

【工学: 応用数学/工学の計算法】

ニューラルネットワーク理論

Neural Networks Theory

Galushkin, Alexander I.

2007, Approx. 400 p., Hardcover ISBN: 978-3-540-48124-9 EUR 79.95

About this book:

'Neural Network Theory is a major contribution to the neural network literature. It is a treasure trove that should be mined by the thousands of researchers and practitioners worldwide who have not previously had access to the fruits of Soviet and Russian neural network research. Dr. Galushkin is to be congratulated and thanked for his completion of this monumental work; a book that only he could write. It is a major gift to the world.' Robert Hecht Nielsen, Computational Neurobiology, University of California, San Diego 'Professor Galushkin's monograph has many unique features that in totality make his work an important contribution to the literature of neural network theory. He and his publisher deserve profuse thanks and congratulations from all who are seriously interested in the foundations of neural network theory, its evolution and current status.' Lotfi Zadeh, Berkeley, Founder of Fuzziness 'Professor Galushkin, a leader in neural network theory in Russia, uses mathematical methods in combination with complexity theory, nonlinear dynamics and optimization, concepts that are solidly grounded in Russian tradition. His theory is expansive: covering not just the traditional topics such as network architecture, it also addresses neural continua in function spaces. I am pleased to see his theory presented in its entirety here, for the first time for many, so that the both theory he developed and the approach he took to understand such complex phenomena can be fully appreciated.' Sun-Ichi Amari, Director of RIKEN Brain Science Institute RIKEN

Contents:

Section 1. Neural Network Structure.- Transfer from logical basis of Boolean elements 'And, Or, Not' to the threshold logical basis.- Qualitative characteristics of neural networks architectures.- Optimization of cross connection multi-layer neural networks structure.- Continual neural networks.- Section 2. Optimal Models of Neural Networks.- Investigation of neural network input signals characteristics.- Design of neural network optimal models.- Analysis of the open-loop neural networks.- Development of multivariable functions extremum search algorithms.- Section 3. Adaptive Neural Network.- Neural network adjustment algorithms.- Adjustment of continuum neural Networks.- Selection of initial conditions during neural network adjustment. Typical neural network input signals.- Analysis of closed-loop multi-layer neural networks.- Synthesis of multi-layer neural networks with flexible structure.- Informative features selection in multi-layer neural networks.- Section 4. Neural networks Reliability and Diagnostics.- Neural networks reliability.- Neural networks diagnostics.- Methods of problem solutions in the neural network logical basis.

ニューラルネットワーク: 計算モデルと応用

Neural Networks: Computational Models and Applications

(Studies in Computational Intelligence Vol. 53)

Tang, Huajin; Tan, Kay Chen; Yi, Zhang

2007, Approx. 300 p., Hardcover ISBN: 978-3-540-69225-6 EUR 99.95

Online version available

About this book:

Neural Networks: Computational Models and Applications covers a wealth of important theoretical and practical issues in neural networks, including the learning algorithms of feed-forward neural networks, various dynamical properties of recurrent neural networks, winner-take-all networks and their applications in broad manifolds of computational intelligence: pattern recognition, uniform approximation, constrained optimization, NP-hard problems, and image segmentation. By presenting various computational models, this book is developed to provide readers with a quick but insightful understanding of the broad and rapidly growing areas in the neural networks domain. Besides laying down fundamentals on artificial neural networks, this book also studies biologically inspired neural networks. Some typical computational models are discussed, and subsequently applied to objection recognition, scene analysis and associative memory. The studies of bio-inspired models have important implications in computer vision and robotic navigation, as well as new efficient algorithms for image analysis. Another significant feature of the

book is that it begins with fundamental dynamical problems in presenting the mathematical techniques extensively used in analyzing neurodynamics, thus allowing non-mathematicians to develop and apply these analytical techniques easily. Written for a wide readership, engineers, computer scientists and mathematicians interested in machine learning, data mining and neural networks modeling will find this book of value. This book will also act as a helpful reference for graduate students studying neural networks and complex dynamical systems.

Contents:

Introduction.- Feedforward Neural Networks and Training Methods.- New Dynamical Optimal Learning for Linear Multilayer FNN.- Fundamentals of Dynamic Systems.- Various Computational Models and Applications.- Convergence Analysis of Discrete Time RNNs for Linear Variational Inequality Problem.- Parameter Settings of Hopfield Networks Applied to Traveling Salesman Problems.- Competitive Model for Combinatorial Optimization Problems.- Competitive Neural Networks for Image Segmentation.- Columnar Competitive Model for Solving Multi-Traveling Salesman Problem.- Improving Local Minima of Columnar Competitive Model.- A New Algorithm for Finding the Shortest Paths Using PCNN.- Qualitative Analysis for Neural Networks with LT Transfer Functions.- Analysis of Cyclic Dynamics for Networks of Linear Threshold Neurons.- LT Network Dynamics and Analog Associative Memory.- Output Convergence Analysis for Delayed RNN with Time Varying Inputs.- Background Neural Networks with Uniform Firing Rate and Background Input.

コンピュータビジョンとパターン認識における応用グラフ理論

Applied Graph Theory in Computer Vision and Pattern Recognition

(Studies in Computational Intelligence Vol. 52)

Kandel, Abraham; Bunke, Horst; Last, Mark (Eds.)

2007, Approx. 280 p., Hardcover ISBN: 978-3-540-68019-2 EUR 99.95

Online version available

About this book:

This book will serve as a foundation for a variety of useful applications of graph theory to computer vision, pattern recognition, and related areas. It covers a representative set of novel graph-theoretic methods for complex computer vision and pattern recognition tasks. The first part of the book presents the application of graph theory to low-level processing of digital images such as a new method for partitioning a given image into a hierarchy of homogeneous areas using graph pyramids, or a study of the relationship between graph theory and digital topology. Part II presents graph-theoretic learning algorithms for high-level computer vision and pattern recognition applications, including a survey of graph based methodologies for pattern recognition and computer vision, a presentation of a series of computationally efficient algorithms for testing graph isomorphism and related graph matching tasks in pattern recognition and a new graph distance measure to be used for solving graph matching problems. Finally, Part III provides detailed descriptions of several applications of graph-based methods to real-world pattern recognition tasks. It includes a critical review of the main graph-based and structural methods for fingerprint classification, a new method to visualize time series of graphs, and potential applications in computer network monitoring and abnormal event detection.

Contents:

Part I: Applied Graph Theory for Low Level Image Processing and Segmentation.- Multi-resolution Image Segmentations in Graph Pyramids.- A Graphical Model Framework for Image Segmentation.- Digital Topologies on Graphs.- Part II: Graph Similarity, Matching, and Learning for High Level Computer Vision and Pattern Recognition.- How and Why Pattern Recognition and Computer Vision Applications Use Graphs.- Efficient Algorithms on Trees and Graphs with Unique Node Labels.- A Generic Graph Distance Measure Based on Multivalent Matchings.- Learning from Supervised Graphs.- Part III: Special Applications.- Graph-Based and Structural Methods for Fingerprint Classification.- Graph Sequence Visualization and Its Application to Computer Network Monitoring and Abnormal Event Detection.- Clustering of Web Documents Using Graph Matching.

遺伝的アルゴリズムにおけるパラメータの設定

Parameter Setting in Evolutionary Algorithms

(Studies in Computational Intelligence Vol. 54)

Lobo, Fernando G.; Lima, Claudio F.; Michalewicz, Zbigniew (Eds.)

2007, Approx. 320 p., Hardcover ISBN: 978-3-540-69431-1 EUR 129.95

Online version available

Contents:

Parameter Setting in EAs: a 30 Year Perspective.- Parameter Control in Evolutionary Algorithms.- Self-Adaptation in Evolutionary Algorithms.- Adaptive Strategies for Operator Allocation.- Sequential Parameter Optimization Applied to Self-Adaptation for Binary-Coded Evolutionary Algorithms.- Combining Meta-EAs and Racing for Difficult EA Parameter Tuning Tasks.- Genetic Programming: Parametric Analysis of Structure Altering Mutation Techniques.- Parameter Sweeps for Exploring Parameter Spaces of Genetic and Evolutionary Algorithms.- Adaptive Population Sizing Schemes in Genetic Algorithms.- Population Sizing to Go: Online Adaptation Using Noise and Substructural Measurements.- Parameter-less Hierarchical Bayesian Optimization Algorithm.- Evolutionary Multi-Objective Optimization Without Additional Parameters.- Parameter Setting in Parallel Genetic Algorithms.- Parameter Control in Practice.- Parameter Adaptation for GP Forecasting Applications.

動的環境と不確実な環境における進化的計算

Evolutionary Computation in Dynamic and Uncertain Environments

(Studies in Computational Intelligence Vol. 51)

Yang, Shengxiang; Ong, Yew-Soon; Jin, Yaochu (Eds.)

2007, Approx. 600 p., Hardcover ISBN: 978-3-540-49772-1 EUR 149.95

Online version available

About this textbook:

This book provides a compilation on the state-of-the-art and recent advances of evolutionary algorithms in dynamic and uncertain environments within a unified framework. The motivation for this book arises from the fact that some degree of uncertainty in characterizing any realistic engineering systems is inevitable. Representative methods for addressing major sources of uncertainties in evolutionary computation, including handle of noisy fitness functions, use of approximate fitness functions, search for robust solutions, and tracking moving optimums, are presented. 'Evolutionary Computation in Dynamic and Uncertain Environments' is a valuable reference for scientists, researchers, professionals and students in the field of engineering and science, particularly in the areas of computational intelligence, natural computing and evolutionary computation.

Contents:

Part I Optimum Tracking in Dynamic Environments.- Part II Approximation of Fitness Functions.- Part III Handling Noisy Fitness Functions.- Part IV Search for Robust Solutions.

確率的グラフィカルモデルの進歩

Advances in Probabilistic Graphical Models

(Studies in Fuzziness and Soft Computing Vol. 213)

Lucas, Peter; Gámez, José A.; Salmerón, Antonio (Eds.)

2007, x, 396 p., Hardcover ISBN: 978-3-540-68994-2 EUR 99.95

About this book:

In recent years considerable progress has been made in the area of probabilistic graphical models, in particular Bayesian networks and influence diagrams. Probabilistic graphical models have become mainstream in the area of uncertainty in artificial intelligence; contributions to the area are coming from computer science, mathematics, statistics and engineering. This carefully edited book brings together in one volume some of the most important topics of current research in probabilistic graphical modelling, learning from data and probabilistic inference. This includes topics such as the characterisation of conditional independence, the sensitivity of the underlying probability distribution of a Bayesian network to variation in its parameters, the learning of graphical models with latent variables and extensions to the influence diagram formalism. In addition, attention is given to important application fields of probabilistic graphical models, such as the control of vehicles, bioinformatics and medicine.

Contents:

Part I Foundations.- Part II Inference.- Part III Learning.- Part IV Decision Processes.- Part V Applications.

ネットワークが創発する知能研究会

Emergent Intelligence of Networked Agents

(Studies in Computational Intelligence Vol. 56)

Namatame, Akira; Kurihara, Satoshi; Nakashima, Hideyuki (Eds.)

2007, Approx. 260 p., Hardcover ISBN: 978-3-540-71073-8 EUR 99.95

Online version available

Contents:

Incremental Development of Networked Intelligence in Flocking Behavior.- Emergence and Software development Based on a Survey of Emergence Definitions.- The Impact of Network Model on Performance of Load-balancing.- Auction-Based Resource Reservation Game in Small World.- Navigational Information as Emergent Intelligence of Spontaneously Structuring Web Space.- From Agents to Communities: A Meta-model for Community Computing in Multi-Agent System.- The effects of market structure on a heterogeneous evolving population of traders.- Analysis on Transport Networks of Railway, Subway and Waterbus in Japan.- Network Design via Flow Optimization.- Gibbs measures for the network.- Extracting Users' Interests of Web-watching Behaviors Based on Site-Keyword Graph.- Topological aspects of protein networks.- Collective Intelligence of Networked Agents.- Using an agent based simulation to evaluate scenarios in customers' buying behaviour.- How to Form Stable and Robust Network Structure through Agent Learning - from the viewpoint of a resource sharing problem.- An Evolutionary Rulebase Based Multi-agents System.- Improvements in Performance of Large-Scale Multi-Agent Systems Based on the Adaptive/Non-Adaptive Agent Selection.- Effect of grouping on classroom communities.- Emergence and Evolution of Coalitions in Buyer-Seller Networks.

