ENGINEERING

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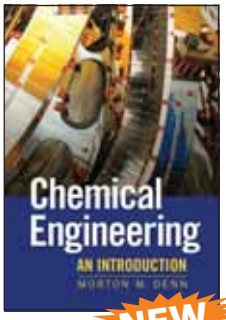
CONTENTS

GENERAL ENGINEERING

Chemical Engineering
An Introduction

Morton Denn
City College, City University of New York



"Chemical engineering is the field of applied science that employs physical, chemical, and biochemical rate processes for the betterment of humanity." This opening sentence of Chapter 1 is the underlying paradigm of chemical engineering. *Chemical Engineering: An Introduction* is designed to enable the student to explore the activities in which a modern chemical engineer is involved by focusing on mass and energy balances in liquid-phase processes. Applications explored include the design of a feedback level controller, membrane separation, hemodialysis, optimal design of a process with chemical reaction and separation, washout in a bioreactor, kinetic and mass transfer limits in a two-phase reactor, and the use of a membrane reactor to overcome equilibrium limits on conversion. Mathematics is employed as a language at the most elementary level. Professor Morton M. Denn incorporates design meaningfully; the design and analysis problems are realistic in format and scope. Students using this text will appreciate why they need the courses that follow in the core curriculum.

Contents: Preface; 1. Introduction; 2. Basic concepts of analysis; 3. The balance equation; 4. Component mass balances; 5. Membrane separation; 6. Reacting systems; 7. Designing reactors; 8. Bioreactors and nonlinear systems; 9. Overcoming equilibrium; 10. Two-phase systems and interfacial mass transfer; 11. Equilibrium staged processes; 12. Energy balances; 13. Heat exchange; 14. Energy balances for multi-component systems; 15. Energy balances for reacting systems.

ISBN: 9781107698727 276pp ₹ 395.00

Ethics in Engineering Practice and Research
2nd Edition

Caroline Whitbeck
Case Western Reserve University, Ohio

The first edition of Caroline Whitbeck's *Ethics in Engineering Practice and Research* focused on the difficult ethical problems engineers encounter in their practice and in research. In many ways, these problems are like design problems: they are complex and often ill defined; resolving them involves an iterative process of analysis and synthesis; and there can be more than one acceptable solution. In the second edition of this text, Dr. Whitbeck goes above and beyond by featuring more real-life problems, stating recent scenarios, and laying the foundation of ethical concepts and reasoning. This book offers a real-world, problem-centered approach to engineering ethics, using a rich collection of open-ended case studies to develop skill in recognizing and addressing ethical issues.

Contents: Part I. Values and the Evaluation of Acts in Engineering: Introduction to Ethical Reasoning and Engineering Ethics: 1. Professional practice in engineering; 2. Two examples of professional behavior: Roger Boisjoly and William Lemessurier; Part II. Engineering Responsibility: 3. Ethics as design – doing justice to moral problems; 4. Central professional responsibilities of engineers; 5. Computers, software, and digital information; 6. Rights and responsibilities regarding intellectual property; 7. Workplace rights and responsibilities; Part III. Responsible Research Conduct: 8. Ethics in the changing domain of research; 9. Responsible authorship and credit in engineering and scientific research; Part IV. The Future of Engineering: 10. Responsibility for the environment; 11. End use and 'macro' issues.

ISBN: 9781107668478 438pp ₹ 495.00

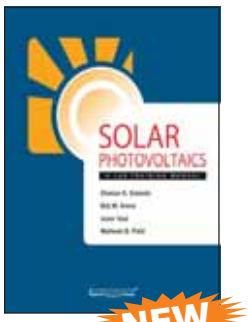
Solar Photovoltaics
A Lab Training Manual

Chetan S. Solanki
Indian Institute of Technology, Bombay

Brij M. Arora
Indian Institute of Technology, Bombay

Juzer Vasi
Indian Institute of Technology, Bombay

& Mahesh B. Patil
Indian Institute of Technology, Bombay



This text provides an up-to-date description of the photovoltaic (PV) components and systems. It contains detailed information on several carefully planned experiments on solar PV cells and modules. The book is divided into two sections: User Manual and Experiments. The experiments are related to the 'characterization' and 'simulation' of solar cells to allow the users to measure various kinds of data on solar cells, modules and PV systems. The simulation experiments would enable the users to simulate solar cells and circuits containing solar cells. The Manual provides an intuitive grasp of PV system components and their behaviour in the field through a discussion of the underlying objectives, expected outcome, theory, equipment used, measurement methodology and results. The Manual will help users in understanding and execution of various experiments related to solar PV.

This book would be an extremely useful reference manual not only for the technicians and system installers working in the PV field, but also for the students and researchers interested in understanding the fundamental aspects of PV system components and their interconnection.

Contents: Preface; Checklist for Performing the Experiments Part I; User Manual; 1. PV Module

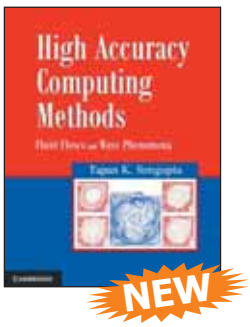
Characterisation Kit; 2. Solar Cell Characterisation Kit; 3. PV System Characterisation Kit; 4. Carrier Lifetime Measurement Kit; 5. Spectral Response Meter; Measurement of Global Solar Irradiation Using a Solar Cell; Part II Experiments; 1. Identifying and Measuring the Parameters of a Solar PV Module in the Field; 2. Series and Parallel Connection of PV Modules; 3. Estimating the Effect of Sun Tracking on Energy Generation by Solar PV Modules; 4. Efficiency Measurement of Standalone Solar PV System; 5. Dark and Illuminated Current–Voltage Characteristics of Solar Cell; 6. Solar Cells Connected in Series and in Parallel; 7. Dependence of Solar Cell I–V Characteristics on Light Intensity and Temperature; 8. Carrier Lifetime Measurements for a Solar Cell; 9. Spectral Response Measurement; 10. Solar Cell Simulation Using PC1D Simulator; 11. SEQUEL: Using the GUI

ISBN: 9789382264590 172pp ₹ 495.00

High Accuracy Computing Methods

Fluid Flows and Wave Phenomena

Tapan Sengupta
Indian Institute of Technology, Kanpur



This book presents methods necessary for high accuracy computing of fluid flow and wave phenomena. These two topics have common threads and are presented in the book in single source format using unified spectral theory of computing.

This book attempts to systematically develop scientific computing from classical approaches – describing equations of motion; classifying, discretizing and solving parabolic, elliptic, hyperbolic PDEs; curvilinear co-ordinates and structured meshing techniques; classical FVM and FEM and solving Navier-Stokes equation by FDM – to its present state of art in high accuracy computing.

New topics discussed in this book are:

- Correct error propagation analysis
- Practical compact schemes and global analysis tool
- Aliasing error and its alleviation
- Spurious upstream propagating q-waves
- Explanation of Gibbs phenomenon
- New 1D and 2D filters for LES/DNS without SGS modelling
- Anisotropic skewed wave propagation
- Development and analysis of dispersion relation preservation (DRP) schemes and
- Focus on capturing flow instabilities and wave propagation phenomena

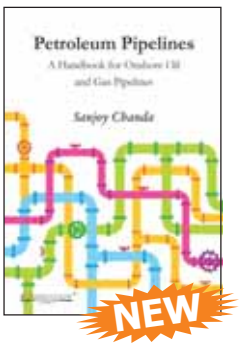
Contents: Foreword; Preface; 1. Introduction to scientific computing; 2. Governing equations of fluid mechanics; 3. Classification of quasi-linear partial differential equations; 4. Waves and space-time dependence in computing; 5. Spatial and temporal discretizations of partial differential equations; 6. Solution methods for parabolic partial differential equations; 7. Solution methods for elliptic partial differential equations; 8. Solution of hyperbolic PDEs: signal and error propagation; 9. Curvilinear coordinates and grid generation; 10. Spectral analysis of numerical schemes and aliasing error; 11. Higher accuracy and higher order methods; 12. Introduction to finite volume and finite element methods; 13. Solution of Navier–Stokes equations; 14. Recent developments in discrete computing; Exercises; References.

ISBN: 9781107023635 590pp ₹ 1295.00

Petroleum Pipelines

A Handbook for Onshore Oil and Gas Pipelines

Sanjoy Chanda
Independent Consultant, Pipeline Engineering



Petroleum pipelines ensure the sustained availability of petroleum products all across the country. Pipelines transport petroleum products in a safe and efficient manner from refineries to demand areas. They also transport crude oil from import terminals as well as domestic sources to the inland refineries. India, being a developing nation, has a large network of petroleum pipelines. Economic growth and expansion of infrastructure in this country offer opportunities to better utilize the existing pipeline network. The construction of new pipelines extends this network further.

This book introduces readers to the field of petroleum pipelines, describes the salient features of a pipeline and discusses how this system is superior to other modes of petroleum transportation. It provides a brief account on different types of fluids transported through pipelines and highlights their properties that affect pipeline design. The book details the actual design of a pipeline - from route selection, hydraulic, mechanical and other aspects of design and engineering. It also describes the operation and maintenance procedures required in the pipeline system to run at a level of efficiency equivalent to its design efficiency.

