (Physik, Chemie, Medizin etc.); Ingenieure und Techniker in der Praxis

Kategorie
Lehrbuch

Erscheint April 2009

Nur gedruckte Ausgabe erhältlich

▶ € (D) 49,50 | € (A) 50,89 | *sFr 77,00
ISBN 978-3-540-82377-9

Springer News 4/2009

Technik

Due April 2009

2009. Approx. 265 p. (Studies in Computational Intelligence, Volume 198) Hardcover
▶ * € (D) 106,95 | € (A) 109,95 | sFr 166,00
ISBN 978-3-642-00618-4

Due April 2009

2nd ed. 2009. Approx. 550 p. 216 illus., 16 in color. Hardcover
▶ * € (D) 96,25 | € (A) 98,95 | sFr 149,50
ISBN 978-3-540-92722-3

Spektrum \(\text{AKADEMISCHER VEB}^\text{TM}\)
New Advances in Intelligent Decision Technologies
Results of the First KES International Symposium IDT’09

IDT (Intelligent Decision Technologies) seeks an interchange of research on intelligent systems and intelligent technologies which enhance or improve decision making in industry, government and academia. The focus is interdisciplinary in nature, and includes research on all aspects of intelligent decision technologies, from fundamental development to the applied system. It constitutes a great honor and pleasure for us to publish the works and new research results of scholars from the First KES International Symposium on Intelligent Decision Technologies (KES IDT’09), hosted and organized by University of Hyogo in conjunction with KES International (Himeji, Japan, April, 2009). The symposium was concerned with theory, design, development, implementation, testing and evaluation of intelligent decision systems.

Features
- Latest research on Intelligent Decision technologies

From the contents

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

Target groups
Researchers, engineers, graduate students in computational intelligence, intelligent decision technologies

Type of publication
Monograph

Technik
The Unknown Technology in Homer

This book has been well received in the original Greek version and is now available in English. It is a thorough review of recent research discoveries of scientific and technological knowledge contained in the Iliad and the Odyssey, suggesting elements of a very advanced, almost modern, civilization, in the Mycenaean era. Recommended for a wide audience.

Features
- Numerical and experimental studies on several issues based on realistic assumptions, rendering surprising results, since they confirm further Homeric descriptions most accurately

Contents

Fields of interest
History of Science

Target groups
All people interested in ancient technology

Type of publication
Monograph

Springer News 4/2009

2009. Approx. 630 p. (Studies in Computational Intelligence, Volume 199) Hardcover
- € (D) 181,85 | € (A) 186,95 | sFr 282,50
ISBN 978-3-642-00908-7

Due April 2009

- approx. € (D) 85,55 | € (A) 87,95 | sFr 133,00
Serious Fun with Flexagons
A Compendium and Guide

Most of the material in this book is new. It is arranged in a logical order appropriate for a textbook on the geometry of flexagons. Extensive cross references are included so that, effectively, individual chapters are self contained. It is assumed that the reader already has an interest in flexagons, and has some knowledge of elementary geometry. The book is written so that it can be enjoyed at both the recreational mathematics level, and at the serious mathematics level. In general detailed proofs are long and tedious, so they are not included. Where there is uncertainty over the accuracy of a conclusion this is made clear in the text. Basic material from Flexagons inside out is only referenced where needed for clarity but, where appropriate, new material is fully referenced. A bibliography is also included. Some Flexagon lovers group postings and web sites are cited.

Features
► Further analysis has led to a much better understanding of the dynamic behaviour of flexagons, from a serious mathematics viewpoint
► Includes extensive information on the mathematical background to various types of flexagons and their relationships to each other
► A geometric approach is used throughout, and the book is profusely illustrated

Fields of interest
Geometry; Engineering; general; Mathematics, general

Target groups
Recreational mathematics level; readers who already have some interest in flexagons and would be likely to join the Flexagon lovers group, if not already members; readers who are interested in flexagons at the serious mathematics level

Type of publication
Monograph

Wavelets
From Math to Practice

The method of wavelet transforms is one key tool in signal processing and control. Modern wavelet theory defines outlines for construction of wavelets and transformations using them. It gives rules that one has to obey to get a wavelet basis with desired properties, meaning that everyone can create a wavelet adequate for the given task. This book helps to understanding these rules.