情報保障と情報セキュリティにおける計算知能

Computational Intelligence in Information Assurance and Security

(Studies in Computational Intelligence Vol. 57)

Nedjah, Nadia; Abraham, Ajith; Mourelle, Luiza de Macedo (Eds.)

2007, Approx. 260 p., Hardcover ISBN-1 978-3-540-71077-6 EUR 99.95

Online version available

About this book:

The global economic infrastructure is becoming increasingly dependent upon information technology, with computer and communication technology being essential and vital components of Government facilities, power plant systems, medical infrastructures, financial centers and military installations to name a few. Finding effective ways to protect information systems, networks and sensitive data within the critical information infrastructure is challenging even with the most advanced technology and trained professionals. This volume provides the academic and industrial community with a medium for presenting original research and applications related to information assurance and security using computational intelligence techniques. The included chapters communicate current research on information assurance and security regarding both the theoretical and methodological aspects, as well as various applications in solving real world information security problems using computational intelligence.

Contents:

Cryptography and Cryptanalysis Through Computational Intelligence.- Multimedia Content Protection Based on Chaotic Neural Networks.- Evolutionary Regular Substitution Boxes.- Industrial Applications Using Wavelet Packets for Gross Error Detection.- Immune-inspired Algorithm for Anomaly Detection.- How to Efficiently Process Uncertainty within a Cyberinfrastructure without Sacrificing Privacy and Confidentiality.- Fingerprint Recognition Using a Hierarchical Approach.- Smart Card Security.- Governance of Information Security: New Paradigm of Security Management.

【工学/計算法:工科の数値・計算方法】

工学のためのテンソル代数とテンソル解析 連続体力学への応用とともに

Tensor Algebra and Tensor Analysis for Engineers

With Applications to Continuum Mechanics

Itskov, Mikhail

2007, Approx. 250 p., Hardcover ISBN: 978-3-540-36046-9 EUR 44.95

About this book:

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.

Contents:

Vectors and Tensors in a Finite-Dimensional Space.- Vector and Tensor Analysis in Euclidean Space.- Curves and Surfaces in Three-Dimensional Euclidean Space.- Eigenvalue Problem and Spectral Decomposition of Second-Order Tensors.- Fourth-Order Tensors.- Analysis of Tensor Functions.- Analytic Tensor Functions.- Application to Continuum Mechanics.- Solutions.- References.- Index..

固体の不連続力学

Nonsmooth Mechanics of Solids

(CISM International Centre for Mechanical Sciences Number 485)

Haslinger, Jaroslav; Stavroulakis, Georgios E. (Eds.)

2007, VII, 314 p. 77 illus., Softcover ISBN: 978-3-211-48241-4 EUR 74.00

About this book:

Mechanics have played an important role in mathematics, from infinitesimal calculus, calculus of variations, partial differential equations and numerical methods (finite elements). Originally, mechanics treated smooth objects. Technological progress has evoked the necessity to model and solve more complicated problems, like unilateral contact and friction, plasticity, delamination and adhesion, advanced materials, etc. The new tools include convex analysis, differential calculus for convex functions, and subgradients of convex functions and extensions for nonconvex problems. Nonsmooth mechanics is a relatively complex field, and requires a good knowledge of mechanics and a good background in some parts of modern mathematics. The present volume of lecture notes follows a very successful advanced school, with the aim to cover as much as possible all these aspects. Therefore the contributions cover mechanical aspects as well as the mathematical and numerical treatment.

Contents:

Frémond, M., Collisions. Thermal effects. Collisions of deformable solids and collisions of solids and fluids.- Glocker, Ch., An introduction to impacts.- Haslinger, J., Approximation of variational and hemivariational inequalities of elliptic type. Applications to contact problems with friction.- Naniewicz, Z., Semicoercive hemivariational inequalities, regularization methods, applications on mechanics.- Outrata, J., Mathematical programs with equilibrium constraints. Theory and numerical methods.- Stavroulakis, G. E., Applied nonsmooth mechanics of deformable bodies.

有限要素解析への MATLAB ガイド インタラクティブなアプローチ

MATLAB Guide to Finite Elements

An Interactive Approach

Kattan, Peter

2nd ed., 2007, Approx. 420 p. With CD-ROM., Hardcover ISBN: 978-3-540-70697-7 EUR 69.95

About this book:

This successful textbook explores the numerical implementation of Finite Element Analysis using the computer program MATLAB, which is very popular today in engineering and engineering education. The book contains a short tutorial on MATLAB as well as a systematic strategy for the treatment of finite element methods. Useful to both students and researchers in engineering, it provides various examples and exercises from mechanical, civil and aerospace engineering, as well as from materials science. The book especially stresses the interactive use of MATLAB, with each example solved in an interactive manner. The accompanying CD-ROM includes more than fifty MATLAB functions specifically written to be used with this book in the form of a MATLAB Finite Element Toolbox. An extensive solutions manual is provided as well, which includes detailed solutions to all the problems in the book for classroom use. This second edition includes a new brick (solid) element with eight nodes and a one-dimensional fluid flow element. A review of the applications of finite elements in various fields such as fluid flow, heat transfer, structural dynamics, electro-magnetics, is added as well.

Contents:

The Spring Element.- The Linear Bar Element.- The Quadratic Bar Element.- The Plane Truss Element.- The Space Truss Element.- The Beam Element.- The Plane Frame Element.- The Grid Element.- The Space Frame Element.- The Linear Triangular Element.- The Quadratic Triangular Element.- The Bilinear Quadrilateral Element.- The Quadratic Quadrilateral Element.- The Linear Tetrahedral (Solid) Element.- The Linear Brick (Solid) Element.- Other Elements.- Answers to Problems.- Contents of the Accompanying CD-ROM.

【工学: 工学の物理/応用物理】

CMOS ホットプレート化学マイクロセンサ

CMOS Hotplate Chemical Microsensors

(Microtechnology and MEMS)

Graf, Markus; Barrettino, Diego; Hierlemann, Andreas; Baltes, Henry P.

2007, Approx. 160 p. 100 illus., Hardcover ISBN: 978-3-540-69561-5 EUR 119.95

About this book:

This is the first comprehensive book on microhotplate-based chemical sensor systems in CMOS-technology. It covers all aspects of successful sensor prototyping: theoretical considerations for modelling, controller- and system design, simulation of circuits and microsensors, design considerations, microfabrication, packaging and testing. A whole family of metal-oxide based microsensor systems with increasing complexity is presented, including fully integrated sensor arrays. They represent the next generation of such sensors and provide one of the first examples of the successful integration of nanomaterials, microtechnology and embedded circuitry. The benefits of sensor miniaturization and smart features are also discussed.

Contents:

Introduction.- Miniaturized Metal-Oxide Sensors.- Thermal Modelling of CMOS Microhotplates.- Microhotplates in CMOS Technology.- Monolithic Gas Sensor Systems.- Microsensor Arrays.- Conclusion and Outlook.

リズムとその変換

Rhythm and Transforms

Sethares, William A.

2007, Approx. 300 p. 170 illus. With CD-ROM., Hardcover ISBN: 978-1-84628-639-1 EUR 62.95

About this book:

People naturally identify the rhythm of music as they tap their feet and sway in time with the beat. Underlying such motions is an act of cognition that is not easily reproduced in a computer program or automated by machine. 'Rhythm and Transforms' asks (and answers) the question: How can we build a device that can 'tap its foot' along with the music? The result is a tool for detecting and measuring the temporal aspects of a musical performance: the periodicities, the regularities (and irregularities), the beat, the rhythm. The impact of such a 'rhythm meter' on music theory and on the design of sound processing electronics is described. It allows discussion of the relationship between cognitive processing of temporal information and mathematical techniques used to describe and understand regularities in data. This book will interest engineers and others interested in the design of audio devices such as musical synthesizers, special effects devices, drum machines, and electronic keyboards. It will be useful to musicians and composers who exploit computer-based tools; arrangers, musicologists, and others interested in musical analysis; and those interested in the way the ear works, and how this influences the types of sound patterns we like to listen to. A unique approach to working with environmental sounds is provided, with clear applications to the synchronization of audio with video. A CD-ROM comes with the book containing audio examples which demonstrate the book's ideas in addition to a suite of programs (a Matlab® 'toolbox' for beat tracking) which allows readers to reproduce many of the of these ideas' results.

Contents:

What is Rhythm?- Visualizing and Conceptualizing Rhythm.- Variety of Rhythmic Experience.- Auditory Perception.- Transforms.- Adaptive Oscillators.- Statistical Models.- Automated Rhythm Analysis.- Beat-based Signal Processing.- Musical Composition and Recomposition.- Musical Analysis via Feature Scores.- Speculations, Interpretations, Conclusions.

【工学:理論・応用力学】

接触力学入門

Introduction to Contact Mechanics

(Mechanical Engineering Series)

Fischer-Cripps, Anthony C.

2nd ed. 2007. Approx. 260 p., Hardcover ISBN: 978-0-387-68187-0 Approx. EUR 77.00

About this textbook:

This book deals with the mechanics of solid bodies in contact, a subject intimately connected with such topics as fracture, hardness, and elasticity. Theoretical work is most commonly supported by the results of indentation experiments under controlled conditions. In recent years, the indentation test has become a popular method of determining mechanical properties of both brittle and ductile materials, and particularly thin film systems. The book begins with an introduction to the mechanical properties of materials, general fracture mechanics, and the fracture of brittle solids. This is followed by a detailed description of indentation stress fields for both elastic and elastic-plastic contact. The discussion then turns to the formation of Hertzian cone cracks in brittle materials, subsurface damage in ductile materials, and the meaning of hardness. The book concludes with an overview of practical methods of indentation testing.

Contents:

Mechanical Properties of Materials.- Linear Elastic Fracture Mechanics.- Delayed Fracture in Brittle Solids.- Statistics of Brittle Fracture Chapter.- Elastic Indentation Stress Fields.- Elastic Contact.- Hertzian Fracture.- Elastic-Plastic Indentation Stress Fields.- Hardness.- Elastic and Elastic-Plastic Contact.- Depth Sensing Indentation Testing.- Indentation Test Methods.

【工学:連続体力学と材料力学】

摩擦のある動的な接触問題 モデル・手法・実験・応用

Dynamical Contact Problems with Friction

Models, Methods, Experiments and Applications

Sextro, Walter K.

2nd ed. 2007, Approx. 190 p., Hardcover ISBN: 978-3-540-69535-6 EUR 89.95

About this book:

The aim of this second edition is to describe an efficient procedure to model dynamical contact problems with friction. This procedure is applied to different practical problems and validated by experiments. Friction contacts are used to transmit forces or to dissipate energy. Examples for dynamical engineering systems with friction are brakes, machine tools, motors, turbines, bearings or wheel-rail systems. A better understanding of friction phenomena can result in improvements like the reduction of noise and maintenance costs, increased life time of machines and improved energy efficiency. Dependent on the features of the friction contact, different contact models and solution methods are applied.

Contents:

Introduction.- Dynamical Descriptions of Elastic Bodies.- Contact Model.- Oscillators with Elastic Contact and Friction.- Friction Damping of Elastic Multibody Systems.- Rolling Contact.- Conclusion.

電磁弾性の数学モデル

Mathematical Methods in Electro-Magneto-Elasticity

(Lecture Notes in Applied and Computational Mechanics Vol. 32)

Bardzokas, D.I.; Filshinsky, M.L.; Filshinsky, L.A.

2007, Approx. 580 p., Hardcover ISBN: 978-3-540-71030-1 EUR 169.95

About this book

The mechanics of Coupled Fields is a discipline at the edge of modern research connecting Continuum Mechanics with Solid State Physics. It integrates the Mechanics of Continuous Media, Heat Conductivity and the theory of Electromagnetism that are usually studied separately. For an accurate description of the influence of static and dynamic loadings, high temperatures and strong electromagnetic fields in elastic media and constructive installations, a new approach is required; an approach that has the potential to establish a synergism between the above

mentioned fields. Throughout the book a vast number of problems are considered: two-dimensional problems of electro-magneto-elasticity as well as static and dynamical problems for piecewise homogenous compound piezoelectric plates weakened by cracks and openings. The boundary conditions, the constructive equations and the mathematical methods for their solution are thoroughly presented, so that the reader can get a clear quantitative and qualitative understanding of the phenomena taking place. This book is for the specialists in Continuous Mechanics, Acoustics and Defectoscopy, and also for advanced undergraduate and graduate-level students in Applied Mathematics, Physics, Engineering Mechanics and Physical Sciences.