Key features

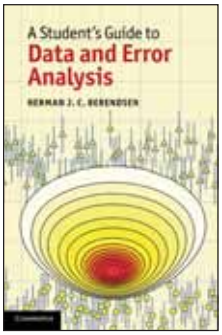
- Covers design and engineering of pipelines
- Discusses deployment of personnel and construction equipment
- Deals with pre-commissioning and commissioning of pipelines
- Examines corrosion of steel pipelines running underground
- Describes in detail the operation and maintenance procedures

Contents: List of tables; List of figures; Preface; 1: Introduction: Some Basic Facts about Pipelines; 2: Pipeline Design and Engineering; 3: Pipeline Construction; 4: Pre-commissioning and Commissioning of Pipelines; 5: Operation and Maintenance of Cross-country Pipelines; 6: Pipeline Corrosion and Its Mitigation; Index

ISBN: 9789382264583 238pp ₹ 795.00

A Student's Guide to Data and Error Analysis

Herman J. C. Berendsen
Rijksuniversiteit Groningen, The Netherlands



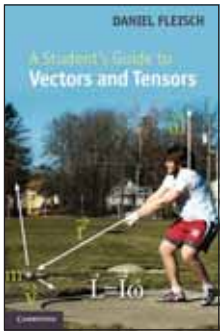
All students taking laboratory courses within the physical sciences and engineering will benefit from this book, whilst researchers will find it an invaluable reference. This concise, practical guide brings the reader up-to-speed on the proper handling and presentation of scientific data and its inaccuracies. It covers all the vital topics with practical guidelines, computer programs (in Python), and recipes for handling experimental errors and reporting experimental data. In addition to the essentials, it also provides further background material for advanced readers who want to understand how the methods work. Plenty of examples, exercises and solutions are provided to aid and test understanding, whilst useful data, tables and formulas are compiled in a handy section for easy reference.

Contents: Part I. Data and Error Analysis: 1. Introduction; 2. The presentation of physical quantities with their inaccuracies; 3. Errors: classification and propagation; 4. Probability distributions; 5. Processing of experimental data; 6. Graphical handling of data with errors; 7. Fitting functions to data; 8. Back to Bayes: knowledge as a probability distribution; Answers to exercises; Part II. Appendices: A1. Combining uncertainties; A2. Systematic deviations due to random errors; A3. Characteristic function; A4. From binomial to normal distributions; A5. Central limit theorem; A6. Estimation of th variance; A7. Standard deviation of the mean; A8. Weight factors when variances are not equal; A9. Least squares fitting; Part III. Python codes; Part IV. Scientific data: Chi-squared distribution; F-distribution; Normal distribution; Physical constants; Probability distributions; Student's t-distribution; Units.

ISBN: 9781107617100 240pp ₹ 295.00

A Student's Guide to Vectors and Tensors

Daniel Fleisch
Wittenberg University, Ohio



Companion Website available

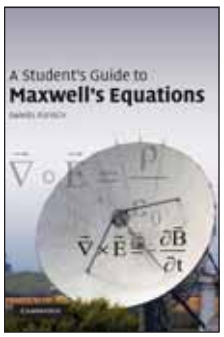
Vectors and tensors are among the most powerful problem-solving tools available, with applications ranging from mechanics and electromagnetics to general relativity. Understanding the nature and application of vectors and tensors is critically important to students of physics and engineering. Adopting the same approach used in his highly popular *A Student's Guide to Maxwell's Equations*, Fleisch explains vectors and tensors in plain language. Written for undergraduate and beginning graduate students, the book provides a thorough grounding in vectors and vector calculus before transitioning through contra and covariant components to tensors and their applications. Matrices and their algebra are reviewed on the book's supporting website, which also features interactive solutions to every problem in the text where students can work through a series of hints or choose to see the entire solution at once. Audio podcasts give students the opportunity to hear important concepts in the book explained by the author.

Contents: 1. Vectors; 2. Vector operations; 3. Vector applications; 4. Covariant and contravariant vector components; 5. Higher-rank tensors; 6. Tensor applications; Index.

ISBN: 9781107608689 208pp ₹ 245.00

A Student's Guide to Maxwell's Equations

Daniel Fleisch
Wittenberg University, Ohio



Companion Website available

Maxwell's Equations are four of the most influential equations in science: Gauss's law for electric fields, Gauss's law for magnetic fields, Faraday's law, and the Ampere-Maxwell law. In this guide for students, each equation is the subject of an entire chapter, with detailed, plain-language explanations of the physical meaning of each symbol in the equation, for both the integral and differential forms. The final chapter shows how Maxwell's Equations may be combined to produce the wave equation, the basis for the electromagnetic theory of light. This book is a wonderful resource for undergraduate and graduate courses in electromagnetism and electromagnetics. A website hosted by the author, and available through www.cambridge.org/9780521701471, contains interactive solutions to every problem in the text. Entire solutions can be viewed immediately, or a series of hints can be given to guide the student to the final answer. The website also contains audio podcasts which walk students through each chapter, pointing out important details and explaining key concepts.

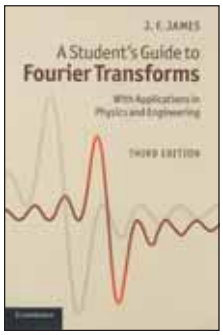
Contents: Preface; 1. Gauss's law for electric fields; 2. Gauss's law for magnetic fields; 3. Faraday's law; 4. The Ampere–Maxwell law; 5. From Maxwell's equations to the wave equation; Appendix; Further reading; Index.

ISBN: 9780521187312 144pp ₹ 245.00

A Student's Guide to Fourier Transforms

With Applications in Physics and Engineering, 3rd Edition

J. F. James
Royal Astronomical Society



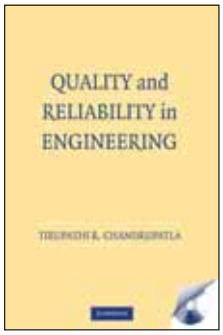
Fourier transform theory is of central importance in a vast range of applications in physical science, engineering and applied mathematics. Providing a concise introduction to the theory and practice of Fourier transforms, this book is invaluable to students of physics, electrical and electronic engineering, and computer science. After a brief description of the basic ideas and theorems, the power of the technique is illustrated through applications in optics, spectroscopy, electronics and telecommunications. The rarely discussed but important field of multi-dimensional Fourier theory is covered, including a description of Computer Axial Tomography (CAT scanning). The book concludes by discussing digital methods, with particular attention to the Fast Fourier Transform and its implementation. This new edition has been revised to include new and interesting material, such as convolution with a sinusoid, coherence, the Michelson stellar interferometer and the van Cittert–Zernike theorem, Babinet's principle and dipole arrays.

Contents: 1. Physics and Fourier transforms; 2. Useful properties and theorems; 3. Applications 1: Fraunhofer diffraction; 4. Applications 2: signal analysis and communication theory; 5. Applications 3: spectroscopy and spectral line shapes; 6. Two-dimensional Fourier transforms; 7. Multi-dimensional Fourier transforms; 8. The formal complex Fourier transform; 9. Discrete and digital Fourier transforms; 10. Appendix; 11. Bibliography; 12. Index.

ISBN: 9781107645509 160pp ₹ 295.00

Quality and Reliability in Engineering

Tirupathi R. Chandrupatla
Rowan University, New Jersey



Quality and Reliability in Engineering provides an integrated approach to quality specification, quality control and monitoring, and reliability. Examples and exercises stress practical engineering applications. Steps in the development of the theory are implemented in complete, self-contained computer programs. The book serves as a textbook for upper level undergraduate courses in quality and reliability in mechanical engineering, manufacturing engineering, and industrial engineering programs. It can be used as a supplement to upper level capstone design courses, short courses for quality training, and as a learning resource for practicing engineers.

Contents: 1. Quality concepts; 2. Tolerances and fits; 3. Geometric tolerances; 4. Elements of probability and statistics; 5. Sampling concepts; 6. Data presentation; 7. Statistical process control; 8. Process capability analysis; 9. Acceptance sampling; 10. Experimental design; 11. Reliability concepts; 12. Reliability testing.

ISBN: 9781107687738 326pp ₹ 495.00

Optimization Concepts and Applications in Engineering

2nd Edition

Ashok D. Belegundu
Pennsylvania State University

& Tirupathi R. Chandrupatla
Rowan University, New Jersey

It is vitally important to meet or exceed previous quality and reliability standards while at the same time reducing resource consumption. This textbook addresses this critical imperative integrating theory, modeling, the development of numerical methods and problem solving, thus preparing the student to apply optimization to real-world problems. This text covers a broad variety of optimization problems using: unconstrained, constrained, gradient and non-gradient techniques; duality concepts; multiobjective optimization; linear, integer, geometric and dynamic programming with applications; and finite element based optimization. In this revised and enhanced second edition of *Optimization Concepts and Applications in Engineering,* the already robust pedagogy has been enhanced with more detailed explanations, an increased number of solved examples and end-of-chapter problems. The source codes are now available free on multiple platforms. It is ideal for advanced undergraduate or graduate courses and for practising engineers in all engineering disciplines, as well as in applied mathematics.