In seven chapters, the book gives a concise understanding of the theory of wavelets, explains how to compute them in practise and finally presents typical applications of wavelets and how they work. The book is written for graduate students and practising Engineers of electrical communications, signal processing and control.

Features
► Concisely shows the theory behind wavelets
► Includes many examples showing the practice of wavelets and how to compute
► Presents a unique chapter showing the analogy with filters

Contents
Introduction.- Least-Squares Approximation.- Multiresolution.- Wavelets.- How to Compute.- Analogy with Filters.- Applications.

Fields of interest
Signal Processing; Scientific Computing; Statistics for Engineering, Physics, Computer Science, Chemistry & Geosciences

Target groups
Graduate students and practising engineers of electrical communications, signal processing and control

Type of publication
Monograph

Betriebliche Instandhaltung

Der VDI Hauptausschuss Instandhaltung blickt auf eine mehr als 30jährige Geschichte zurück, die davon geprägt ist, das Aufgabengebiet Instandhaltung zum Gegenstand öffentlichen Erfahrungsaustauschs und wissenschaftlicher Betrachtung zu machen. Zum Teil sind Erkenntnisse zu effizienten Vorgehensweisen, Methoden und Strategien der Instandhaltung bereits in VDI-Richtlinien dokumentiert. Ein vollständiges Abbild der Instandhaltung ist aber weder in Richtlinien noch in einem Buch möglich. Trotzdem soll mit dem Buch zum Einen die Entwicklung der Instandhaltung der letzten Jahre reflektiert, zum Anderen das derzeit Bestes aus Praxis und Forschung der Instandhaltung präsentiert werden. Hierzu gehören die aktuell innovativsten Ideen, die erfolgreichsten Strategien und die besten Umsetzungen.

Pluspunkte
► Blick auf aktuelle Trends und Best Practices
► Reflexierenden Betrachtungen der Entwicklung von Instandhaltungskonzepten im Kontext produzierender Unternehmen
► Zahlreiche detailierte Abbildungen

Inhalt

Fachgebiete
Produktion und Fertigung; Facility Management

Zielgruppen
Industriepraktiker, Dienstleister, Facility Manager

Kategorien
Fachbuch
Predictive Functional Control
Principles and Industrial Applications

The demands of the modern economic climate have led to a dramatic increase in the industrial application of model-based predictive control. Apart from PID, predictive control is probably the most popular control approach in use today. Predictive functional control (PFC) was first used to develop a model-based predictive controller that was easy to understand, implement and tune from an instrumentation engineer's perspective. In the forty years since, there have been thousands of successful applications of PFC controllers in a large and diverse group of industries. Predictive Functional Control provides readers with: a fundamental understanding of the principles associated with PFC; the basic PFC control equations to be implemented in all programmable logic controllers or digital control systems in block programming form; and tuning rules and implementation procedures. Some new features arising from the needs of the process industries are reported along with many examples of industrial applications.

Features
- Introduces the industrial engineer to more efficient control for more cost-effective processes and more profitable industry
- Shows the reader how to implement predictive control in programmable logic and digital control systems
- Draws on the forty years of applications experience of the “Grandfather of predictive control”

Fields of interest
Industrial Chemistry/Chemical Engineering; Electronics and Microelectronics, Instrumentation

Target groups
Industrial engineers, industrial control engineers and process control engineers from petrochemicals, process, food, automobile, chemical, water treatment, HVAC, utility and manufacturing industries; academic researchers and graduates working in control from mechanical, process and chemical engineering backgrounds; instrumentation and control engineers; libraries

Type of publication
Monograph

Due July 2009

2009. Approx. 245 p. 151 illus. (Advances in Industrial Control) Hardcover

$ \text{€ (D) 106,95 | € (A) 109,95 | sFr 166,00}$

ISBN 978-3-540-92226-3

Springer News 4/2009

A. J. Schwab, Universität Karlsruhe

Elektroenergiesysteme
Erzeugung, Transport, Übertragung und Verteilung elektrischer Energie