Contents:

Physical Fields in Solid Bodies.- Basic Equations of the Linear Electroelasticity.- Static Problems of Electroelasticity for Bimorphs with Stress Concentrators.- Diffraction of a Shear Wave on Tunnel Cracks in Media of Various Configurations.- Scattering of a Shear Wave by Cylindrical Inhomogeneities in Piezoceramic Media of Various Configurations.- Mixed Dynamic Problems of Electroelasticity for Piezoelectric Bodies with Surface Electrodes.- Harmonic Oscillations of Continuous Piezoceramic Cylinders with Inner Defects.- Electroacoustic Waves in Piezoceramic Media with Defects.- Fundamentals of Magnetoelasticity.- Influence of the Induced Currents on the Dynamic Intensity of Piece-Wise Uniform Electro-Conductive Bodies in Magnetic Fields.- Influence of Magnetizability of Material on the Stress State of a Ferromagnetic Medium with Heterogeneities.- Optimal Control of Physical Fields in Piezoelectric Bodies with Defects.

金属疲労 現象の説明と問題

Metal Fatigue

What it is, why it matters

(Solid Mechanics and Its Applications Vol. 145)

Pook, Les

2007, Approx. 280 p., Hardcover ISBN: 978-1-4020-5596-6 EUR 79.95

About this book:

There do not appear to be any recent books on metal fatigue which are presented in a format that appeals to engineers, and which can be recommended to newcomers to the topic. This book aims to present the important ideas in metal fatigue in as straightforward a manner as possible for the benefit of readers who need to be able understand more advanced documents on a wide range of metal fatigue topics. Indications on how metal fatigue problems are solved in engineering practice are included. The prerequisite knowledge required for readers is a basic understanding of stress analysis and mathematics covered in engineering undergraduate courses. No prior knowledge of metal fatigue is assumed. The book has several objectives. Firstly, to explain the terminology used in metal fatigue. Secondly, to provide a brief description of the mechanisms of metal fatigue. Thirdly, to describe the basis of design against the fatigue failure of components and structures. Fourthly, to provide examples illustrating various points made. Finally, the overall objective is to provide a firm foundation for readers who wish to study various aspects of metal fatigue in more detail, including finding solutions to specific fatigue problems.

From the contents:

1: Introduction.- 2: Historical Background.- 3: Constant Amplitude Fatigue.- 4: Variable Amplitude and Multiaxial Fatigue.- 5: Fatigue Design.- 6: The Uncracked Situation.- 7: The Cracked Situation.- 8: Fatigue Crack Paths.- 9: Why Metal Fatigue Matters.- Appendix A: Fracture Mechanics. Appendix B: Random Load Theory and RMS. Appendix C: Non Destructive Testing.- References.- Index.

【工学：構造力学】

構造物の安定性と最適化 一般化感度解析

Stability and Optimization of Structures

Generalized Sensitivity Analysis

(Mechanical Engineering Series)

Ohsaki, Makoto; Ikeda, Kiyohiro

2007, Approx. 240 p., Hardcover ISBN: 978-0-387-68183-2 Approx. EUR 114.75

About this book:

本書では、「安定性に関する制約の下での幾何的に非線形な構造物の最適化」に焦点を当てている。これは、構造工学、機械工学、応用数学において急速に進歩をしている分野である。パラメータ感度解析への統一的なアプローチに基づく離散構造物の最適化ベースかつ計算機支援による安定設計に対する深い洞察が、本文や図表の中でわかりやすく表現されている。

Contents:

Introduction to Design Sensitivity Analysis.- Methods of Design Sensitivity Analysis.- Imperfection Sensitivity Analysis.- Optimization Under Stability Constraints.- Optimal Structures Under Snapthrough Constraint.- Shape Optimization of Complaint Mechanisms.- Optimal Braced Frames with Coincident Buckling Loads.- Worst Imperfection: Theory.- Worst Imperfection: Anti-Optimization by LP and QP.- Worst Imperfection: Stable Bifurcation.- Random Imperfections: Theory.- Random Imperfections of Steel Members.

構造解析に対するクリープ現象のモデル化

Modeling of Creep for Structural Analysis

(Foundations of Engineering Mechanics)

Naumenko, Konstantin; Altenbach, Holm

2007, Approx. 230 p. 77 illus., Hardcover ISBN: 978-0-387-68183-2 EUR 119.95

About this book:

'Creep Modeling for Structural Analysis' develops methods to simulate and analyze the time-dependent changes of stress and strain states in engineering structures up to the critical stage of creep rupture. The principal subjects of creep mechanics are the formulation of constitutive equations for creep in structural materials under multi-axial stress states; the application of structural mechanics models of beams, plates, shells and three-dimensional solids and the utilization of procedures for the solution of non-linear initial-boundary value problems. The objective of this book is to review some of the classical and recently proposed approaches to the modeling of creep for structural analysis applications as well as to extend the collection of available solutions of creep problems by new, more sophisticated examples. In Chapter 1, the book discusses basic features of the creep behavior in materials and structures and presents an overview of various approaches to the modeling of creep. Chapter 2 collects constitutive models that describe creep and damage processes under multi-axial stress states. Chapter 3 deals with the application of constitutive models to the description of creep for several structural materials. Constitutive and evolution equations, response functions and material constants are presented according to recently published experimental data. In Chapter 4 the authors discuss structural mechanics problems. Governing equations of creep in three-dimensional solids, direct variational methods and time step algorithms are reviewed. Examples are presented to illustrate the application of advanced numerical methods to the structural analysis. An emphasis is placed on the development and verification of creep-damage material subroutines inside the general purpose finite element codes.

Contents:

Introduction.- Constitutive Models of Creep.- Examples of Constitutive Equations for Various Materials.- Modeling of Creep in Structures.

【工学:振動, 動的システム, 制御】

超音波非破壊評価システム モデルと測定法

Ultrasonic Nondestructive Evaluation Systems

Models and Measurements

Schmerr, Lester; Song, Sung-Jin

2007, Approx. 550 p., Hardcover ISBN: 978-0-387-49061-8 Approx. EUR 114.00

About this book:

超音波非破壊評価(NDE)検査では、材料内部の危険な傷を特定し特徴づけるために高周波の音波を用いる。システムレベルのアプローチに基づき、本書では線型システム論および波の伝播・散乱の理論を用いて超音波測定システム全体に関する包括的なモデルを開発している。この統合化されたアプローチは、超音波 NDE 検査を設計・使用・最適化するための新たなモデルベースのエンジニアリング技術に結びついている。この分野でなされた最新の研究の進展が議論されており、本書で扱う研究の進展や概念を理解するために必要な背景が提供

されている。

振動工学: その現状

Mechanical Vibration: Where Do We Stand?

(CISM International Centre for Mechanical Sciences Number 488)

Elishakoff, Isaac (Ed.)

2007, VIII, 488 p. 134 illus., Hardcover ISBN: 978-3-211-68586-0 EUR 98.00

About this book:

Written by the world's leading researchers on various topics of linear, nonlinear, and stochastic mechanical vibrations, this work gives an authoritative overview of the classic yet still very modern subject of mechanical vibrations. It poses the question: What are the most important contributions made in the past decade? The reader will be able to gain a critical and authoritative overview of the subject from various complementary perspectives.

無限領域への波の伝播 構造との練成への応用とともに

Wave Propagation in Infinite Domains

With Applications to Structure Interaction

(Lecture Notes in Applied and Computational Mechanics Vol. 31)

Lehmann, Lutz

2007, Approx. 185 p., Hardcover ISBN: 978-3-540-71108-7 EUR 99.95

About this book:

Wave propagation in infinite or unbounded domains is often encountered in scientific and engineering applications. Theoretical fundamentals and applications of a new numerical model which has the ability to simulate such wave propagation are presented. Attention is focused on linear waves in ideal fluids and elastic domains. Wave propagation based on scalar and vector wave equations, as well as fluid-structure interaction and soil-structure interaction is numerically simulated. The model is based on a coupled finite element/scaled boundary finite element method (FEM/SBFEM). While the FEM maps the near-field, under the immense variety of non-reflecting boundary conditions the SBFEM, developed by Wolf and Song, was chosen. It has some unique features: reduction of the spatial dimension by one without requiring a fundamental solution, no discretisation of free and fixed boundaries and interfaces between different materials, and influence of the infinite far-field could be stored in the form of matrices for further simulations (e.g., different load cases). Benchmark examples show the efficiency and accuracy of the proposed algorithm. Finally, covered fields of applications are: acoustics, dynamic behaviour of offshore wind turbines, and seismic analysis of buildings including soil-structure interaction.

Contents:

Part I Theory.- Finite element method.- Boundary element method.- Scaled boundary finite element method .- Benchmark examples.- Part II Applications.- Wave propagation in fluids.- Offshore wind energy conversion systems ..- Earthquake excited building.

【工学: 流体力学】

フォイト型ターボ動力

Voith Turbo Power

Schweickert, Hermann (Ed.)

2007, 320 p. 479 illus. in color., Hardcover ISBN: 978-3-540-68784-9 EUR 49.95

About this book:

This richly and coloured illustrated book about Hermann Föttinger, his idea of hydrodynamic power transmission, the industrial introduction and its further developments by Voith follows the trail of the technical milestones, that mark progress of hydrodynamic power transmission. Hydrodynamic power transmission at Voith initiated a successful expansion of a business area into an independent group division. The book starts with the historical beginnings and describes the technical development of turbo transmissions for rail vehicles, which, after a few attempts, resulted in the Division 'Power Transmission' at Voith. It also illustrates the vast field of industrial applications in control and start-up processes and gives an account of the development of transmissions and retarders for buses, coaches and trucks. This retrospective from early experiments to today's successes is followed by a brief overview of the prospects

of hydrodynamic drive systems in the near future. The text is well edited for generally interested readers. The well-founded depiction of technical contexts is easy to understand. The book bridges an information gap regarding the early applications of hydrodynamic power transmission to modern developments, a subject of which a treatise in such a richly illustrated presentation had not previously been available. Students and young engineers find it encouraging to read about the inventor Föttinger, his brilliant idea and the enormous impact it had on the development of industry with Voith. It is a must for every collectors library.

Contents:

Preface.- A New Way - The Development of Hydrodynamic Power Transmission.- On the Rails of the World - Voith Turbo Transmissions in Rail Technology.- Starting and Controlling - Voith Turbo Couplings and Torque Converters in Industrial Plants.- Driving Comfort and Safety - Voith Automatic Transmissions and Hydrodynamic Brakes in Road Traffic.- History Has a Future - The Perspectives of Voith Hydrodynamics.- Voith Turbo - The Development into a Group Division.- Addendum.

地球流体における波 津波・フリーク波・内部潮波

Waves in Geophysical Fluids

Tsunamis, Rogue Waves, Internal Waves and Internal Tides

(CISM International Centre for Mechanical Sciences Number 489)

Grue, John; Trulsen, Karsten (Eds.)

2007, XII, 332 p. 172 illus., Softcover ISBN: 978-3-211-37460-3 EUR 76.00

About this book:

Waves in Geophysical Fluids describes: the forecasting and risk evaluation of tsunamis by tectonic motion, land slides, explosions, run-up, and maps the tsunami sources in the world's oceans; stochastic Monte-Carlo simulations and focusing mechanisms for rogue waves, nonlinear wave models, breather formulas, and the kinematics of the Draupner wave; the full story about the discovery of the very large oceanic internal waves, how the waves are visible from above through the signatures on the sea surface, and how to compute them; observations of energetic internal tides and hot spots from several field campaigns in all parts of the world's oceans, with interpretation of spectra. An essential work for students, scientists and engineers working with the fundamental and applied aspects of ocean waves.