Contents: 1. Preliminary concepts; 2. One dimensional unconstrained minimization; 3. Unconstrained optimization; 4. Linear programming; 5. Constrained minimization; 6. Penalty functions, duality, and geometric programming; 7. Direct search methods for nonlinear optimization; 8. Multiobjective optimization; 9. Integer and discrete programming;10. Dynamic programming; 11. Optimization applications for transportation, assignment, and network problems; 12. Finite element based optimization.

ISBN: 9781107606227 435pp ₹ 695.00

Earthquake-Resistant Design of Masonry Buildings

Miha Tomazevic
Slovenian National Building and Civil Engineering Institute

(World Scientific)

In the last few decades, a considerable amount of experimental and analytical research on the seismic behaviour of masonry walls and buildings has been carried out. The investigations resulted in the development of methods for seismic analysis and design, as well as new technologies and construction systems. After many centuries of traditional use and decades of allowable stress design, clear concepts for limit state verification of masonry buildings under earthquake loading have recently been introduced in codes of practice.

Although this book is not a review of the state-of-the-art of masonry structures in earthquake zones, an attempt has been made to balance the discussion on recent code requirements, state-of-the-art methods of earthquake-resistant design and the author's research work, in order to render the book useful for a broader application in design practice. An attempt has also been made to present, in a condensed but easy to understand way, all the information needed for earthquake-resistant design of masonry buildings constructed using traditional systems. The basic concepts of limit state verification are presented and equations for seismic resistance verification of masonry walls of all types of construction, (unreinforced, confined

and reinforced) as well as masonry-infilled reinforced concrete frames, are addressed. A method for seismic resistance verification, compatible with recent code requirements, is also discussed. In all cases, experimental results are used to explain the proposed methods and equations.

An important part of this book is dedicated to the discussion of the problems of repair, retrofit and rehabilitation of existing masonry buildings, including historical structures in urban centres. Methods of strengthening masonry walls as well as improving the structural integrity of existing buildings are described in detail. Wherever possible, experimental evidence regarding the effectiveness of the proposed strengthening methods is given.

Contents: • Earthquakes and Seismic Performance of Masonry Buildings; • Masonry Materials and Construction Systems; • Architectural and Structural Concepts of Earthquake-Resistant Building Configuration; • Floors and Roofs; • Basic Concepts of Limit States Verification of Seismic Resistance of Masonry Buildings; • Seismic Resistance Verification of Structural Walls; • Masonry Infilled Reinforced Concrete Frames; • Seismic Resistance Verification of Masonry Buildings; • Repair and Strengthening of Masonry Buildings

ISBN: 9788175969018 280pp ₹ 495.00

Crystal Engineering

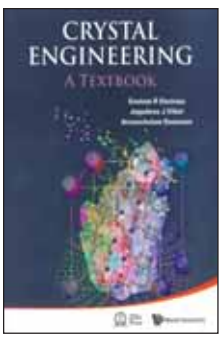
A Textbook

Gautam R. Desiraju
Indian Institute of Science, Bangalore

Jagadese J. Vittal
National University of Singapore

& Arunachalam Ramanan
Indian Institute of Technology, Delhi

(World Scientific)



This book is important because it is the first textbook in an area that has become very popular in recent times. There are around 250 research groups in crystal engineering worldwide today. The subject has been researched for around 40 years but there is still no textbook at the level of senior undergraduates and beginning PhD students. This book is expected to fill this gap.

The writing style is simple, with an adequate number of exercises and problems, and the diagrams are easy to understand. This book consists of major areas of the subject, including organic crystals and co-ordination polymers, and can easily form the basis of a 30 to 40 lecture course for senior undergraduates.

Contents: Preface; Acknowledgements; Copyright Permissions; 1. Crystal Engineering: 1.1 X-ray Crystallography; 1.2 Organic Solid State Chemistry; 1.3 The Crystal as a Supramolecular Entity; 1.4 Modern Crystal Engineering; 1.5 Summary; 1.6 Further Reading; 1.7 Problems; 2 Intermolecular Interactions: 2.1 General Properties; 2.2 van der Waals Interactions; 2.3 Hydrogen Bonds; 2.4 Halogen Bonds; 2.5 Other Interactions; 2.6 Methods of Study of Interactions; 2.7 Analysis of Typical Crystal Structures; 2.8 Summary; 2.9 Further Reading; 2.10 Problems; 3 Crystal Design Strategies: 3.1 Synthesis in Chemistry; 3.2 Supramolecular Chemistry; 3.3 The Synthon in Crystal Engineering; 3.4 Summary; 3.5 Further Reading; 3.6 Problems; 4 Crystallization and Crystal Growth: 4.1 Crystallization of Organic Solids; 4.2 Nucleation; 4.3 Thermodynamics and Kinetics of Crystallization; 4.4 Crystal Growth; 4.5 Crystal Morphology and Habit; 4.6 Crystal Morphology Engineering; 4.7 Why is it that all Compounds don't seem to Crystallize Equally Well or Equally Quickly?; 4.8 Summary; 4.9 Further Reading; 4.10 Problems; 5 Polymorphism: 5.1 What is Polymorphism?; 5.2 Occurrence of Polymorphism; 5.3 Thermodynamics of Polymorphism; 5.4 Thermodynamics versus Kinetics and the Formation of Polymorphs; 5.5 Methods of Polymorph Characterization; 5.6 Properties of Polymorphs; 5.7 Case Studies from the Pharmaceutical Industry; 5.8 Polymorphism Today; 5.9 Summary; 5.10 Further Reading; 5.11 Problems; 6 Multi-component Crystals: 6.1 General Classification and Nomenclature; 6.2 Solid Solutions; 6.3 Host-Guest Compounds; 6.4 Solvates and Hydrates; 6.5 Donor-Acceptor Complexes; 6.6 Co-crystals; 6.7 Summary; 6.8 Further Reading; 6.9 Problems; 7 Coordination Polymers: 7.1 What are Coordination Polymers?; 7.2 Classification Schemes; 7.3 Crystal Design Strategies; 7.4 Network Topologies; 7.5 Supramolecular Isomerism; 7.6 Interpenetration; 7.7 Porous Coordination Polymers; 7.8 Properties and Applications; 7.9 Building Approach: Influence of Experimental Conditions; 7.10 Summary; 7.11 Further Reading; 7.12 Problems; Glossary; Some Data on Crystallographic Space Groups; List of Useful Web Sites; Some Useful Educational References in Crystal Engineering; Index

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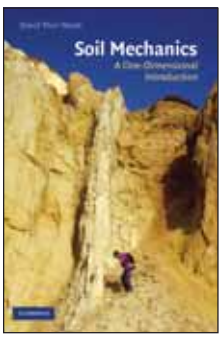
Soil Mechanics

A One-Dimensional Introduction

David Muir Wood
University of Bristol



This book teaches the principles of soil mechanics to undergraduates, along with other properties of engineering materials, to which the students are exposed simultaneously. Using the critical state method of soil mechanics to study the mechanical behavior of soils requires the student to consider density alongside effective stresses, permitting the unification of deformation and strength characteristics. This unification aids the understanding of soil mechanics. This book explores a one-dimensional theme for the presentation of many of the key concepts of soil mechanics - density, stress, stiffness, strength, and fluid flow - and includes a chapter on the analysis of one-dimensional consolidation, which fits nicely with the theme of the book. It also presents some theoretical analyses of soil-structure interaction, which can be analyzed using essentially one-dimensional governing equations. Examples are given at the end of most chapters, and suggestions for laboratory exercises or demonstrations are given.

Contents: 1. Introduction; 2. Stress in soils; 3. Density; 4. Stiffness; 5. Seepage; 6. Changes in stress; 7. Consolidation; 8. Strength; 9. Soil-structure interaction; 10. Envoi, exercises; Numerical answers.

ISBN: 9780521187305 252pp ₹ 445.00

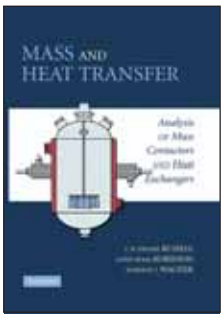
Mass and Heat Transfer

Analysis of Mass Contactors and Heat Exchangers

T. W. Fraser Russell
University of Delaware

Anne S. Robinson
University of Delaware

& Norman J. Wagner
University of Delaware



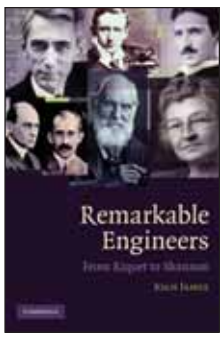
This text allows instructors to teach a course on heat and mass transfer that will equip students with the pragmatic, applied skills required by the modern chemical industry. This new approach is a combined presentation of heat and mass transfer, maintaining mathematical rigor while keeping mathematical analysis to a minimum. This allows students to develop a strong conceptual understanding, and teaches them how to become proficient in engineering analysis of mass contactors and heat exchangers and the transport theory used as a basis for determining how the critical coefficients depend upon physical properties and fluid motions. Students will first study the engineering analysis and design of equipment important in experiments and for the processing of material at the commercial scale. The second part of the book presents the fundamentals of transport phenomena relevant to these applications. A complete teaching package includes a comprehensive instructor's guide, exercises, design case studies, and project assignments.