Pluspunkte
- Aktuelles Spektrum der Erzeugung, Übertragung und Verteilung elektrischer Energie

Inhalt

Fachgebiete
Energietechnik; Energiewirtschaft

Zielgruppen
Studierende der Elektrotechnik, des Maschinenbaus und des Wirtschaftsingenieurwesens, Ingenieure die in der Praxis stehen, Ingenieure der Elektroenergie

Kategorie
Weiterführendes Lehrbuch

Erscheint Juni 2009


$ \text{€ (D) 129,95 | € (A) 133,60 | sFr 203,00}$

ISBN 978-3-540-92226-3

G. Schweitzer, ETH Zürich, Switzerland; E. H. Maslen, University of Virginia, Charlottesville, VA, USA (Eds.)

Magnetic Bearings
Theory, Design, and Application to Rotating Machinery

Compiling the expertise of nine pioneers of the field, Magnetic Bearings - Theory, Design, and Application to Rotating Machinery offers an encyclopedic study of this rapidly emerging field with a balanced blend of commercial and academic perspectives. Every element of the technology is examined in detail, beginning at the component level and proceeding through a thorough exposition of the design and performance of these systems. The book is organized in a logical fashion, starting with an overview of the technology and a survey of the range of applications. A background chapter then explains the central concepts of active magnetic bearings while avoiding a morass of technical details. From here, the reader continues to a meticulous, state-of-the-art exposition of the component technologies and the manner in which they are assembled to form the AMB/rotor system.

Features
- Reports the state of the art in this subfield of mechatronics
- Written by internationally renowned experts

From the contents

Fields of interest
Machinery and Machine Elements; Vibration, Dynamical Systems, Control

Target groups
Researchers and advanced students, engineering professionals

Type of publication
Monograph

Due April 2009

2009. Approx. 600 p. Hardcover

$ \text{€ (D) 106,95 | € (A) 109,95 | sFr 166,00}$

ISBN 978-3-642-00496-4
Springer News 4/2009

A. Shami, M. Maier, C. Assi (Eds.)

Broadband Access Networks
Technologies and Deployments

Considering the key evolutions within the access network technologies as well as the unprecedented levels of bandwidth demands by end users, this book condenses the relentless research, design, and deployment experience of state-of-the-art access networks. Furthermore, it shares the critical steps and details of the developments and deployment of these emergent technologies; which is very crucial particularly as telecommunications vendors and carriers are looking for cost-effective ultra-broadband "last-mile" access solutions to stay competitive in the "post bubble" era.

The book is written to provide a comprehensive overview of the major broadband access technologies and deployments involving internationally recognized authors and key players. Due to its scope and depth, the proposed book is able to fill an important gap of today's available literature.

Features
- Consolidates and disseminates the latest developments and advances in the area of broadband access network technologies and architectures
- Combines and shares the emergent technologies developed and devised in the last few years
- Shares the many experiences and lessons learned from the deployments of field/testing trials of these technologies

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

Target groups
Students, researchers, practicing networks engineers, and telecommunication specialists

Type of publication
Contributed volume

S. Tadokoro, Tohoku University, Sendai, Japan (Ed.)

Rescue Robotics
DDT Project on Robots and Systems for Urban Search and Rescue

Rescue Robotics presents the most significant findings of the DDT Project on robots and systems for urban search and rescue. This project was launched by the Japanese government in 2002 with the aim of applying a wide variety of robotics technologies to find a solution to the problem of disaster response, especially urban search and rescue in large-scale earthquakes.

From 2002 to 2007 more than 100 researchers took part in the DDT Project, coming from a wide spectrum of research and development to make up four research groups: Aerial Robot Systems MU (Mission Unit), Information Infrastructure System MU, In-Rubble Robot System MU, and On-Rubble Robot System MU. This book discusses their development and testing of various robotic systems and technologies such as serpentine robots, traced vehicles, intelligent human interface and data processing, as well as analysing and verifying the results of these experiments.