Contents:

Preface.- Pelinovsky, E., Hydrodynamics of tsunami waves.- Trulsen, K., Weakly nonlinear and stochastic properties of ocean waves fields. Application to an extreme wave event.- Kharif, C., Pelinovsky, E., Freak waves phenomenon: Physical mechanisms and modelling.- Grue, J., Rapid computations of steep surface waves in three dimensions, and comparison with experiments.- Grue, J., Very large internal waves in the ocean – observations and nonlinear models.- Morozov, E., Internal tides. Global field of internal tides and mixing caused by internal tides.

混相流の力学1&2 (第3版)

Multiphase Flow Dynamics 1&2, 3rd ed.

Kolev, Nikolay I.

1: Fundamentals Approx. 820 p. With CD-ROM., Hardcover ISBN: 978-3-540-69832-6 EUR 149.95

2: Thermal and Mechanical Interactions Approx. 780 p., Hardcover ISBN: 978-3-540-69834-0 EUR 149.95

About this book:

混相流の問題は、トルネード、台風、大気、水汚染、火山活動などの自然環境や発電所、燃焼エンジン、推進装置、化学・生物産業などの産業技術の広範な分野にわたっている。混相流の問題は、固体、液体、気体間の相互作用に伴う流動や状態変化を連立して解析する必要があり、連続体の理論に基づいて考察されることが多い。本書では、過度現象における複雑な混相流の理論、研究法や実際的な経験の成果が扱われており、多相流力学の理論と数値的手法が体系的に解説されている。全2巻より構成されており、第1巻では混相流力学の基礎的な問題が、第2巻では混相流力学の機械的・熱的相互作用の問題が扱われている。また、第1巻ではCD-ROM が付されており、混相流の流動現象の理解を深めている。複雑な混相流の力学的理論と数値的手法について詳説した有用な研究書である。

Contents: (Vol.1)

Mass conservation.- Momentums conservation.- Derivatives for the equations of state.- On the variety of notations of the energy conservation for single-phase flow.- First and second laws of the thermodynamics.- Some simple applications of the mass and energy conservation.- Exergy of multi-phase multi-component systems.- One-dimensional three-fluid flows.- Detonation waves caused by chemical reactions or by melt-coolant interactions.- Conservation equations in general curvilinear coordinate systems.- Type of the system of PDEs.- Numerical solution methods for multi-phase flow problems.- Numerical methods for multi-phase flow in curvilinear coordinate systems.- Visual demonstration of the method.

From the contents: (Vol.2)

Flow regime transition criteria.- Drag, lift and virtual mass forces.- Friction pressure drop.- Diffusion velocities for algebraic slip models.- Entrainment in annular two-phase flow.- Deposition in annular two-phase flow.- Introduction to fragmentation and coalescence.- Acceleration induced droplet and bubble fragmentation.- Turbulence induced particle fragmentation and coalescence.- Liquid and gas jet disintegration.- Fragmentation of melt in coolant.- Nucleation in liquids.- Bubble growth in superheated liquid.- Condensation of a pure steam bubble in a subcooled liquid.- Bubble departure diameter.- How accurately can we predict nucleate boiling?.- Heterogeneous nucleation and flashing in adiabatic pipes.- Boiling of subcooled liquid.- Natural convection film boiling.- Forced convection boiling.

【工学：機械工学一般】

光マイクロシステム 光デバイス・光システムに応用されるマイクロテクノロジーとナノテクノロジー

Photonic Microsystems

Micro and Nanotechnology applied to Optical Devices and Systems

(MEMS Reference Shelf)

Solgaard, Olav

2007, Approx. 600 p., Hardcover ISBN: 978-0-387-29022-5 Approx. EUR 99.35

About this book:

Photonic Microsystems: Micro and Nanotechnology Applied to Optical Devices and Systems describes MEMS technology and demonstrates how MEMS allow miniaturization, parallel fabrication, and efficient packaging of optics, as well as integration of optics and electronics. This book shows how the characteristics of MEMS enable practical implementations of a variety of applications, including projection displays, fiber switches, interferometers, and spectrometers. Photonic Microsystems also describes the phenomenon of Photonic crystals (nanophotonics) and demonstrates their ability to enable synthesis of materials with optimized optical characteristics. This provides control over optical fields over sub-wavelength distances, leading to devices with improved scaling and functionality compared to traditional optics. Photonic Microsystems concludes with an up-to-date discussion of the need for the combination of MEMS and Photonic crystals by demonstrating that practical photonic-crystal devices leverage MEMS technology for integration and packaging.

Contents:

Introduction.- Scaling of Optics.- Optial Fibers and Optical Waveguides.- Beam Steering Micromirrors.- Diffractive Beam Steering.- Optical Displacement Sensors.- Tunable Filters - Interferometers.- Diffractive Filters.- Tunable Microlenses.- Photonic Crystal Basics.- Tunable Photonic Crystals.- Integration and Packaging of Photonic Microsystems.- Basics of MEMS for Integration and Packaging.

【機械工学：工業デザイン】

協同的な製品の設計・製造の方法とその応用

Collaborative Product Design and Manufacturing Methodologies and Applications

(Springer Series in Advanced Manufacturing)

Li, W. D.; Ong, S. K.; Nee, Andrew Y. C.; McMahon, Chris (Eds.)

2007, Approx. 330 p., Hardcover ISBN: 978-1-84628-801-2 EUR 99.95

About this book:

There have been major innovations and paradigm shifts in product design methodologies and systems. The current R and D trend is for collaborative design and manufacturing methodologies and systems. These allow designers to participate in global design chains and collaborate with each other and overseas partners to pursue competitive

advantages. Designers can work closely with suppliers, manufacturing partners and customers across enterprise firewalls to obtain valuable input. This book introduces a spectrum of collaborative engineering issues in design and manufacturing. It contains state-of-the-art chapters written by experts from academia and industry and reflects the R and D work and applications of the last 3-5 years. A reference for academics, senior undergraduates, graduates and practitioners in collaborative design and manufacturing, concurrent engineering, Internet-based/intelligent design and manufacturing, CAD/PDM/CAPP/CAM, Internet applications, product lifecycle management, supply chain, etc.

Contents:

An Adaptable Service-based Framework for Distributed Service Realization.- A Web-based Intelligent Collaborative System for Engineering Design.- A Shared VE for Collaborative Product Development in Manufacturing Enterprises.- A 'Plug-and-Play' Computing Environment for Collaborative Product Design and Manufacturing across an Extended Enterprise.- Cooperative Design in Building Construction.- A Fine-grain and Feature-oriented Product Database for Collaborative Engineering.- A Web-based Framework for Distributed and Collaborative Manufacturing of Engineering Parts.- Wise-ShopFloor: A Portal toward Collaborative Manufacturing.- Real-time Distributed Shop Floor Scheduling: An Agent-based Service-oriented Framework.- Leveraging Design Process Related Intellectual Capital – A Key to Enhancing Enterprise Agility.- Manufacturing Information Organization in Product Lifecycle Management.- Semantic Interoperability to Support Collaborative Product Development.- A Proposal of Distributed Virtual Factory for Collaborative Production.

【機械工学:機械, マシンエレメント】

ニューマチックドライブ システム設計・モデル化・制御

Pneumatic Drives

System Design, Modelling and Control

Beater, Peter

2007, XIV, 324 p., 244 illus., Hardcover ISBN: 978-3-540-69470-0 EUR 129.95

About this book:

This book is a comprehensive work on all aspects of pneumatic drives. It bridges the gap between classical descriptions of pneumatic systems in terms of their steady-state behaviour and the wish of design engineers to test their design before setting up the actual hardware. The book covers the whole range of today's technology for pneumatic drives. In addition to drives for factory automation and automotive applications the technology for the process industry like positioners or spring-and-diaphragm actuators is described. The wish to analyse the design beforehand requires a mathematical description for computer simulation. Therefore, the book presents the basic laws of nature as well as the design and the modes of operation of pneumatic components to derive the modelling equations. It further covers several control strategies like binary mode cylinder drives or position controlled drives and computer aided analysis of complex systems. The book is a unique resource and valuable reference for both, scientists and graduate students as well as professional engineers who need to design and control pneumatic drives.

Contents:

Introduction.- Properties of Compressed Air.- Thermodynamic Processes.- Some Results from Fluid Mechanics.- Engineering Flow Rate Calculations.- Modelling of Long Lines.- Electro-Mechanical Converters.- Cylinders.- Non-Standard Linear Actuators.- Semi-Rotary Actuators.- Air Motors and Air Turbines.- Directional Control Valves.- Shut-Off Valves.- Pressure Control Valves.- Flow Control Valves.- Proportional Directional Control Valves.- Stroke-Time Control.- Position Control of Pneumatic Systems.- Control of Actuators for Process Valves.- Digital Simulation.

【機械工学:自動車工学・航空宇宙工学】

内燃機関の給気

Charging the Internal Combustion Engine

(Powertrain)

Hiereth, Hermann; Prenninger, Peter

2006, Approx. 220 p., Hardcover ISBN: 978-3-211-33033-3 Approx. EUR 78.00

About this book:

The book focuses on all aspects of supercharging internal combustion engines. Charging systems and components, the theoretical basic relations between engines and charging systems as well as layout and evaluation criteria for best interaction are addressed in detail. Recent experiences in design and development of supercharging systems,

improved graphical presentations and most advanced calculation and simulation tools are described. The book is prepared for students enrolled in mechanical engineering courses on the one hand, and for research-, development- and application-engineers, specialised in the field of supercharging systems for combustion engines, on the other leading to improved knowledge about benefits and problems of supercharging and providing help and tips for application engineers to design, optimise and develop supercharged internal combustion engines. A large number of selected examples as well as an outlook on possible future developments of supercharging systems finally close the book.

【工学・生産工学：工業経済学，組織，物流】

物流における自律協調と制御の理解 経営フロー・情報フロー・コミュニケーションフロー・資源フローへのインパクト

Understanding Autonomous Cooperation & Control in Logistics

The Impact on Management, Information, Communication and Material Flow

Windt, Katja; Hülsmann, Michael

2007, Approx. 400 p., Hardcover ISBN: 978-3-540-47449-4 EUR 129.95

About this book

One of the great challenges in flexible production and supply chains is the availability of necessary information at any time and any place. As a result of increasing dynamical and structural complexity of structures and processes in production it is often impossible to make all necessary information available to a central instance in real time and to perform appropriate measures of control in terms of a defined target system. A fast and flexible adaptation to changing basic conditions ought to be achieved by establishing autonomous logistics processes. In this context several fundamental questions concerning autonomous cooperating logistics processes were investigated: The identification problem: What are autonomous logistics processes and how do they differ from conventionally managed processes? The description problem: Which changes will autonomy cause in order processing? One of the first results is a definition for the term autonomy for applications in engineering science. The constituent characteristics of this definition were considered within the development of the catalogue of criteria in order to describe autonomous logistic processes. Regarding the modelling of autonomous processes, first requirements for modelling methods were specified. To validate the research results, a production-logistic shop-floor scenario and a practical scenario based on the real business processes of an automobile terminal were developed. Simulation studies concerning autonomously controlled allocation of parking areas document comprehensive opportunities for improvement.

Contents:

Introduction.- Fundamental Basics and Concepts of Autonomous Control and Cooperation.- Autonomous Control Methods for the Management, Information and Communication Layer.- Autonomous Control Methods and Examples for the Material Flow Layer.- Fazit.

製造実行システム－MES

Manufacturing Execution Systems – MES

Kletti, Jürgen

2007, Approx. 200 p. 100 illus., Hardcover ISBN: 978-3-540-49743-1 EUR 69.95

About this book

The classical factory fades into history as production plants today develop into modern service centers. Problems in management arise for which many companies are not yet prepared: economic efficiency of modern added value is not a property of products alone but of the process. Decisive potential in business now is a question of process capability, rather than production capability. Process capability in business requires real-time systems for optimization. Business-IT needs to be developed from telecommunications and ERP to real-time services, which are not offered by the prevailing ERP systems. Today, only modern Manufacturing Execution Systems (MES) offer real-time applications. They generate current as well as historic mappings of production facilities and thus they can be used as basis for optimizations. It is important to map the supply chain in real time. Increasing complexity in production requires an integrated view of the production and service facilities: detailed scheduling, status collection, quality, performance analysis, tracing of material and so on have to be recorded and displayed in an integrated way. MES (Manufacturing Execution System) were developed in the mid-nineties. MESA (Manufacturing Execution System Association) standardized applications and appointed three application layers of production, as a principle. Further

standardizations on this subject are already being developed, like ISA S95. Expectations regarding MES are high, related to TQM, SIX Sigma, production scheduling or optimized material movements. This book describes the requirements for optimized Manufacturing Execution Systems. It gives an overview of the efficiency potentials and different applications of Manufacturing Execution Systems.