ISBN: 9781107624573 402pp ₹ 495.00

Remarkable Engineers

From Riquet to Shannon

Ioan James
University of Oxford



Engineering transformed the world completely between the 17th and 21st centuries. *Remarkable Engineers* tells the stories of 51 of the key pioneers in this transformation, from the designers and builders of the world's railways, bridges and aeroplanes, to the founders of the modern electronics and communications revolutions. The focus throughout is on their varied life stories, and engineering and scientific detail is kept to a minimum. Engineer profiles are organized chronologically, inviting readers with an interest in engineering to follow the path by which these remarkable engineers utterly changed our lives.

ISBN: 9780521187336 218pp ₹ 345.00

Fundamentals of Modeling and Analyzing Engineering Systems

Philip D. Cha
Harvey Mudd College, California

James J. Rosenberg
Harvey Mudd College, California

& Clive L. Dym
Harvey Mudd College, California

System modeling and analysis is a standard activity in every engineering discipline. This text offers a broad-based introduction to engineering systems that incorporates material from mechanical and electrical engineering, and hydraulic and thermal systems. The overall theme that distinguishes the text from others is its unified treatment of disparate physical systems, emphasizing similarities in both the modeling and behavior of such lumped-element systems.

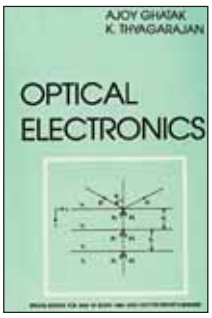
Linear graph theory is presented as a unifying framework for modeling electrical, mechanical, hydraulic, and thermal systems as lumped elements. The analysis of system dynamics that follows is done in the time domain and organized by behavioral characteristics rather than by engineering subdisciplines. Next, the Laplace transform is introduced as a tool for understanding frequency response. State space methods are also presented to provide a third perspective on system behavior. The final chapter covers the interaction of subcomponents of an overall system, particularly feedback systems and feedback control systems. Every chapter includes a wide variety of examples, as well as exercise problems, drawn from real-world mechanical, electrical, hydraulic, chemical and thermal systems.

ISBN: 9780521675932 488pp ₹ 495.00

Optical Electronics

Ajoy Ghatak
Indian Institute of Techonology, New Delhi

& K. Thyagarajan
Indian Institute of Techonology, New Delhi



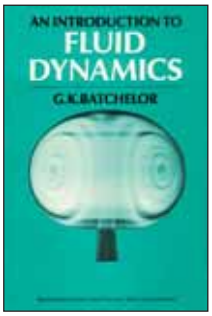
This textbook provides senior undergraduates studying modern optics with a comprehensive account of optics and optical electronics. A large number of solved and unsolved problems are included in the book. The extensive coverage makes it valuable to postgraduates, and also to optical engineers, as a source of basic design information.

Contents: 1. Maxwell's equations and propagation of electromagnetic waves; 2. Reflection and refraction of electromagnetic waves; 3. Wave propagation in anisotropic media; 4. Fraunhofer diffraction; 5. Frosnel diffraction; 6. Spatial frequency filtering; 7. Holography; 8. Lasers: I; 9. Lasers: II; 10. Some laser systems; 11. Electromagnetic analysis of the simplest optical waveguide;12. Leaky modes in optical waveguides;13. Optical fibre waveguides; 14. Integrated optics; 15. The electrooptic effect; 16. The strain optic tensor, 17. Acoustooptic effect: Raman-Nath diffraction; 18. Acoustooptic effect: Bragg diffraction; 19. Acoustooptic devices; 20. Non-linear optics; Appendices; References and suggested reading; Index.

ISBN: 9788185618104 640pp ₹ 345.00

An Introduction to Fluid Dynamics

G.K. Batchelor
University of Cambridge



First published in 1967, Professor Batchelor's classic text on fluid dynamics is still one of the foremost texts in the subject. The careful presentation of the underlying theories of fluids is still timely and applicable, even in these days of almost limitless computer power. This re-issue should ensure that a new generation of graduate students see the elegance of Professor Batchelor's presentation.

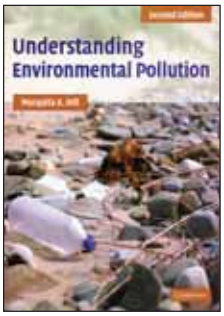
Contents: Preface; Conventions and notation; 1. The physical properties of fluids; 2. Kinematics of the flow field; 3. Equations governing the motion of a fluid; 4. Flow of a uniform incompressible viscous fluid; 5. Flow at large Reynolds number: effects of viscosity; 6. Irrotational flow theory and its applications; 7. Flow of effectively inviscid liquid with vorticity; Appendices.

ISBN: 9788185618241 635pp ₹ 445.00

Understanding Environmental Pollution

2nd Edition

Marquita K. Hill
University of Maine, Orono



Understanding Environmental Pollution systematically introduces pollution issues to students and others with little scientific background. The first edition received excellent reviews, and the new edition has been completely refined and updated. The book moves from the definition of pollution and how pollutants behave, to air and water pollution basics, pollution and global change, solid waste, and pollution in the home. It also discusses persistent and bioaccumulative chemicals, and pesticides, and it places greater stress on global pollutants. The relationship between energy generation and use, and pollution is stressed, as well as the importance of going beyond pollution control, to pollution prevention. Impacts on human and environmental health are emphasized throughout. Students are often invited to come to their own conclusions after having been presented with a variety of opinions. This textbook provides the basic concepts of pollution, toxicology and risk assessment for non-science majors as well as environmental science students.

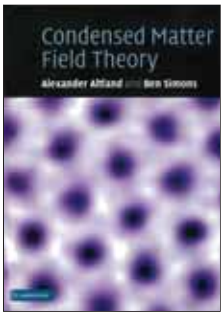
Contents: 1. Understanding pollution; 2. Reducing pollution; 3. Chemical toxicity; 4. Chemical exposures and risk assessment; 5. Ambient air pollution; 6. Acid deposition; 7. Global climate change; 8. Stratospheric ozone depletion; 9. Water pollution; 10. Drinking water; 11. Solid waste; 12. Hazardous waste; 13. Energy; 14. Persistent, bioaocumulative and toxic; 15. Metals; 16. Pesticides; 17. Pollution at home; 18. Zero waste, zero emissions; Index.

ISBN: 9780521670388 484pp ₹ 595.00

Condensed Matter Field Theory

Alexander Altland
Institute of Theoretical Physics, Cologne

& Ben Simons
Cavendish Laboratory, Cambridge



Theoretical condensed matter physics draws heavily and increasingly on the language of quantum field theory. This primer is aimed at elevating graduate students of condensed matter physics to a level where they can engage in independent research. It emphasizes the development of modern methods of classical and quantum field theory with applications of interest in both experimental and theoretical condensed matter physics. Topics covered include second quantization, path and functional field integration, mean-field theory and collective phenomena, the renormalization group, and topology. Conceptual aspects and formal methodology are emphasized and developed, but the discussion is rooted firmly in practical experimental application.

As well as routine exercises, the text includes extended and challenging problems, with fully worked solutions, designed to provide a bridge between formal manipulations and research-oriented thinking. This book will complement graduate level courses on theoretical quantum condensed matter physics.

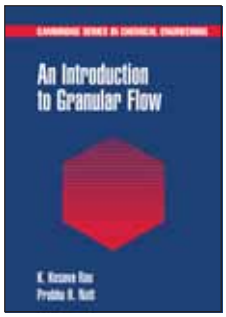
Contents: Preface 1. From particles to fields; 2. Second quantization; 3. Feynman path integral; 4. Functional field integral; 5. Perturbation theory; 6. Broken symmetry and collective phenomena; 7. Response functions; 8. The renormalization group; 9. Topology; Index

ISBN: 9780521736442 636pp ₹ 545.00

An Introduction to Granular Flow

K. Kesava Rao
Indian Institute of Science, Bangalore

& Prabhu R. Nott
Indian Institute of Science, Bangalore



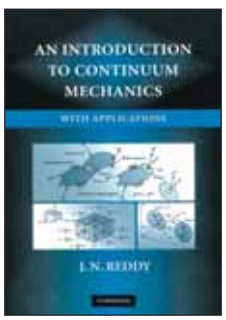
The flow of granular materials such as sand, snow, coal, and catalyst particles is common occurrence in natural and industrial settings. The mechanics of these materials is not well understood. They are important since a large fraction of the materials handled and processed in the chemical, metallurgical, pharmaceutical, and food processing industries are granular in nature. This book describes the theories for granular flow based mainly on continuum models although alternative discrete models are also discussed briefly. The level is appropriate for advanced undergraduates or beginning graduate students. The goal is to inform the reader about observed phenomena, some available models, and their shortcomings and to visit some issues that remain unresolved. There is a selection of problems at the end of the chapters to encourage exploration, and extensive references are given.