Features
- Describes the results from the Japanese national DDT Project on rescue robotics
- Discusses the state of the art of the field of robotics for urban search and rescue, including aerial robot systems, information infrastructure systems, in-rubble robot systems and on-rubble robot systems

From the contents

Fields of interest
Artificial Intelligence (incl. Robotics); Emergency Services

Target groups
Researchers and postgraduates in robotics; mechanical, electrical and materials engineers; emergency services

Type of publication
Monograph

S. G. Tzafestas, National Technical University of Athens, Greece (Ed.)

Web-Based Control and Robotics Education

The development of Internet and World Wide Web technologies has motivated the introduction of new ways for distance learning and education in almost all scientific fields. In conventional teaching, the teacher is at the same place with the students and can monitor their progress and provide direct live feedback to them. In web-based teaching this is done through the web and the teacher-student interaction is performed via the computer monitor. Actually, web-based technology offers new possibilities for enhancing the capability of access to knowledge and instruction, going beyond the pure use of technical tools for achieving place and time ubiquity. In control and robotics education the classroom lectures need to be completed with hands–on laboratory experimentation. The problem here is the limited availability of proper equipment which typically is very expensive. This problem can be faced using the concepts of web-based virtual laboratory and tele-laboratory.

Features
- Will include web-based educational material and practical tools using both virtual labs and tele-labs
- Will provide collectively best practices in web-based teaching, experienced by the groups and institutes of the contributors

Fields of interest
Systems Theory, Control; Complexity

Target groups
Students, scientists, academic teachers, researchers, professionals in the fields of control, robotics and automation

Type of publication
Contributed volume

Due June 2009

2009. Approx. 395 p. 75 illus. (Optical Networks) Hardcover
- * € (D) 139,05 | € (A) 142,95 | sFr 216,00

Due September 2009

- * € (D) 139,05 | € (A) 142,95 | sFr 216,00
Inductive Powering
Basic Theory and Application to Biomedical Systems

Inductive powering has been a reliable and simple method for many years to wirelessly power devices over relatively short distances, from a few centimetres to a few feet. Examples are found in biomedical applications, such as cochlear implants; in RFID, such as smart cards for building access control; and in consumer devices, such as electrical toothbrushes. Device sizes shrank considerably in the past decades, demanding accurate design tools to obtain reliable link operation in demanding environments. With smaller coil sizes, the link efficiency drops dramatically to a point where the commonly used calculation methods become invalid.

Inductive Powering: Basic Theory and Application to Biomedical Systems lists all design equations and topology alternatives to successfully build an inductive power and data link for your specific application. It also contains practical guidelines to expand the external driver with a servomechanism that automatically tunes itself to varying coupling and load conditions.

Features
- Basic handbook on inductive link design
- In-depth theoretical analysis
- Thorough review of formulas for calculation and optimization of inductive fields
- Understanding the interface between magnetic powering fields and humans
- RFID

Fields of interest
Circuits and Systems; Electronic and Computer Engineering; Engineering Design

Target groups
Scientists, academia and companies conducting R & D on wireless energy supply systems, inductive powering of implanted systems, biomedical engineering

Type of publication
Monograph

Due June 2009


* € (D) 106,95 | € (A) 109,95 | sFr 166,00


UWB Pulse-based Radio
Reliable Communication over a Wideband Channel

Ultra-Wideband Pulse-based Radio lays the foundations of a new radio transceiver architecture, based on the Ultra-Wideband pulse-based radio principle. Instead of a continuous-time modulated carrier, the pulse-based radio system uses short electromagnetic pulses with a wide spectral footprint. This has considerable advantages for the reliability of a wireless link in an indoor environment. However, what is not accounted for in most high-level theoretical perspectives, is that a wide transmission bandwidth opens up a Pandora’s box of many complications at receiver side. A real-world wireless channel, for example, suffers from multipath reflections: multiple, delayed versions of the same signal arrive at the receive antenna and start to interfere with one another, an effect that is known as intersymbol interference. Also, a wide transmission band is a wide open door for in-band interfering signals, caused by other transmitters in the same frequency band.