Contents:

New avenues for the effective factory.- MES for process capability.- Added value from software.- MES - the new class of IT applications.- Building an MES system.-Integrated production management with MES.- Detailed planning and control with MES.- Quality assurance with MES.- Personnel management with MES.- MES under SAP.- MES in plastics processing.- Abbreviations.- Checklist.- The authors.- Index.

【工業・生産工学：製造，機械，工具】

5 軸 NC 加工機の切断操作を最適化するための数値手法

Advanced Numerical Methods to Optimize Cutting Operations of Five Axis Milling Machines

(Springer Series in Advanced Manufacturing)

Makhanov, Stanislav S.; Anotaipaiboon, Weerachai

2007, Approx. 220 p. 113 illus., Hardcover ISBN: 978-3-540-71120-9 EUR 99.95

About this book

The book presents new optimization algorithms designed to improve the efficiency of tool paths for five-axis NC machining of sculptured surfaces. The book introduces to fundamental issues involved in the tool path planning such as the kinematics of five-axis machines, types of 5 axis machines, part surface representation, machining strips, optimal tool orientation, gouging avoidance and forward step error. The book introduces new methods of optimization based on research conducted by the authors, including schemes performed in the spatial domain, angular domain as well as procedures to optimize the initial setup. The book can be used by undergraduate and graduate students and researchers in the field of NC machining and CAD/CAM as well as by the corporate research groups for advanced optimization of cutting operations.

Contents:

Introduction to Five-Axis NC Machining.- Fundamental Issues in Tool Path Planning.- Space-Filling Curve Tool Paths.- Tool Paths in Adaptive Curvilinear Coordinates.- Optimization of Rotations.- Theory of Optimal Setup for Five-Axis NC Machining.

製造業における意志決定 グラフ理論とファジーな多基準型意思決定法の利用

Decision Making in the Manufacturing Environment Using Graph Theory and Fuzzy Multiple Attribute Decision Making Methods

(Springer Series in Advanced Manufacturing)

Rao, R.Venkata

2007, Approx. 390 p. 8 illus., Hardcover ISBN: 978-1-84628-818-0 EUR 109.95

About this book

Recent worldwide advances in manufacturing technologies led to a metamorphism in the industry. Fast-changing technologies on the product front have created a need for an equally fast response from manufacturing industries, who select manufacturing strategies, product designs, manufacturing processes, and machinery and equipment. Decision makers have the problem of assessing a range of options and selecting one based on conflicting criteria. This book shows how graph theory and matrix approach, and fuzzy multiple attribute decision making methods can be used in manufacturing. Part I introduces the decision making situations in the manufacturing environment and presents decision making methods; Part II uses case studies to illustrate the applications of these methods in real manufacturing situations. This book will interest designers, manufacturing engineers, practitioners, managers, institutes involved in design and manufacturing related projects, researchers, academics, and graduates in this field.

Contents:

Introduction to Decision Making in the Manufacturing Environment.- Graph Theory and Matrix Approach as a Decision Making Method.- Introduction to Multiple Attribute Decision Making (MADM) Methods.- A Logical Approach to Fuzzy MADM Problems.- Material Selection for a Given Engineering Application.- Evaluation of Product Designs.-

Machinability Evaluation of Work Materials.- Cutting Fluid Selection for a Given Machining Application.- Evaluation and Selection of Modern Machining Methods.- Evaluation of Flexible Manufacturing Systems.- Machine Selection in a Flexible Manufacturing Cell.- Failure Cause Analysis of Machine Tools.- Robot Selection for a Given Industrial Application.- Selection of Automated Inspection Systems.- Selection of Material Handling Equipment.- Selection of Rapid Prototyping Process in Rapid Product Development.- Selection of Software in Manufacturing Industries.- Welding Process Selection for a Given Application.- Geometric Mouldability Analysis of Parts.- Evaluation of Metal Stamping Layouts.- Selection of Forging Conditions for Forging a Given Component.- Evaluation of Environmentally Conscious Manufacturing Programs.- Environmental Impact Assessment of Manufacturing Processes.- Evaluation of Aggregate Risk in Green Manufacturing.- Selection of Best Product End-of-Life Scenario.- Integrated Project Evaluation and Selection.- Facility Location Selection.- Operational Performance Evaluation of Competing Companies.- Vendor Selection in a Supply Chain Environment.- Group Decision Making in the Manufacturing Environment.

【工業・生産工学：品質管理，信頼性】

交通システムにおける人的信頼性とヒューマンエラー

Human Reliability and Error in Transportation Systems

(Springer Series in Reliability Engineering)

Dhillon, B.S.

2007, Approx. 310 p., Hardcover ISBN: 978-1-84628-811-1 EUR 99.95

About this book:

Each year billions of dollars are being spent to develop, manufacture, and operate transportation systems such as aircraft, ships, trains, and motor vehicles throughout the world. During their operation thousands of lives are lost annually due to various types accidents. Needless to say, approximately 70 to 90 percent of transportation crashes are the result of human error to a certain degree. Moreover, it may be added that human errors contribute significantly to most transportation crashes across all modes of transportation. Human Reliability and Error in Transportation Systems is the first book to cover the subject of human reliability across all types of transportation system. The material will be accessible to readers with no previous knowledge in the field, and is supported with a full explanation of the necessary mathematical concepts together with numerous examples and test problems.

Contents:

Introduction.- Human Reliability and Error Basic Mathematical Concepts.- Introductory Human Factors.- Basic Human Reliability and Error Concepts.- Methods for Performing Human Reliability and Error Analysis in Transportation Systems.- Human Error in Railways.- Human Error in Shipping.- Human Error in Road Transportation Systems.- Human Error in Aviation.- Human Error in Aircraft Maintenance.- Mathematical Models for Predicting Human Reliability and Error in Transportation Systems.

保守管理のフレームワーク 複雑系の保守に対するモデルと方法

The Maintenance Management Framework

Models and Methods for Complex Systems Maintenance

Crespo Márquez, Adolfo

2007, Approx. 350 p. 119 illus., Hardcover ISBN: 978-1-84628-820-3 EUR 109.95

About this book:

'The Maintenance Management Framework' describes and reviews the concept, process and framework of modern maintenance management of complex systems; concentrating specifically on modern modelling tools (deterministic and empirical) for maintenance planning and scheduling. It presents a new perspective of maintenance management by: focusing on the course of maintenance actions; presenting a structure that ensures proper support for current maintenance managers; clarifying the functionality that is required from information technology when applied to maintenance and the functions of modern maintenance engineering; and creating a set of practical models for maintenance management planning and scheduling. The discussion of all of these issues is supported through the use of case studies. 'The Maintenance Management Framework' will be beneficial for engineers and professionals involved in: maintenance management, maintenance engineering, operations management, quality, etc. It will also be of interest to graduate students and researchers in this field.

Contents:

On the Definition of Maintenance Management.- Maintenance Management Characterization: Process, Framework and Supporting Pillars.- The Failure Concept.- Failure Models.- The Maintenance Concept.- Basic maintenance Models.- A Review of Key Decision Areas in Maintenance Management.- Definition of Maintenance Objectives and Strategy.- Criticality Analysis for Asset Priority Setting.- Root Cause Failure Analysis (RCFA) for High Impact Weak Points.- A Method to Design the Maintenance Plan.- Models to Deal with Maintenance Capacity Planning.- Models to Deal with Maintenance Activities Planning.- Models to Deal with Maintenance Scheduling Issues.- Overall Maintenance Management Assessment.- Failures Impact on Life Cycle Cost Analysis.- Maintenance Improvement through Organizational Efficiency.- The E-Maintenance Revolution.

【工業・生産工学:操作手順, 材料の取り扱い】

材料加工法

Advanced Methods in Material Forming

Banabic, Dorel

2007, Approx. 500 p., Hardcover ISBN: 978-3-540-69844-9 EUR 199.95

About this book:

The book contains the most relevant papers presented in the International Conference on Materials Forming, ESAFORM 2005. The list below presents some of the most successful minisymposia of the conference: -New and advanced numerical strategies in forming process simulation; -Sheet metal forming technologies and modeling; -Anisotropy and formability of materials; -Polymer processing and modeling; -Composite forming technologies and modeling; -Superplastic forming. Plenary and keynote papers were presented by well-known specialists working in the fields of sheet metal forming technology, automotive industry, modeling of the mechanical behavior as well as the fundamental and industrial research on polymeric materials. This volume gathers selected plenary and keynote papers presented in the conference, offering an up-to-date synthesis of the academic and industrial research in the fields of physical and numerical modeling of materials forming processes. The book is useful for the doctoral fellows, scientists and engineers involved in various domains of materials processing technology.

【工業・生産工学:オートメーションとロボット工学】

ロボットシステムソフトウェア工学

Software Engineering for Experimental Robotics

(Springer Tracts in Advanced Robotics Vol. 30)

Brugali, Davide (Ed.)

2007, Approx. 490 p., Hardcover ISBN: 978-3-540-68949-2 EUR 119.95

Online version available

About this book:

'Software Engineering for Experimental Robotics' collects contributions that describe the state of the art in software development for the Robotics domain. It reports on innovative ideas that are progressively introduced in the software development process, in order to promote the reuse of robotic software artifacts: domain engineering, components, frameworks and architectural styles. It illustrates the results of the most successful and well-known research projects which aim to develop reusable robotic software systems. Most of the chapters report on concepts and ideas discussed at the well attended ICRA2005 Workshop on 'Principles and Practice of Software Development in Robotics', Barcelona, Spain, April 18 2005. The authors are recognised as leading scholars internationally, and the result is an effective blend of fundamental and innovative results on research and development in software for robotic systems, where one common factor is the integration of reusable building blocks. Besides the advancement in the field, most contributions survey the state of the art, report a number of practical applications to real systems, and discuss possible future developments.

Contents:

Part I Robot Software: Principles and Challenges.- Part II Component-Based Robotics.- Part III Robotic Software Frameworks.- Part IV Software Environments for Networked Robotics.

ロボットセルのスループット最適化

Throughput Optimization in Robotic Cells

(International Series in Operations Research & Management Science Vol. 101)
Dawande, Milind W.; Geismar, H. Neil; Sethi, Suresh P.; Sriskandarajah, Chelliah
2007, Approx. 430 p., Hardcover ISBN: 978-0-387-70987-1 Approx. EUR 88.55

About this book:

Intense global competition in manufacturing has compelled manufacturers to incorporate repetitive processing and automation for improving productivity. Modern manufacturing systems use robotic cells – a particular type of computer-controlled system in cellular manufacturing. Throughput optimization in robotic cells provides practitioners, researchers, and students with up-to-date algorithmic results on sequencing of robot moves and scheduling of parts in robotic cells. It brings together the structural results developed over the last 25 years for the various realistic models of robotic cells. After describing industrial applications of robotic cells and presenting fundamental results about cyclic production, several advanced features, such as dual-grippers, parallel machines, multi-part-type production, and multiple robots, are treated. Important open problems in the area are also identified. This book is an excellent text for use in a graduate course or a research seminar on robotic cells.

Contents:

Robotic Cells in Practice –A Classification Scheme for Robotic Cell Scheduling –Cell Data –Cyclic Production –Dual Gripper Robots –Parallel Machines –Multiple Part-Types Production: Single Gripper Robots –Multiple Part-Types Production: Dual Gripper Robots –No-wait Robotic Cells –Interval Robotic Cells –Implementation Issues –Open Problems –Index.