Contents: Preface. 1. Introduction; 2. Theory for slow plane flow; 3. Flow through hoppers; 4. Flow through wedge-shaped bunkers; 5. Theory for slow three-dimensional flow; 6. Flow through axisymmetric hoppers and bunkers; 7. Theory for rapid flow of smooth, inelastic particles; 8. Analysis of rapid flow in simple geometries; 9. Theory for rapid flow of rough, inelastic particles; 10. Hybrid theories; A. Operations with vectors and tensors; B. The stress tensor; C. Hyperbolic partial differential equations of first order; D. Jump balances; E. Discontinuous solutions of hyperbolic equations; F. Proof of the coaxiality condition; G. Material frame-indifference; H. The evaluation of some integrals; I. Linear stability; J. Pseudoscalars, vectors, and tensors; K. Answers to selected problems; References.

ISBN: 9780521571661 512pp $ 151.00

An Introduction to Continuum Mechanics

J.N. Reddy
Texas A & M University



This textbook on continuum mechanics reflects the modern view that scientists and engineers should be trained to think and work in multidisciplinary environments. A course on continuum mechanics introduces the basic principles of mechanics and prepares students for advanced courses in traditional and emerging fields such as biomechanics and nanomechanics. This text introduces the main concepts of continuum mechanics simply with rich supporting examples but does not compromise mathematically in providing the invariant form as well as component form of the basic equations and their applications to problems in elasticity, fluid mechanics, and heat transfer. The book is ideal for advanced undergraduate and beginning graduate students. The book features: derivations of the basic equations of mechanics in invariant (vector and tensor) form and specializations of the governing equations to various coordinate systems; numerous illustrative examples; chapter-end summaries; and exercise problems to test and extend the understanding of concepts presented.

Contents: 1. Introduction; 2. Vectors and tensors; 3. Kinematics; 4. Stress measures; 5. Conservation of mass, momenta, and energy; 6. Constitutive equations; 7. Linearized elasticity problems; 8. Fluid mechanics and heat transfer problems; 9. Linear viscoelasticity.

ISBN: 9780521870443 368pp $ 117.00

General Continuum Mechanics

T. J. Chung
University of Alabama, Huntsville

In this book, a new approach is pioneered in providing a unified theory in continuum mechanics. *General Continuum Mechanics* is intended for the beginner, but it develops advanced material covering interdisciplinary subjects. With applications of convective, Lagrangian, and Eulerian coordinates and the first and second laws of thermodynamics, the first-year graduate student will learn solid mechanics and fluid mechanics as an integrated subject. Electromagnetic continuum and relativistic continuum are included. The conservational properties of mass, momentum, and energy on earth and in the universe constitute the ingredients of this book. They are the monumental contributions of Newton, Maxwell, and Einstein, a panorama of beauty of universal laws that evolved over the last four centuries. No boundaries are needed to separate them, but rather we integrate them in harmony and place them in perspective. This is the book for interdisciplinary studies to carry out the modern scientific projects in which engineering, physics, and applied mathematics must be combined.

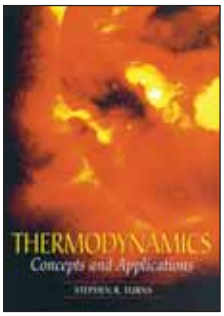
Contents: Part I. Basic Topics: 1. Introduction; 2. Kinematics; 3. Kinetics; 4. Linear elasticity; 5. Newtonian fluid mechanics; Part II. Special Topics: 6. Curvilinear continuum; 7. Nonlinear continuum; 8. Electromagnetic continuum; 9. Differential geometry continuum; Epilogue

ISBN: 9780521874069 440pp $ 130.00

Thermodynamics

Concepts and Applications

Stephen R. Turns
Pennsylvania State University



The focus of *Thermodynamics: Concepts and Applications* is on traditional thermodynamics topics, but structurally the book introduces the thermal-fluid sciences. Chapter 2 includes essentially all material related to thermodynamic properties clearly showing the hierarchy of thermodynamic state relationships. Element conservation is considered in Chapter 3 as a way of expressing conservation of mass. Constant-pressure and volume combustion are considered in Chapter 5 - Energy Conservation. Chemical and phase equilibria are treated as a consequence of the 2nd law in Chapter 6. 2nd law topics are introduced hierarchically in one chapter, important structure for a beginner. The book is designed for the instructor to select topics and combine them with material from other chapters seamlessly. Pedagogical devices include: learning objectives, chapter overviews and summaries, historical perspectives, and numerous examples, questions and problems and lavish illustrations. Students are encouraged to use the National Institute of Science and Technology (NIST) online properties database.

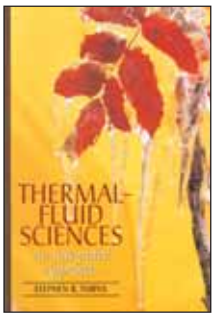
Contents: Preface; 1. Beginnings; 2. Thermodynamic properties, property relationships and processes; 3. Conservation of mass; 4. Energy and energy transfer; 5. Conservation of energy; 6. Second law of thermodynamics and some of its consequences; 7. Steady-flow devices; 6. Systems for power production, propulsion, heating and cooling; Appendix A. Historical timeline; Appendix B. Thermodynamic properties of ideal gases and carbon; Appendix C. Thermodynamic and thermo-physical properties of air; Appendix D. Thermodynamic properties of H20; Appendix E. Various thermodynamic data; Appendix F. Thermo-physical properties of selected gases at 1ATM; Appendix G. Thermo-physical properties of selected liquids; Appendix H. Thermo-physical properties of hydrocarbon fuels; Appendix I. Thermo-physical properties of selected solids; Appendix J. Radiation properties of selected materials and substances; Appendix K. Mach number relationships for compressible flow; Appendix L. Psychometric charts; Answers to Selected Problems; Index.

ISBN: 9780521850421 764pp $ 143.00

Thermal-Fluid Sciences

An Integrated Approach

Stephen Turns
Pennsylvania State University



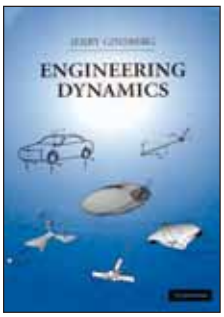
Thermal-Fluid Sciences is a truly integrated textbook for engineering courses covering thermodynamics, heat transfer and fluid mechanics. This integration is based on: 1. The fundamental conservation principles of mass, energy, and momentum; 2. A hierarchical grouping of related topics; 3. The early introduction and revisiting of practical device examples and applications. As with all great textbooks the focus is on accuracy and accessibility. To enhance the learning experience *Thermal-Fluid Sciences* features full color illustrations. The robust pedagogy includes: chapter learning objectives, overviews, historical vignettes, numerous examples which follow a consistent problem-solving format enhanced by innovative self tests and color coding to highlight significant equations and advanced topics. Each chapter concludes with a brief summary and a unique checklist of key concepts and definitions. Integrated tutorials show the student how to use modern software including the NIST Database (included on the in-text CD) to obtain thermodynamic and transport properties.

Contents: Preface; Part I. Fundamentals: 1. Beginnings; 2 Thermodynamic properties, property relationships and processes; 3. Conservation of mass; 4. Energy and energy transfer; 5. Conservation of energy; 6. Conservation of momentum; 7. Second law of thermodynamics and some of its consequences; 8. Similitude and dimensionless parameters; Part II. Beyond the Fundamentals; 9. External flows: friction, drag and heat transfer; 10. Internal flows: friction, pressure drop and heat transfer; 11. Thermal-fluid analysis of steady-flow devices; 12. Systems for power production, propulsion, heating and cooling; Appendix A. Historical timeline; Appendix B. Thermodynamic properties of ideal gases and carbon; Appendix C. Thermodynamics and thermo-physical properties of air; Appendix D. Thermodynamics properties of H_20; Appendix E. Various thermodynamic data; Appendix F. Thermo-physical properties of selected gases at 1 ATM; Appendix G. Thermo-physical properties of selected liquids; Appendix H. Thermo-physical properties of hydrocarbon fuels; Appendix I. Thermo-physical properties of selected solids; Appendix J. Radiation properties of selected materials and substances; Appendix K. Mach number relationships for compressible flow; Selected answers; Index

ISBN: 9780521850438 1218pp $ 156.00

Engineering Dynamics

Jerry Ginsberg
Georgia Institute of Technology



This text is a modern vector-oriented treatment of classical dynamics and its application to engineering problems. Based on Ginsberg's *Advanced Engineering Dynamics 2nd edition*, it develops a broad spectrum of kinematical concepts, which provide the framework for formulations of kinetics principles following the Newton-Euler and analytical approaches. This fresh treatment features many expanded and new derivations, with an emphasis on both breadth and depth and a focus on making the subject accessible to individuals from a broad range of backgrounds. Numerous examples implement a consistent pedagogical structure. Many new homework problems were added and their variety increased.