Features
- Analyses the problems of wideband wireless communications, such as in-band interference, multipath reflections
- Introduces a novel interference suppression and signal reconstruction scheme for Ultra-Wideband pulse-based radio
- Provides technical details on how to build a robust pulse-based radio system

Contents

Fields of interest
Circuits and Systems

Target groups
Researchers, graduate students, academics, R&D research industry on analog/RF design for wireless communications

Type of publication
Monograph

Due June 2009


* € (D) 106,95 | € (A) 109,95 | sFr 166,00


Reconfigurable Computing Technology

Dynamic System Reconfiguration in Heterogeneous Platforms defines the MORPHEUS offering a platform that can join the performance density advantage of reconfigurable technologies and the easy control capabilities of general purpose processors. It consists of a System-on-Chip made of a scalable system infrastructure hosting heterogeneous reconfigurable accelerators, providing dynamic reconfiguration capabilities and data-stream management capabilities.

Features
- Fine/coarse-grain architectural elements connected by a network on chip
- Software-like design tool flow for dynamically reconfigurable platform
- Full set of industrial applications
- Unique development to true silicon

From the contents

Fields of interest
Circuits and Systems; Special Purpose and Application-Based Systems

Target groups
Computer engineers, computer architects, computer scientists, FPGA designers, ASIC designers, students and teachers in computer engineering and electrical engineering

Type of publication
Monograph

Due June 2009

2009. Approx. 250 p. (Lecture Notes in Electrical Engineering, Volume 40) Hardcover

* € (D) 85,55 | € (A) 87,95 | sFr 133,00

Mathematics of Fuzziness—Basic Issues

Mathematics of Fuzziness—Basic Issues introduces a basic notion of ‘fuzziness’ and provides a conceptual mathematical framework to characterize such fuzzy phenomena in Studies in Fuzziness and Soft Computing. The book systematically presents a self-contained introduction to the essentials of mathematics of fuzziness ranging from fuzzy sets, fuzzy relations, fuzzy numbers, fuzzy algebra, fuzzy measures, fuzzy integrals, and fuzzy topology to fuzzy control in a strictly mathematical manner. It contains most of the authors’ research results in the field of fuzzy set theory and has evolved from the authors’ lecture notes to both undergraduate and graduate students over the last three decades. A lot of exercises in each chapter of the book are particularly suitable as a textbook for any undergraduate and graduate student in mathematics, computer science and engineering. The reading of the book will surely lay a solid foundation for further research on fuzzy set theory and its applications.

Features
► Systematic, self-contained introduction to the essentials of mathematics of fuzziness ► Contains a lot of exercises in each section

Contents

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

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

Type of publication
Monograph

Partial Differential Equations and Solitary Waves Theory

“A Partial Differential Equations and Solitary Waves Theory” is a self-contained book divided into two parts: Part I is a coherent survey bringing together newly developed methods for solving PDEs. While some traditional techniques are presented, this part does not require thorough understanding of abstract theories or compact concepts. Well-selected worked examples and exercises shall guide the reader through the text. Part II provides an extensive exposition of the solitary waves theory. This part handles nonlinear evolution equations by methods such as Hirota’s bilinear method or the tanh-coth method. A self-contained treatment is presented to discuss complete integrability of a wide class of nonlinear equations. This part presents in an accessible manner a systematic presentation of solitons, multi-soliton solutions, kinks, peaks, cuspons, and compactons.

Features
► Handles solitary waves theory in an accessible manner ► Combines in two parts an easy-to-read introduction with recent research achievements ► Graphs of all types of travelling waves illustrate the basic features of soliton theory

From the contents

Fields of interest
Signal Processing; Algorithms

Target groups
Mathematics, science, and engineering students, scholars and researchers

Type of publication
Monograph

Due May 2009

Distribution rights in China: Higher Education Press
Jointly published with Higher Education Press

Protective Relaying of Power Systems Using Mathematical Morphology

The basic operating principles of the most common types of protection relays have not changed for more than half a century. However, the calculations used to measure power system fault signals continue to cause problems with relay performance. As a result, there is a need for developing a next generation of protection relays which are more accurate, more reliable and faster than the conventional relays. Protective Relaying of Power Systems Using Mathematical Morphology discusses the development of novel protective relaying algorithms using Mathematical Morphology (MM). MM is a nonlinear signal processing technique derived from set theory and geometry. It analyses signals in terms of shape by retrieving the features of the signals using a pre-defined structuring element.