【電子・情報工学: マイクロ波, 高周波】

ワイヤレスマルチギガヘルツアプリケーション用の CMOS シングルチップ高速ホッピング周波数シンセサイザー設計法・解析・実装

CMOS Single Chip Fast Frequency Hopping Synthesizers For Wireless Multi-Gigahertz Applications

Design Methodology, Analysis, and Implementation

(Analog Circuits and Signal Processing)

Bourdi, Taoufik; Kale, Izzet

2007, Approx. 235 p., Hardcover ISBN: 978-1-4020-5927-8 EUR 99.95

About this book:

Recently, wireless LAN standards have emerged in the market. Those standards operate in various frequency ranges. To reduce component count, it is of importance to design a multi-mode frequency synthesizer that serves all wireless LAN standards including 802.11a, 802.11b and 802.11g standards. With different specifications for those standards, designing integer-based phase-locked loop frequency synthesizers can not be achieved. Fractional-N frequency synthesizers offer the solution required for a common multi-mode local oscillator. Those fractional-N synthesizers are based on delta-sigma modulators which in combination with a divider yield the fractional division required for the desired frequency of interest. In **CMOS Single Chip Fast Frequency Hopping Synthesizers for Wireless Multi-Gigahertz Applications**, the authors outline detailed design methodology for fast frequency hopping synthesizers for RF and wireless communications applications. Great emphasis on fractional-N delta-sigma based phase locked loops from specifications, system analysis and architecture planning to circuit design and silicon implementation. The book describes an efficient design and characterization methodology that has been developed to study loop trade-offs in both open and close loop modelling techniques. This is based on a simulation platform that incorporates both behavioral models and measured/simulated sub-blocks of the chosen frequency synthesizer. The platform predicts accurately the phase noise, spurious and switching performance of the final design. Therefore excellent phase noise and spurious performance can be achieved while meeting all the specified requirements. The design methodology reduces the need for silicon re-spin enabling circuit designers to directly meet cost, performance and schedule milestones. The developed knowledge and techniques have been used in the successful design and implementation of two high speed multi-mode fractional-N frequency synthesizers for the IEEE 801.11a/b/g standards. Both synthesizer designs are described in details.

Contents:

1: Introduction.- 2: Wireless Communication Systems.- 3: Phase Lock Loop Frequency Synthesizer Principles.- 4: System Simulation of D-S Based Fractional-N Synthesizers.- 5: Multi-Mode D-S Based Frequency Synthesizer.- 6: Improved Performance Fractional-N Frequency Synthesizer Architecture.

【電子・情報工学:エレクトロニクス/マイクロエレクトロニクス/器械研究】

半導体における分極効果 初歩の理論からデバイスの応用まで

Polarization Effects in Semiconductors

From Ab Initio Theory to Device Application

Wood, Colin (Ed.)

2007, Approx. 350 p., Hardcover ISBN: 978-0-387-36831-3 Approx. EUR 99.35

About this book:

This book presents the latest understanding of the solid physics, electronic implications and practical applications of the unique spontaneous or pyro-electric polarization charge of hexagonal semiconductors, and the piezo-electric effects in thin film hetero-structures which are used in wide forbidden band gap sensor, electronic and opto-electronic semiconductor devices. The book chapters will be authored primarily by the physics, applied physics and electrical engineering professors and students who worked for 5 years under the 'Polarization Effects in Semiconductors' DOD funded Multi Disciplinary University Research Initiative. The book covers ab initio theory of polarization in cubic and hexagonal semiconductors, growth of thin film GaN, and GaN/AlGaIn GaAlN/ AlGaInN and other nitride, and SiC hetero-structures; graded structures for distributed piezo-electric charge, electrical and electronic characterization of polarization charge and charge distribution by scanning-probe spectroscopies, gauge factors and strain effects. Polarization in extended defects and device effects; Piezo-electric strain / charge engineering and application to device design and processing: ohmic, and Shottky diodes, drift, diffusion, low and high field carrier dynamics in plane and normal to thin film and polarization engineered semiconductor hetero-structures are also covered.

Contents:

Wannier Functional Theory Approach to Polarization Effects.- Piezo, Pyro, and Ferro-Electric Device Concepts.- Distributed Piezo, Pyro, and Ferro-electric polarization.- Local and Surface Polarization Effects on Devices.- Polarization Effects in MBE Growth, Heterojunctions and Sensors.- SiC Hetero-Polytype Junctions and Polarization Probe Spectroscopy.- HEMT Devices and Amplifiers Based Upon Polarization Effects.- Novel Heterostructure Polarization Effect Devices.

【電子・情報工学:通信工学, ネットワーク】

ワイヤレスネットワークにおける協調:原理と応用 真に利己的な行為は協調することだ!

Cooperation in Wireless Networks: Principles and Applications

Real Egoistic Behavior is to Cooperate!

Fitzek, Frank H.P.; Katz, Marcos D. (Eds.)

1st ed. 2006. 2nd printing., 2007, LII, 641 p., Hardcover ISBN: 978-1-4020-4710-7 EUR 89.95

About this book:

Cooperation in Wireless Networks: Principles and Applications covers the underlying principles of cooperative techniques as well as several applications demonstrating the use of such techniques in practical systems. The work is written in a collaborative manner by several authors from Asia, America, and Europe. Twenty chapters introduce and discuss in detail the main cooperative strategies for the whole communication protocol stack from the application layer down to the physical layer. Furthermore power saving strategies, security, hardware realization, and user scenarios for cooperative communication systems are introduced and discussed. The book also summarizes the strength of cooperation for upcoming generation of wireless communication systems, clearly motivating the use of cooperative techniques and pointing out that cooperation will become one of the key technologies enabling 4G and beyond. This book puts into one volume a comprehensive and technically rich view of the wireless communications scene from a cooperation point of view.

Contents:

1. Cooperation in Nature and Wireless Communications.- 2. Cooperative Communications.- 3. Cooperation, Competition and Cognition in Wireless Networks.- 4. Cooperation Techniques in Cross-layer Design.- 5. Network Coding in Wireless Networks.- 6. Cooperative Diversity: Models, Algorithms, and Architectures.- 7. Cooperation in Ad-Hoc Networks.- 8. Multi-route and Multi-user Diversity in Infrastructure-based Multi-hop Networks.- 9. Cognitive Radio Architecture.- 10 Stability and Security in Wireless Cooperative Networks.- 11. Power Consumption and Spectrum Usage Paradigms in Cooperative Wireless Networks.- 12. Cooperative Antenna Systems.- 13. Distributed

Antennas: The Concept of Virtual Antenna Arrays.- 14. Cooperation in 4G Networks.- 15. Cooperation in IEEE 802 Standards.- 16. Cooperative Communication with Multiple Description Coding.- 17. Cooperative Header Compression.- 18. Energy Aware Task Allocation in Cooperative Wireless Networks.- 19. Cooperative Coding.- 20. Cooperative Methods for Spatial Channel Control.- Index.

モバイルでワイヤレスのネットワークのセキュリティとプライバシー

Mobile and Wireless Network Security and Privacy

Makki, Kia; Makki, Kami; Reiher, Peter; Pissinou, Niki; Makki, Shamila (Eds.)

2007, Approx. 200 p., Hardcover ISBN: 978-0-387-71057-0 Approx. EUR 99.35

About this book:

Security in mobile and wireless ad-hoc networks has become a major concern at both the national and international levels, not only because of the increase in the sensitive data and applications which are transmitted within mobile ad-hoc networks, but also because of the dynamically self-organized network topologies and the principally missing infrastructure which generates huge complexity to achieve a secure communications and to ensure proper behavior of entire nodes in the network. For example, achieving connection anonymity and establishing security associations based on distributed trust among nodes in wireless ad hoc networks are only some of the challenging and important issues where routing of data packets require cooperation of all the network nodes for planning and establishment of a secure routing solution. These concerns are due to the increase in potential damage that can be done to these networks, from both traditional security threats that have not been adequately addressed and the new security threats inadvertently created from the new services available in these networks. Although solutions to the traditional network communication security issues seem to be more or less available, modern security threats seem to demand additional research efforts. The use of wireless services by the general public needs to address in depth privacy issues that have been raised by several user groups. For example, trust and/or distrust relationships in the Internet and in pervasive infrastructures are key factors to enable dynamic interaction and cooperation of various users, systems and services. This book brings together a number of papers, which represent seminal contributions underlying mobile and wireless network security and privacy. It provides a foundation for implementation and standardization as well as further research. The diverse topics and protocols described in this book give the reader a good idea of the current state-of-the-art technologies in mobile and wireless network security and privacy. The authors of each chapter are among the foremost researchers or practitioners in the field.

Contents:

Security and Privacy for Mobile and Wireless Networks.- Pervasive System: Enhancing Trust Negotiation with Privacy Support.- An Overview of Models Applying Trust Management as a Component of Security Services in MANETs.- A Framework for Computing Trust in Mobile Ad Hoc Networks.- Reactive and Proactive Approaches to Secure Routing in MANETs.- Towards Efficient Solutions to Resist Mobile Traffic Sensors: How Much Performance Cost is Paid by On-Demand Anonymous Routing Protocols.- Computing Ecology: Responding to Mobile Worms with Location0Based Quarantine Boundaries.- Approaches for Ensuring Security and Privacy in Unplanned Ubiquitous Computing Interaction.- Mobile Handset Authentication and Authorization in Distributed Wireless Environments.- Hardware/Software Solution to Improve Security in Mobile Ad-Hoc Networks.- An Anonymous MAC Protocol for Wireless Ad-Hoc Networks.- Opportunity Networks: The Concept and Research Challenges in Privacy and Security.- Optimizing Cost-Sensitive Trust-Negotiation Protocols.

【電子・情報工学:制御工学】

通信ネットワーク上の評価と制御

Estimation and Control over Communication Networks

(Control Engineering)

Matveev, Alexey S.; Savkin, Andrey V.

2007, Approx. 470 p. 60 illus., Hardcover ISBN: 978-0-8176-4494-9 Approx. EUR 72.00

About this book:

Advances in communication technology have led to large-scale control systems with distribution of control tasks among several processors via communication channels. Classical estimation and control theory via communication channels commonly decoupled the problems of estimation and control from communication issues. Although this approach simplifies classical models for infinite precision communication, newer engineering systems require a

systematic theory that takes into account limitations of the communication channels. This self-contained monograph covers the latest achievements in the area. The presentation offers accessible mathematical models and results for graduates, researchers, lecturers, practitioners, and advanced undergraduates in the fields of electrical, mechanical, control, computer, and communications engineering, as well as applied mathematics and computer science.

Contents:

Introduction.-Topological Entropy, Observability, Robustness, Stabilizability and Optimal Control.-Stabilization of Linear Multiple Sensor Systems via Limited Capacity Communication Channels.-Detectability and Output Feedback Stabilizability of Nonlinear Systems via Limited Capacity Communication Channels.-Robust Kalman State Estimation via Limited Capacity Communication Channels.- An Analog of Shannon Information Theory for Networked Control Systems: Estimation and Stabilization via Noisy Discrete Channels.-An Analog of Shannon Information Theory for Networked Control Systems: Zero Error Channel Capacity and Systems with Disturbances.-Decentralized Stabilization of Linear Systems via Complex Communication Networks.-H-infinity State Estimation via Communication Channels.-Kalman State Estimation via Asynchronous Communication Channels.- Linear-Quadratic Gaussian Optimal Control via Limited Capacity Communication Channels.-Optimal State Estimation in Networked Systems with Asynchronous Communication Channels and Switched Sensors.-Robust Kalman State Estimation in Networked Systems with Switched Sensors.-References.-Index.

【電子・情報工学:信号処理】

マルチレートな統計的信号処理

Multirate Statistical Signal Processing

(Signals and Communication Technology)

Jahromi, Omid S.

2007, Approx. 250 p., Hardcover ISBN: 978-1-4020-5316-0 EUR 109.95

About this book:

Multirate Statistical Signal Processing introduces a statistical theory for extracting information from several related signals that have different sampling rates. This new theory generalizes the conventional (deterministic) theory of multirate systems beyond many of its constraints. Furthermore, it allows for the formulation and solution of several new problems such as spectrum estimation, time-delay estimation and sensor fusion in the realm of multirate signal processing. The author presents background material, key principles, potential applications and leading-edge research while striking the appropriate balance between clarity and brevity. The book is self-contained and provides a valuable resource for signal processing researchers, graduate students and practicing engineers.

Contents:

1. Introduction. 2. Background. 3. Multirate Spectrum Estimation. 4. Multirate Time Delay Estimation. 5. Multirate Signal Estimation. 6. Algebraic Theory of Scalable Multirate Systems. 7. Information Theory of Multirate Systems. 8. Distributed Algorithms. 9. Epilogue.