Contents: Preface; 1. Basic considerations; 2. Particle kinematics; 3. Relative motion; 4. Kinematics of constrained rigid bodies; 5. Inertial effects for a rigid body; 6. Newton-Euler equations of motion; 7. Introduction to analytical mechanics; 8. Constrained generalized coordinates; 9. Alternative formulations; 10. Gyroscopic effects.

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Solving ODEs with MATLAB

L. F. Shampine
Southern Methodist University, Texas

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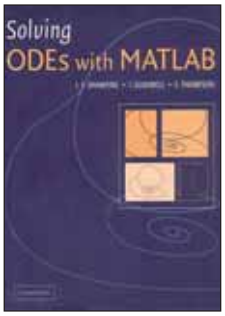
Southern Methodist University, Texas

& S. Thompson
Radford University, Virginia



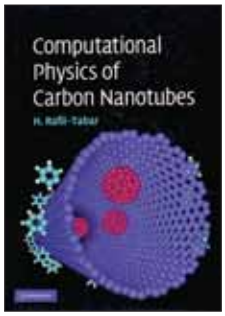
This book is for people who need to solve ordinary differential equations (ODEs), both initial value problems (IVOs) and boundary value problems (BVPs) as well as delay differential equations (DDEs). These topics are usually taught in separate courses of length one semester each, but *Solving ODEs with MATLAB* provides a sound treatment of all three in about 250 pages. The chapters on each of these topics begin with a discussion of the "facts of life" for the problem, mainly by means of examples. Numerical methods for the problem are then developed - but only the methods most widely used. Although the treatment of each method is brief and technical issues are minimized, the issues important in practice and for understanding the codes are discussed. Often solving a real problem is much more than just learning how to call a code. The last part of each chapter is a tutorial that shows how to solve problems by means of small but realistic examples.

Contents: Preface 1. Getting Started; 2. Initial Value Problems; 3. Boundary Value Problems; 4. Delay Differential Equations; Bibliography, Index.

ISBN: 9780521530941 272pp £ 32.99

Computational Physics of Carbon Nanotubes

Hashem Rafi-Taber
Institute of Studies in Theoretical Physics and Mathematics



Carbon nanotubes are the fabric of nanotechnology. Investigation into their properties has become one of the most active fields of modern research. This book presents the key computational modeling and numerical simulation tools to investigate carbon nanotube characteristics. In particular, methods applied to geometry and bonding, mechanical, thermal, transport and storage properties are addressed. The first half describes classic statistical and quantum mechanical simulation techniques, (including molecular dynamics, monte carlo simulations and ab initio molecular dynamics), atomistic theory and continuum based methods. The second half discusses the application of these numerical simulation tools to emerging fields such as nanofluidics and nanomechanics. With selected experimental results to help clarify theoretical concepts, this is a self-contained book that will be of interest to researchers in a broad range of disciplines, including nanotechnology, engineering, materials science and physics.

Contents: 1. Introduction; 2. Formation of carbon allotropes; 3. Nanoscale numerical simulation techniques; 4. Interatomic potentials and force fields in the computational physics of carbon nanotubes; 5. Continuum elasticity theories for modelling the mechanical properties of nanotubes; 6. Atomistic theories of mechanical properties; 7. Theories for modelling thermal transport in nanotubes; 8. Modelling fluid flow in nanotubes; 9. Modelling gas adsorption in carbon nanotubes; 10. Modelling the mechanical properties of carbon nanotubes; 11. Modelling the thermal properties in carbon nanotubes.

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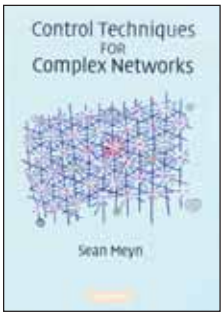
Control Techniques for Complex Networks

Sean Meyn
University of Illinois, Urbana-Champaign



Power grids, flexible manufacturing, cellular communications: interconnectedness has consequences. This remarkable book gives the tools and philosophy you need to build network models detailed enough to capture essential dynamics but simple enough to expose the structure of effective control solutions. Core chapters assume only exposure to stochastic processes and linear algebra at undergraduate level; later chapters are for advanced graduate students and researchers/practitioners. This gradual development bridges classical theory with the state-of-the-art. The workload model at the heart of traditional analysis of the single queue becomes a foundation for workload relaxations used in the treatment of complex networks. Lyapunov functions and dynamic programming equations lead to the celebrated MaxWeight policy along with many generalizations. Other topics include methods for synthesizing hedging and safety stocks, stability theory for networks, and techniques for accelerated simulation. Examples and figures throughout make ideas concrete. Solutions to end-of-chapter exercises are available on a companion website.

Contents: Preface; 1. Introduction; Part I. Modeling and Control: 2. Examples; 3. The single-server queue; 4. Scheduling; Part II. Workload: 5. Workload and scheduling; 6. Routing and resource pooling; 7. Demand; Part III. Stability and Performance: 8. Foster-Lyapunov techniques; 9. Optimization; 10. ODE methods; 11. Simulation and learning; Appendix. Markov models; References; Index.

ISBN: 9780521884419 582pp £ 58.00

Space-Time Coding

Theory and Practice

Hamid Jafarkhani
University of California, Irvine

This book covers the fundamental principles of space-time coding for wireless communications over multiple-input multiple-output (MIMO) channels, and sets out practical coding methods for achieving the performance improvements predicted by the theory. Starting with background material on wireless communications and the capacity of MIMO channels, the book then reviews design criteria for space-time codes. A detailed treatment of the theory behind space-time block codes then leads on to an in-depth discussion of space-time trellis codes. The book continues with discussion of differential space-time modulation, BLAST and some other space-time processing methods and the final chapter addresses additional topics in space-time coding. The theory and practice sections can be used independently of each other. Written by one of the inventors of space-time block coding, this book is ideal for a graduate student familiar with the basics of digital communications, and for engineers implementing the theory in real systems.

Contents: Preface; Standard notation; Space-time coding notation; Abbreviations; 1. Introduction; 2. Capacity of multiple-input multiple-output channels; 3. Space-time code design criteria; 4. Orthogonal space-time block codes; 5. Quasi-orthogonal space-time block

codes;6. Space-time trellis codes; 7. Super-orthogonal space-time trellis codes; 8. Differential space-time modulation; 9. Spatial multiplexing and receiver design; 10. Non-orthogonal space-time block codes; 11. Additional topics in space-time coding; Bibliography

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Molecular Models for Fluids

Klaus Lucas
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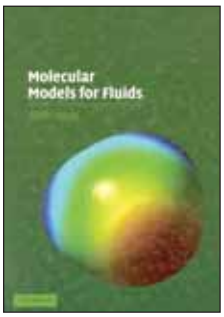


This book presents the development of modern molecular models for fluids from the interdisciplinary fundamentals of classical and statistical mechanics, of electrodynamics and of quantum mechanics. The concepts and working equations of the various fields are briefly derived and illustrated in the context of understanding the properties of molecular systems. Special emphasis is devoted to the quantum mechanical basis, since this is used throughout in the calculation of the molecular energy of a system. The book is application oriented. It stresses those elements that are essential for practical model development. The fundamentals are then used to derive models for various types of applications. Finally, equation of state models are presented based on quantum chemically based models for the intermolecular potential energy and perturbation theory. The book is suited for graduate courses in chemical and mechanical engineering, physics and chemistry, but may also, by proper selection, be found useful on the undergraduate level.

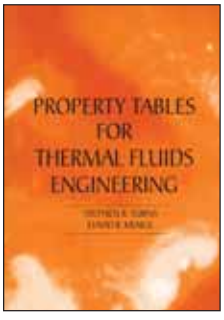
Contents: Nomenclature; 1. Introduction; 2. Foundations; 3. The ideal gas; 4. Excess function models; 5. Equation of state models; Appendices; Index

ISBN: 9780521852401 406pp £ 72.00

Property Tables Booklet for Thermal Fluids Engineering

Stephen Turns
Pennsylvania State University

& David Kraige
Pennsylvania State University



This booklet is an ideal supplement for any course in thermodynamics or the thermal fluid sciences and a handy reference for the practicing engineer. The tables in the booklet complement and extend the property tables in the appendices to Stephen Turn's *Thermodynamics: Concepts and Applications* and *Thermal-Fluid Sciences: An Integrated Approach*. In addition to duplicating the SI tables in these books it extends the tables to cover US Customary units as well. The booklet also contains property data for the refrigerant R-134a and properties of the atmosphere at high altitudes.