Features
► Discusses the development of novel protective relaying algorithms using Mathematical Morphology (MM), a nonlinear signal processing technique derived from set theory and geometry

Contents

Fields of interest
Engineering

Target groups
Postgraduate students in the area of power systems; academic researchers in the area of power systems and automation; industrial researchers in the area of power engineering and automation; power engineers

Type of publication
Monograph

Due June 2009

Distribution rights in China: Higher Education Press
Jointly published with Higher Education Press
**Convection in Fluids**

*R. Zeytounian, Université des Sciences et Technolo-
gies de Lille, France*

**A Rational Analysis and Asymptotic Modelling**

In the present monograph, entirely devoted to
"Convection in Fluids", the purpose is to present
a unified rational approach of various convective
phenomena in fluids (mainly considered as a ther-
mally perfect gas or an expansible liquid), where
the main driving mechanism is the buoyancy force
(Archimedean thrust) or temperature-dependent
surface tension in homogeneities (Marangoni
effect). Also, the general mathematical formulation
(for instance, in the Bénard problem - heated from
below) and the effect of the free surface deforma-
tion are taken into account. In the case of the
atmospheric thermal convection, the Coriolis force
and stratification effects are also considered.

**Features**

- Probably the only book in this topic

**From the contents**

1 Short Preliminary Comments and Summary
   of Chapters 2 to 10. 2 The Navier-Stokes and
   Fourier Problem. 3 The Simple Rayleigh (1916)
   Thermal Convection Problem. 4 The Bénard (1900,
   1901), Heated from Below, Convection Problem.
   5 Thermal Shallow Convection Problem, ‘à la
   Rayleigh-Bénard’. 6 The Deep Thermal Convection
   Problem.

**Fields of interest**

Engineering Fluid Dynamics; Mathematical
Modeling and Industrial Mathematics

**Target groups**

Final year undergraduates and graduates students,
postgraduate research workers and young
researchers in fluid mechanics, applied math-
ematics, and theoretical/mathematical physics,
others interested in a systematic and logical
account of theoretical aspects of the convection
in fluids will find various answers concerning the
analytical approach in modelling of the convection
problems and the quantitative constraints directly
related with this approach

**Type of publication**

Monograph

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**Controlling Chaos**

*H. Zhang, Northeastern University, Shenyang, China;*

*D. Liu, University of Illinois at Chicago, IL, USA;*

*Z. Wang, Northeastern University, Shenyang, China*

**Suppression, Synchronization and Chaotification**

Controlling Chaos achieves three goals: the
suppression, synchronisation and generation of
chaos, each of which is the focus of a separate
part of the book. The text deals with the well-
known Lorenz, Rössler and Hénon attractors and
the Chua circuit and with less celebrated novel
systems. Modelling of chaos is accomplished
using difference equations and ordinary and
time-delayed differential equations. The methods
directed at controlling chaos benefit from the
influence of advanced nonlinear control theory:
inverse optimal control is used for stabilization;
exact linearization for synchronization; and impul-
sive control for chaotification. Notably, a fusion
of chaos and fuzzy systems theories is employed.
Time-delayed systems are also studied. The results
presented are general for a broad class of chaotic
systems.

This monograph is self-contained with introd-
cutory material providing a review of the history
of chaos control and the necessary mathematical
preliminaries for working with dynamical systems.

**Features**

- Unifies chaos theory with fuzzy systems theory
  for more effective control of chaotic systems
- Presents the latest results on chaotification of
  linear systems
- Presents novel advanced control
  methods for applications to chaotic and nonlinear
  systems

**Fields of interest**

Systems Theory, Control; Complexity

**Target groups**

Academics studying chaotic systems or interested
in the control of chaos in an electrical, systems,
mechanical or chemical engineering context;
graduate students studying chaos control; libraries

**Type of publication**

Monograph