信号処理へのインタラクティブな入門

An Interactive Multimedia Introduction to Signal Processing

Karrenberg, Ulrich

2nd arranged and supplemented ed., 2007, Approx. 470 p. With CD-ROM., Softcover ISBN: 978-3-540-49152-1 EUR 79.55

About this book:

Together the book and CD-ROM form a learning system that provides both investigative studies and the visualization of complex processes. A didactic concept is undertaken for microelectronics, computer technology and communication engineering, which deals with the visualization of signals and processes in addition to graphical programming of signal processing systems. Through the utilization of a professional and globally supported software for metrology and control engineering, DasyLab, useful applications can be developed, modified and optimized. Computer supported processing of real signals is made possible over the sound card and the parallel port. Over two hundred pre-programmed signal engineering systems and design transparencies are provided. Pictures also play a dominant role in this book: there are numerous introduction-videos, one for every chapter, more than 250 high-quality pictures and - most important - all the „living' experiments and their results are visualized. With this learning system, readers can now make use of „equipment' and software, which was practically unaffordable for individuals in the past. What's more, here is a very new concept for learning Signal Processing, not only from the

physically-based scientific fundamentals, but also from the didactic perspective, based on modern results of brain research.

Contents:

Introduction.- The Concept: Methods, Contents, Objectives.- Signals in the time and frequency domain.- The Uncertainty Principle.- Language as a carrier of information.- The Symmetry Principle.- System analysis.- Linear and non-linear processes.- Classical modulation procedures.- Digitalisation.- Digital filters.- Digital transmission technology I: Source encoding.- Digital transmission technology II: Channel encoding.- Digital Transmission Techniques III: Modulation.- Bibliography.- Index.

【回路/システム】

0.5V のアナログ回路設計テクニック

Analog Circuit Design Techniques at 0.5V

(Analog Circuits and Signal Processing)

Chatterjee, Shouri; Kinget, Peter; Tsvividis, Yannis; Pun, K.P.

2007, Approx. 200 p., Hardcover ISBN: 978-0-387-69953-0 Approx. EUR 92.40

About this book:

The International Technology Roadmap for Semiconductors (ITRS) forecasts a strong downwards evolution of the power supply voltages for integrated circuits using nanoscale devices to maintain reliability. It is projected that in a decade technologies with feature sizes of 22nm will be available with supply voltages down to 0.5V. This book tackles challenges for the design of analog integrated circuits that operate from ultra-low power supply voltages (down to 0.5V). All design techniques presented are true low voltage techniques - all nodes in the circuits are within the power supply rails. Current books on low voltage analog design typically cover techniques for supply voltages down to approximately 1V. This book presents novel ideas and results for operation from much lower supply voltages. The design of operational transconductance amplifiers (OTAs) is used as a vehicle to demonstrate the signal processing circuit and circuit biasing approaches. These amplifiers are then used to build analog system functions including continuous time filter and a sample and hold amplifier. The techniques presented are basic circuit techniques that are widely applicable beyond the scope of the presented examples.

Contents:

Introduction.- 0.5V Fully Differential Operation Transconductance Amplifiers (OTAs).- Weak Inversion MOS Varactors for Tunable Integrators at 0.5V.- 0.5V 5th-Order Low-Pass Elliptic Filter.- 0.5V Track-and-Hold (T/H) Circuit.- Conclusions and Suggestions for Future Work.

ウルトラワイドバンドー回路, トランシーバー, システム

Ultra Wideband - Circuits, Transceivers and Systems

(Series on Integrated Circuits and Systems)

Gharpurey, Ranjit; Kinget, Peter (Eds.)

2007, Approx. 225 p., Hardcover ISBN: 978-0-387-37238-9 Approx. EUR 87.80

About this book:

Ultra Wideband – Circuits, Transceivers and Systems is a compilation of chapters on various aspects of Ultra Wideband. The topics covered include: An overview of circuit techniques for broadband applications which provides a comparative analysis of various broadband implementations for different parts of the transceiver such as amplifiers, oscillators and filters. System proposals for Ultra Wideband: This material includes a historical perspective of the development of Ultra Wideband, starting with the earliest proposals to the FCC, and describing the current state of the art, including the OFDM and pulse based approaches to Ultra Wideband. Ultra Wideband – Circuits, Transceivers and Systems includes three chapters on Ultra Wideband transceiver implementations. Two chapters cover pulse-based systems and another presents an implementation for the WiMedia/MBOFDM approach. One chapter discusses the implementation of the physical layer baseband, including the ADC and post-ADC processing required in the UWB system. Future advances such as multiantenna UWB solutions are also discussed. Each chapter is authored by leading experts from industry and academia.

Contents:

Introduction to UWB and Circuit Design for Broadband Wireless Circuits.- Overview of the Communication Systems Aspects of UWB; UWB Standards Evolution; and Current Standards Proposals.- Multiple Antenna Ultra Wideband;

Receiver Baseband Processing.- UWB Transceiver Implementations for Pulse Based Systems; System Level and Implementation.- UWB Transceiver Implementation for MBOFDM Application; Receiver Front-End; Frequency Synthesis for MBOFDM

CMOS バイオテクノロジー

CMOS Biotechnology

(Series on Integrated Circuits and Systems)

Lee, Hakho; Ham, Donhee; Westervelt, Robert M. (Eds.)

2007, Approx. 450 p., Hardcover ISBN: 978-0-387-36836-8 Approx. EUR 99.35

About this book:

Today's semiconductor integrated circuits can contain over 100 million transistors, operate at GHz speeds, process Gbyte data, and can be manufactured inexpensively. These advantages have allowed ICs to become one of the most significant enabling technologies of this time, lying at the heart of today's advanced computers, communication systems, and multimedia hardware. Lately, there has been a growing interest in exploiting the benefits of the ICs for areas outside of the traditional application spaces. One notable area is found in biology. Bioanalytical instruments have been miniaturized on ICs to study various biophenomena or to actuate biosystems. These biolab-on-IC systems utilize the IC to facilitate faster, repeatable, and standardized biological experiments at low cost with a small volume of biological sample. The research activities in this field are expected to enjoy substantial growth in the foreseeable future. BioCMOS Technologies reviews these exciting recent efforts in joining CMOS technology with biology.

Contents:

CMOS Bio Actuators.- Microfluidics for Electrical Engineers.- IC/Microfluidics Hybrid Systems.- Magnetophoresis.- CMOS Magnetophoresis.- Dielectrophoresis.- CMOS Dielectrophoresis.- CMOS Nuron and Heart Cell Sensor.- CMOS Neural Recording.- CMOS DNA Sensor.- CMOS Imager for Biology.- Implantable CMOS Biosensor.- CMOS NMR and ESR.- Nanomechanical Biosensors.

通信用アナログ集積回路 原理・シミュレーション・設計

Analog Integrated Circuits for Communication

Principles, Simulation and Design

Pederson, Donald O.; Mayaram, Kartikeya

2nd ed., 2007, Approx. 650 p., Hardcover ISBN: 978-0-387-68029-3 Approx. EUR 77.00

About this book:

This book is on the analysis and design of nonlinear analog integrated circuits that form the basis of present-day communication systems. The material is intended to be a textbook for class use but should also be a valuable source of information for a practicing engineer. Both bipolar and MOS transistor circuits have been analyzed and many numerical examples are used to illustrate the analysis and design techniques developed in this book. Problem sets at the end of each chapter emphasize the subject matter covered in the chapter. The readers are expected to have had an introductory course in analog circuits - so that they are familiar with some of the basic analysis techniques and also with the operating principles of the various semiconductor devices. A brief review of some of these topics is provided in the book. Important basic circuits and concepts are reviewed as the subject matter is developed. The approach taken is as follows: first-order analysis techniques are developed first using basic principles and simple device models. Then circuit simulation is used to corroborate the analysis techniques. This procedure provides insight into the operation of circuits and a systematic way of obtaining an initial design of a circuit. The circuit simulation program Spice has been extensively used to verify the results of first-order analyses, and for detailed simulations with complex device models. In this manner the reader can appreciate the shortcomings of the hand analysis and use simulations when necessary. Simulation results can only be interpreted once one has an understanding of how a circuit operates and this is reflected by the manner in which the material is presented. Spice input file listings are provided for all the circuits that have been analyzed so that the reader can quickly verify the results.

Contents:

Review.- Large-Signal Performance.- Amplifier Power Series.- Distortion Generation.- Distortion in Feedback Amplifiers.- Basic IC Output Stages.- Transformers.- Tuned Circuits.- Simple Band pass Amplifiers.- Basic Electronic Oscillators.- Electronic Oscillators.- Relaxation and Voltage-Controlled Oscillators.- Analog Multipliers, Mixers, Modulators.- Demodulators and Detectors.- Phase-Locked Loops.

カーボンナノチューブエレクトロニクス

Carbon Nanotube Electronics

(Series on Integrated Circuits and Systems)

Javey, Ali; Kong, Jing (Eds.)

2007, Approx. 350 p., Hardcover ISBN: 978-0-387-36833-7 Approx. EUR 76.25

About this book:

本書では、カーボンナノチューブエレクトロニクス分野の全容を紹介している。材料および物理的な特性、合成および加工の過程、デバイスと回路、モデル化、ナノチューブベースのエレクトロニクスの新たな応用をカバーしている。1-D エレクトロニクスの根本的なデバイス物理学と回路の概念を紹介する一方で、化学センサ、バイオセンサ、オプトエレクトロニクス、フレキシブルマクロエレクトロニクスなどの最新のナノチューブデバイスや新たな工学的な応用の例も提供している。ナノチューブエレクトロニクス分野の完全なガイドである。(84)

Contents:

Remarkable Electronic Properties and Integration.- Devices and Circuits.- Modeling.- Novel Applications.- Outlook and Future Challenges.

ESTEREL のコンパイル

Compiling ESTEREL

Potop-Butucaru, Dumitru; Edwards, Stephen A.; Berry, Gerard

2007, Approx. 335 p., Hardcover ISBN: 978-0-387-70626-9 EUR 89.95

About this book:

Designed as the definitive reference on the compilation of the Esterel synchronous reactive real-time language, Compiling Esterel covers all aspects of the language and includes a tutorial, a reference manual, its formal semantics, and detailed technical information about the many techniques used to compile it. Esterel is based on the simple idea of providing a software language that has a synchronous model of time. That is, the execution of the program is divided into discrete instants, and statements are either guaranteed to execute in a single instant, or take multiple instants as requested by the programmer. Suitable for programming safety-critical real-time systems, Esterel and its model of computation have found use in industrial applications such as avionics, integrated circuit design, and other safety-critical environments. While this book does not assume prior knowledge of the Esterel language, readers will appreciate having prior knowledge of programming language semantics and compiler technology, along with some familiarity with synchronous digital hardware design. Researchers as well as advanced developers will find this book essential for understanding Esterel at all levels.

Contents:

Preface.- I The Esterel Language.- 1 Introduction to Esterel.- 2 The Esterel Language.- II Formal Semantics.- 3 Introduction to Esterel Semantics.- 4 Constructive Behavioral Semantics.- 5 Constructive Operational Semantics.- 6 Constructive Circuit Translation.- III Compiling Esterel.- 7 Overview.- 8 The GRC Intermediate Format.- 9 Code Generation from GRC.- 10 The Columbia Compiler.- Appendices.- A Language Extensions.- B An Esterel Reference Manual.- C The C Language Interface.- Esterel V7.- Bibliography.- Index.

高速デジタル回路に対するタイミングの最適化

Timing Optimization for High-Speed Digital Circuits

Kourtev, Ivan S.; Friedman, Eby G.; Taskin, Baris

2007, Approx. 300 p., Hardcover ISBN: 978-0-387-71055-6 Approx. EUR 99.35

About this book:

The focus of this book is on timing analysis and optimization techniques for circuits with level-sensitive memory elements (registers). Level-sensitive registers are becoming significantly more popular in practice as integrated circuit densities are increasing and the 'performance-per-power' metric for integrated circuits becomes a key issue. Therefore, techniques for understanding level-sensitive based circuits and for optimizing the performance of such circuits are increasingly important. The book includes the following major topics in the timing analysis and optimization of level-sensitive circuits: A linear programming (LP) formulation applicable to the timing analysis of large scale circuits.