Contents: Part I. SI Units Appendices A-M: Appendix A. Thermodynamic properties of refrigerant-134a; Appendix B. Thermodynamic properties of ideal gases & carbon; Appendix C. Thermodynamic & thermo-physical properties of air; Appendix D. Thermodynamic properties of H_2O; Appendix E. Various thermodynamic data; Appendix F. Thermo-physical properties of selected gases at 1 ATM; Appendix G. Thermo-physical properties of selected liquids; Appendix H. Thermo-physical properties of hydrocarbon fuels; Appendix I. Thermo-physical properties of selected solids; Appendix J. Radiation properties of selected materials and substances; Appendix K. Mach number relationships for compressible flow; Appendix L. Psychrometry chart 714 T; Appendix M. Properties of the atmosphere at high altitude; Part II. Appendix AE-ME English Units: Appendix AE. Thermodynamic properties of refrigerant-134a; Appendix BE. Thermodynamic properties of ideal gases & carbon; Appendix CE. Thermodynamic and thermo-physical properties of air; Appendix DE. Thermodynamic properties of H_2O; Appendix EE. Various thermodynamic data; Appendix FE. Thermo-physical properties of selected gases at 1 ATM; Appendix GE. Thermo-physical properties of selected liquids; Appendix HE. Thermo-physical properties of hydrocarbon fuels; Appendix IE. Thermo-physical properties of selected solids; Appendix JE. Radiation properties of selected materials and substances; Appendix KE. MACH number relationships for compressible flow; Appendix LE. Psychrometry chart 715 T; Appendix ME. Properties of the atmosphere at high altitude.

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Structural Nanocrystalline Materials

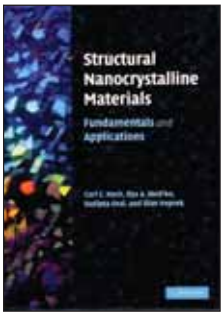
Fundamentals and Applications

Carl Koch
North Carolina State University

Ilya Ovid'ko
Russian Academy of Sciences, Moscow

Sudipta Seal
University of Central Florida

& Stan Veprek
Technische Universitat Munchen



Nanocrystalline materials exhibit exceptional mechanical properties, representing an exciting new class of structural materials for technological applications. The advancement of this important field depends on the development of new fabrication methods, and an appreciation of the underlying nano-scale and interface effects. This authored book addresses these essential issues, presenting for the first time a fundamental, coherent and current account at the theoretical and practical level of nanocrystalline and nanocomposite bulk materials and coatings. The subject is approached systematically, covering processing methods, key structural and mechanical properties, and a wealth of applications. This is a valuable resource for graduate students studying nanomaterials science and nanotechnologies, as well as researchers and practitioners in materials science and engineering.

Contents: 1. Introduction; 2. Processing of structural nanocrystalline materials; 3. Stability of structural nanocrystalline materials - grain growth; 4. Mechanical properties of structural nanocrystalline materials - experimental observations; 5. Mechanical properties of structural nanocrystalline materials - theory and simulations; 6. Corrosion of structural nanomaterials; 7. Applications of structural nanomaterials

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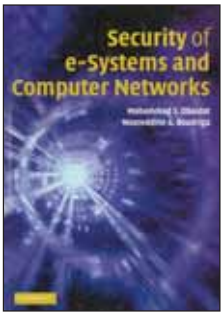
Security of e-Systems and Computer Networks

Mohammad Obaidat
Monmouth University, New Jersey

& Noureddine Boudriga
Universite du 7 Novembre a Carthage, Tunis



E-based systems are ubiquitous in the modern world with applications spanning e-commerce, WLANs, health care and government organisations. The secure transfer of information has therefore become a critical area of research, development, and investment. This book presents the fundamental concepts and tools of e-based security and its range of applications. The core areas of e-based security - authentication of users; system integrity; confidentiality of communication; availability of business service; and non-repudiation of transactions - are covered in detail. Throughout the book the major trends, challenges and applications of e-security are presented, with emphasis on public key infrastructure (PKI) systems, biometric-based security systems, trust management systems, and the e-service paradigm. Intrusion detection technologies, virtual private networks (VPNs), malware, and risk management are also discussed. Technically oriented with many practical examples, this book is suitable for practitioners in network security, as well as graduate students and researchers in telecommunications and computer science.

Contents: Part I. E-Security: 1. Introduction to e-security; 2. Public key cryptosystems; 3. Authentication and digital signature; Part II. E-security Tools: 4. Public key infrastructure (PKI) systems; 5. Biometric-based security systems; 6. Trust management systems in communication networks; Part III. E-Security Applications: 7. e-services security; 8. e-government security; 9. e-commerce security; 10. Wireless LANs security; Part IV. Protecting Enterprises: 11. Intrusion detection systems; 12. Virtual private networks; 13. Protecting against malware; 14. Computer and network security risk management; Index

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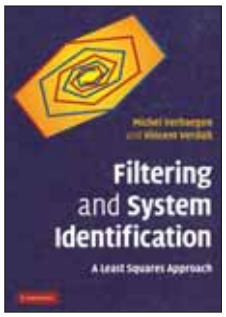
Filtering and System Identification

A Least Squares Approach

Michel Verhaegen
Technische Universiteit Delft, The Netherlands

& Vincent Verdult
Technische Universiteit Delft, The Netherlands



Companion Website available

Filtering and system identification are powerful techniques for building models of complex systems. This book discusses the design of reliable numerical methods to retrieve missing information in models derived using these techniques. Emphasis is on the least squares approach as applied to the linear state-space model, and problems of increasing complexity are analyzed and solved within this framework, starting with the Kalman filter and concluding with the estimation of a full model, noise statistics and state estimator directly from the data. Key background topics, including linear matrix algebra and linear system theory, are covered, followed by different estimation and identification methods in the state-space model. With end-of-chapter exercises, MATLAB simulations and numerous illustrations, this book will appeal to graduate students and researchers in electrical, mechanical, and aerospace engineering. It is also useful for practitioners. Additional resources for this title, including solutions for instructors, are available online at www.cambridge.org/9780521875127.

Contents: Preface. 1. Introduction; 2. Linear algebra; 3. Discrete-time signals and systems; 4. Random variables and signals; 5. Kalman filtering; 6. Estimation of spectra and frequency response functions; 7. Output-error parametric model estimation; 8. Prediction-error parametric model estimation; 9. Subspace model identification; 10. The system identification cycle; Notation and symbols; List of abbreviations; References; Index

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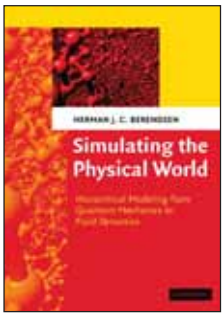
Simulating the Physical World

Hierarchical Modeling from Quantum Mechanics to Fluid Dynamics

Herman J. C. Berendsen
Rijksuniversiteit Groningen, The Netherlands



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The simulation of physical systems requires a simplified, hierarchical approach which models each level from the atomistic to the macroscopic scale. From quantum mechanics to fluid dynamics, this book systematically treats the broad scope of computer modeling and simulations, describing the fundamental theory behind each level of approximation. Berendsen evaluates each stage in relation to its applications giving the reader insight into the possibilities and limitations of the models. Practical guidance for applications and sample programs in Python are provided. With a strong emphasis on molecular models in chemistry and biochemistry, this book will be suitable for advanced undergraduate and graduate courses on molecular modeling and simulation within physics, biophysics, physical chemistry and materials science. It will also be a useful reference to all those working in the field. Additional resources for this title including solutions for instructors and programs are available online at www.cambridge.org/9780521835275.

Contents: Preface; Symbols, units and constants; 1. Introduction; 2. Quantum mechanics: principles; 3. From quantum to classical; 4. Quantum chemistry; 5. Mixed quantum/classical dynamics; 6. Quantum Corrections; 7. Molecular dynamics; 8. Free energy, entropy and potential of mean force; 9. Sampling phase space; 10. Stochastic

dynamics; 11. Coarse-Graining; 12. Dissipative particle dynamics; Topic 1. Fourier transforms; Topic 2. Electromagnetism; Topic 3. Vectors, operators and vector spaces; Topic 4. Mechanics; Topic 5. Review of thermodynamics; Topic 6. Review of statistical mechanics; Topic 7. Linear response theory; Topic 8. Splines; References; Index

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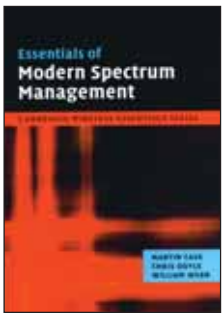
Essentials of Modern Spectrum Management

Martin Cave
University of Warwick

Chris Doyle
University of Warwick

& William Webb
Ofcom, London



Are you fully up-to-speed on today's modern spectrum management tools? As regulators move away from traditional spectrum management methods, introduce spectrum trading and consider opening up more spectrum to commons, do you understand the implications of these developments for your own networks? This is the first book to describe and evaluate modern spectrum management tools. Expert authors offer you unique insights into the technical, economic and management issues involved. Auctions, administrative pricing, trading, property rights and spectrum commons are all explained. A series of real-world case studies from around the world is used to highlight the strengths and weaknesses of the various approaches adopted by different regulators, and valuable lessons are drawn from these. This concise and authoritative resource is a must-have for telecom regulators, network planners, designers and technical managers at mobile and fixed operators and broadcasters, and academics involved in the technology and economics of radio spectrum.