The formulation uses a variation of the big M method - called the modified big M method - to transform the non-linear constraints in the problem formulation into solvable linear constraints. This LP formulation is computationally efficient and demonstrates significant circuit performance improvement. By making maximum use of cycle stealing, operation at a higher clock frequency (reduced clock period) is possible. A delay insertion methodology that improves the efficiency of clock skew scheduling in level-sensitive circuits. It is shown that re-convergent paths limit the improvement of circuit performance that can be achieved through clock skew scheduling. The described delay insertion method mitigates the limitations cause by re-convergent data paths and improves the results of timing optimization (for increased clock frequency). A summary of circuit partitioning, placement and synchronization methodologies that enables the implementation of high speed, low power circuits synchronized with ultra modern resonant clocking technology (such as traveling oscillators/waves). The described framework includes the particular circuit partitioning and placement methodologies that permit the hierarchical application of non-zero clock skew system timing in resonant clocking based circuits. A framework for and results from implementing the described timing optimization algorithms in a parallel computing environment. As multi-core microprocessors become commonplace, computationally intense algorithms can benefit greatly by exploiting this available parallelism. The framework uses a heuristic approach to generate circuit partition and solve them independently on processors/computers working on parallel. This is one of the first such applications of explicit parallelism in Electronic Design Automation (EDA), and, will be of great interest to practicing EDA engineers.

Contents:

Introduction.- VLSI Systems.- Signal Delay in VLSI Systems.- Timing Properties of Synchronous Systems.- Clock Tree Synthesis and Clock Skew Scheduling.- Clock Scheduling for Improved Reliability.- Simultaneous Delay Insertion with Clock Scheduling.- Practical Considerations.- Clock Skew Scheduling on Rotary Clocking Technology.- Experimental Results.

低出力組込みプロセッサのためのメモリ最適化テクニック

Advanced Memory Optimization Techniques for Low-Power Embedded Processors

Verma, Manish; Marwedel, Peter

2007, Approx. 170 p., Hardcover ISBN: 978-1-4020-5896-7 Approx. EUR 89.95

About this book:

The design of embedded systems warrants a new perspective because of the following two reasons: Firstly, slow and energy inefficient memory hierarchies have already become the bottleneck of the embedded systems. It is documented in the literature as the memory wall problem. Secondly, the software running on the contemporary embedded devices is becoming increasingly complex. It is also well understood that no silver bullet exists to solve the memory wall problem. Therefore, this book explores a collaborative approach by proposing novel memory hierarchies and software optimization techniques for the optimal utilization of these memory hierarchies. Linking memory architecture design with memory-architecture aware compilation results in fast, energy-efficient and timing predictable memory accesses. The evaluation of the optimization techniques using real-life benchmarks for a single processor system, a multiprocessor system-on-chip (SoC) and for a digital signal processor system, reports significant reductions in the energy consumption and performance improvement of these systems. The book presents a wide range of optimizations, progressively increasing in the complexity of analysis and of memory hierarchies. The final chapter covers optimization techniques for applications consisting of multiple processes found in most modern embedded devices. **Advanced Memory Optimization Techniques for Low Power Embedded Processors** is designed for researchers, compiler writers and embedded system designers / architects who wish to optimize the energy and performance characteristics of the memory subsystem.

Contents:

1.Introduction.- 2.Related Work.- 3.Memory Aware Compilation and Simulation Framework.- 4.Non-Overlaid Scratchpad Allocation Approaches for Main / Scratchpad Memory Hierarchy.- 5.Non-Overlaid Scratchpad Allocation Approaches for Main / Scratchpad + Cache Memory Hierarchy.- 6. Scratchpad Overlay Approaches for Main / Scratchpad Memory Hierarchy.- 7. Data Partitioning and Loop Nest Splitting.- 8. Scratchpad Sharing Strategies for Multiprocess Applications.- 9. Conclusions and Future Work.- A.Theoretical Analysis for Scratchpad Sharing Strategies.- References.

最新回路配置 最良の方法とその結果

Modern Circuit Placement

Best Practices and Results

(Series on Integrated Circuits and Systems)

Cong, J.; Nam, Gi-Joon (Eds.)

2007, Approx. 275 p., Hardcover ISBN: 978-0-387-36837-5 Approx. EUR 99.35

About this book:

This book will cover the advanced techniques in placement which is known as one of the most important components of physical design flow in VLSI design. Physical design addresses the back-end layout stage of chip design process. As the technology scales down, the importance of interconnect optimization becomes more important than ever, and physical design, particularly placement process, stands in the center of interconnect optimization. It will have three unique characteristics compared against other books on design automation or physical design: 1) Focusing solely on most recent placement techniques: The placement process is no longer considered as a point tool within physical design process, particular for timing closure. The industrial trend in physical design is to integrate design optimization techniques such as buffering, gate sizing, or even logic synthesis techniques with placement process. Thus, we cannot overemphasize the important of placement techniques for VLSI timing closure. However, most design automation books allocate one or two chapters for placement only treating the general concepts. Unfortunately, placement has been researched for decades, and most of those concepts are out of date. The purpose of this book is to address all of most recent placement techniques available in the field. 2) Comprehensiveness: Although the book is dedicated to a single topic of placement, the goal of this book is to address all the techniques being used in the field. Recently during ISPD (International Symposium on Physical Design: the conference focusing on physical design process), we had the placement contest where academic placement tools have competed each other on the same industrial benchmark circuits. This book will include all the academic placement tools participated in this contest. Although these are academic placement tools, these techniques are extensively being used in industrial tools too. Thus, it is safe to say that these techniques represents today's advanced placement techniques. 3) (Indirect) comparison among techniques: This book is based on the ISPD placement contest where all these the participating placement tools were run on the same set of industrial benchmark circuits. Therefore, fair comparison can be made among these techniques. The book is expected to provide significant amounts of analysis on each technique such as trade-offs between quality-of-results (QoR) and runtime. 4) Optimality analysis: Recently PEKO synthetic benchmarks drew a lot of attention because they provide the first method to analyze the optimality of placement results. We're going to use the similar benchmarks to analyze the optimality of these placement techniques. As far as we know, this is the almost first time to include the optimality issue of placement techniques in text book.

Contents:

Introduction and Benchmarks.- Introduction.- ISPD and PEKO benchmarks.- Flat Placement Techniques.- DAPlace.- FastPlace.- KraftWerk.- Recursive Top-down Partitioning Techniques.- Capo.- Dragon.- NTUPlace.- Multilevel Method.- Aplace.- mFAR.- mPL.

デジタル VLSI システム設計 Verilog を用いた FPGA と ASIC のプロジェクトの実装設計マニュアル

Digital VLSI Systems Design

A Design Manual for Implementation of Projects on FPGAs and ASICs using Verilog

Ramachandran, Seetharaman

2007, Approx. 500 p. With CD-ROM., Hardcover ISBN: 978-1-4020-5828-8 EUR 109.95

About this book:

The book presents new material and theory as well as synthesis of recent work with complete Project Designs using industry standard CAD tools and FPGA boards, enabling the serious readers to design VLSI Systems on their own. The reader is taken step by step through the design right from implementing a single digital gate to a massive design consuming well over 100,000 gates. The Verilog codes developed for these designs are universal and can work on any FPGA or ASIC and are technology independent. The book presents the development of novel algorithms and architectures for optimum realization of high tech. products. All the design codes developed in this book are Register Transfer Level (RTL) compliant and can be readily used or amended to suit new projects.

Contents:

Preface.- Chapter 1 Introduction to Digital VLSI Systems Design.- Chapter 2 Review of Digital Systems Design.- Chapter 3 Design of Combinational and Sequential Circuits using Verilog.- Chapter 4 Writing a Test Bench for the Design.- Chapter 5 RTL Coding Guidelines.- Chapter 6 Simulation of Designs – Modelsim Tool.- Chapter 7 Synthesis of Designs – Synplify Tool.- Chapter 8 Place and Route and Back annotation – Xilinx Tool.- Chapter 9 Design of Memories.- Chapter 10 Arithmetic Circuit Designs.- Chapter 11 Development of Algorithms and Verification using High Level Languages.- Chapter 12 Architectural Design.- Chapter 13 Project Design.- Chapter 14 Hardware Implementations using FPGA and I/O boards.- Chapter 15 Projects suggested for FPGA/ASIC Implementations.

アサーションベースの IP の創造

Creating Assertion-Based IP

(Series on Integrated Circuits and Systems)

Foster, Harry D.; Krolnik, Adam C.

2007, Approx. 200 p., Hardcover ISBN: 978-0-387-36641-8 Approx. EUR 100.10

About this book:

A project's functional verification testplan is the specification for the verification process. Developing this testplan usually involves the entire engineering team (architects, designers, and verification engineers). In general, the verification testplan defines exactly what functionality will be verified, how it will be verified (the verification strategy and resource allocation), and when the verification process is complete (for example, metrics for measuring progress or completion criteria). Without a verification testplan, it is unlikely that a verification team will achieve first-time verification success in both schedule and quality. Given that today's ASIC design flows often involve aggressive development schedules combined with limited verification resources, it is critical for the verification team to plan an appropriate verification solution that effectively targets each verification challenge. However, while the process of simulation-based testplanning is well understood in a traditional verification environment, the process of formal-based testplanning is generally not well understood due to the lack of industry formal experience and published formal-based testplanning guidelines. As verification teams consider the option of integrating functional formal verification tools into their flow, the lack of a formal-based testplan often results in ad hoc verification results, with a questionable return on investment. This testplanning is critical in projects with a fixed time and resource budget for all verification activities. This book will present formal testplanning guidelines with examples focused on creating assertion-based verification IP. Note that there are many books published on assertion languages (such as SystemVerilog assertions and PSL). Yet, none of them discuss the important process of testplanning and using these languages to create verification IP. This will be the first book published on this subject.

Contents:

Foreword.- Preface.- Introduction.- Testplanning process and verification IP.- Assertion language review.- Bus-based design example.- Bus interfaces.- Arbiters.- Datapath.- Controllers.- Bibliography.- Index.

A/D 変換器と D/A 変換器

Advanced Analog-to-Digital and Digital-to-Analog Convertors

Gulati, Kush; Lee, Hae-Seung (Eds.)

2007, Approx. 300 p., Hardcover ISBN: 978-0-387-71053-2 Approx. EUR 99.35

About this book:

This advanced reference book provides a compilation of innovative data conversion techniques from a research group that has been critically shaping the evolution of analog-to-digital converter design for two decades. It presents a wealth of creative approaches across a number of different technologies, including CMOS, BiCMOS, CCD/CMOS, and Josephson technologies. The topics cover most popular architectures including the pipeline, delta-sigma, successive-approximation, flash and algorithmic converters. Advanced Analog-Digital Conversion delves into a variety of architectural techniques that lead to reduced power consumption and improved linearity and signal-to-noise ratio of data-converters. These include self-calibration, commutative feedback and mismatch-shaping techniques. It outlines methods to construct data converters with flexible converter resolution and bandwidth that can morph across a multitude of converter architectures. It details methods to minimize and shape the noise experienced by sensitive analog circuits in large SoCs through the use of delta-sigma techniques. Advanced Analog-Digital Conversion introduces the reader to new paradigms in data conversion by exploiting strengths of technologies while avoiding their weaknesses. They include precision switched-capacitor circuit design without the

use of opamps in scaled CMOS, analog signal processing in the charge domain in CCD/CMOS, and circuits built with superconducting elements. Each of these innovations stand at the forefront of revolutionizing the way circuits may be designed in the future in their respective technology. This book captures the essence of how data converters can be designed incorporating these paradigms.

Contents:

An Overview of Analog-to-Digital Conversion.- Self-Calibrating Successive-Approximation ADCs.- Digital Self-Calibration Techniques for Pipeline ADCs.- Low-Power Design Techniques for A/D Conversion.- Mismatch Shaping Pipeline ADCs.- Reconfigurable A/D Conversion.- Substrate Noise Shaping.- Charge-to-Digital Data Conversion.- High-Speed Flash ADCs.- Superconducting Bandpass ADCs.- Radio Frequency DAC.- Comparator-Based Switched-Capacitor Circuits for Scaled CMOS Technologies.- Conclusions.