Contents: Acknowledgements; Part I. Emerging Problems with the Current Spectrum Management Approach: 1. Current spectrum management methods and their shortcomings; 2. How changing technology is impacting spectrum management; 3. Alternative ways of dividing spectrum; Part II. Markets: 4. Market solutions; 5. Auctions; 6. Spectrum trading - secondary markets; 7. Technical issues with property rights; 8. Economic issues with property rights; 9. Competition issues relating to spectrum; 10. Band management; Part III. Regulation: 11. Incentive based spectrum prices - theory; 12. Incentive based spectrum pricing - practicalities; 13. How the commons works; 14. Commons or non-commons; 15. Is the public sector spectrum management different?; 16. Are developing countries different?; Part IV. Conclusions: 17. Conclusions; Further reading; Index; List of abbreviations; Author biographies

ISBN: 9780521208499 278pp £ 18.99

Multi-Application Smart Cards

Technology and Applications

Mike Hendry
UK Chip and Pin Programme

Multi-application smart cards have yet to realise their enormous potential, partly because few people understand the technology, market, and behavioural issues involved. Here, Mike Hendry sets out to fill this knowledge gap with a comprehensive and accessible guide. Following a review of the state-of-the-art in smart card technology, the book describes the business requirements of each smart-card-using sector, and the systems required to support multiple applications. Implementation aspects, including security, are treated in detail and numerous international case studies cover identity, telecom, banking and transportation applications. Lessons are drawn from these studies to help deliver more successful projects in the future. Invaluable for users and integrators specifying, evaluating and integrating multi-application systems, the book will also be useful to terminal, card and system designers; network, IT and security managers; and software specialists.

Contents: Foreword; Acknowledgements; 1. Background; 2. When is a card multi-application?; 3. Smart card basics; 4. Biometrics; 5. Security and cryptography; 6. Card technology; 7. Readers and terminals; 8. Application selection: the ISO 7816 family; 9. JavaCard and GlobalPlatform; 10. Multos; 11. Other operating systems; 12. Card management systems; 13. Common business requirements; 14. Telecommunications; 15. Banking; 16. Transportation; 17. Government and citizens' cards; 18. Campus cards and closed user groups; 19. Organisation and structure; 20. Implementation; 21. Prognosis; Appendix A. Glossary; Appendix B. Further reading; Appendix C. Standards; References.

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Emerging Technologies in Wireless LANs

Theory, Design and Deployment

Edited by
Benny Bing
Georgia Institute of Technology

Wireless LANs have become mainstream over the last few years. What started out as cable replacement for static desktops in indoor networks has been extended to fully mobile broadband applications involving moving vehicles, high-speed trains, and even airplanes. This book is designed to appeal to a broad audience with different levels of technical background and can be used in a variety of ways: as a first course on wireless LANs, as a graduate-level textbook, or simply as a professional reference guide. It describes the key practical considerations when deploying wireless LANs and equips the reader with a solid understanding of the emerging technologies. The book comprises 38 high-quality contributions from industry and academia and covers a broad range of important topics related to 802.11 networks, including quality of service, security, high throughput systems, mesh networking, 802.11/ cellular interworking, coexistence, cognitive radio resource management, range and capacity evaluation, hardware and antenna design, hotspots, new applications, ultra-wideband, and public wireless broadband.

Contents: Foreword; Preface; Part I. Introduction to 802.11: 1. Emerging IEEE 802.11 standards; 2. Guide to wireless LAN analysis; Part II. 802.11 Quality of Service: 3. WLAN QoS; 4. Performance understanding of IEEE 802.11 DCF and IEEE 802.11e EDCA; 5. Cross-layer optimized video streaming over wireless multi-hop mesh networks; Part III. 802.11 Security: 6. Understanding and achieving next-generation wireless security; 7. Wireless local area network security; Part IV. High throughput 802.11: 8. The 802.11n standard; 9. MIMO spatial processing for 802.11n WLAN; Part V. 802.11 Mesh Networks: 10. Capacity of wireless mesh networks; 11. Autonomous mobile mesh networks and their design challenges; 12. Service provisioning for wireless mesh networks; 13. Metro-scale Wi-Fi networks; 14. Usage and performance comparison of mobile MetroMesh networks; 15. First, second and third generation mesh architectures; 16. Wireless mesh networks; Part VI. 802.11/Cellular Interworking: 17. WLAN interworking with 2G/3G systems; 18. Towards service continuity in emerging heterogeneous mobile networks; 19. A survey of analytical modeling for cellular/WLAN interworking; Part VII. Coexistence: 20. Coexistence of unlicensed wireless networks; 21. Coexistence of IEEE 802.11n and bluetooth; Part VIII. 802.11 Network and Radio Resource Management: 22. Measured WLANs: the first step to managed WLANs; 23. Cognitive WLAN - a better architecture; Part IX. 802.11 range: 24. Wi-Fi range - impact on data rates, coverage, and capacity; Part X. 802.11 Hardware Design: 25. An 802.11g WLAN system on a chip; 26. Antenna design for portable computers; Part XI. Wi-Fi Hotspots: 27. Service control and service management of Wi-Fi hotspots; 28. Hot spots - public access using 802.11; 29. Strategies for maximizing access to public commercial hot spots; Part XII: Wi-Fi applications 30. A discussion of 802.11 for sensor networks; 31. Wi-Fi based tracking systems; 32. Building the mobile computing environment through context-aware service management; 33. Experiments using small unmanned aircraft to augment a mobile ad hoc network; Part XIII. Ultra WideBand (UWB): 34. Ultra-wideband wireless technology; 35. High-rate WPAN; Part XIV. Public Wireless Broadband: 36. Wireless cities; 37. The path to 4G and the mobilization of the internet; 38. All internet is local - five ways public ownership solves the U.S. broadband problem; Epilogue; Index

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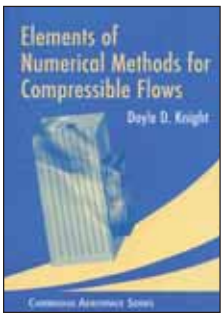
Elements of Numerical Methods for Compressible Flows

Doyle D. Knight
Rutgers University,
New Jersey



The purpose of this book is to present the basic elements of numerical methods for compressible flows. It is appropriate for advanced undergraduate and graduate students and specialists working in high speed flows. The focus is on the unsteady one-dimensional Euler equations which form the basis for numerical algorithms in compressible fluid mechanics. The book is restricted to the basic concepts of finite volume methods, and even in this regard is not intended to be exhaustive in its treatment. Although the practical applications of the one-dimensional Euler equations are limited, virtually all numerical algorithms for inviscid compressible flow in two and three dimensions owe their origin to techniques developed in the context of the one-dimensional Euler equations. The author believes it is therefore essential to understand the development and implementation of these algorithms in their original one-dimensional context. The text is supplemented by numerous end-of-chapter exercises.

Contents: 1. Governing equations; 2. Mathematical nature of 1-D Euler equations; 3.1-D Euler equations; 4. Reconstruction; 5. Godunov methods; 6. Flux vector splitting methods; 7. Temporal quadrature; 8. TVD methods; Index; Notes; Bibliography.

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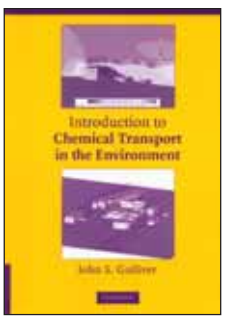
Introduction to Chemical Transport in the Environment

John S. Gulliver
University of Minnesota



This is a textbook for courses and independent study in environmental and chemical engineering, as well as in many other disciplines concerned with transport and diffusion of all manner of chemicals. Estimating the transport and fate of chemicals released into the environment is an interesting and challenging task. The global environment is large, on the chemical transport and fate scale. This text applies the mathematics of diffusion, turbulent diffusion and dispersion to the atmosphere, lakes, rivers, groundwater and the ocean, as well as transport between these media. The book follows a new educational paradigm of text books, in that it is based upon examples and case studies. The required theory is explained as a solution technique to solve the case studies and example problems. A large portion of the book is dedicated to examples and case studies, from which the important principles are derived.

Contents: Prologue; 1. The global perspective on environmental transport and fate; 2. The diffusion equation; 3. Diffusion coefficients; 4. Mass, heat, and momentum transport analogies; 5. Turbulent diffusion; 6. Reactor mixing assumptions; 7. Computational mass transport; 8. Interfacial mass transfer; 9. Air-water mass transfer in the field; Appendices; References.

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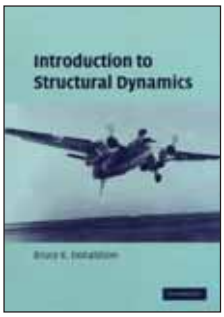
Introduction to Structural Dynamics

Bruce Donaldson
University of Maryland, College Park



This textbook provides the student of aerospace, civil, and mechanical engineering with all the fundamentals of linear structural dynamics analysis. It is designed for an advanced undergraduate or first year graduate course. This textbook is a departure from the usual presentation in two important respects. First, descriptions of system dynamics are based on the simpler to use Lagrange equations. Second, no organizational distinctions are made between multidegree of freedom systems and single-degree of freedom systems. The textbook is organized on the basis of first writing structural equation systems of motion, and then solving those equations mostly by means of a modal transformation. The text contains more material than is commonly taught in one semester so advanced topics are designated by an asterisk. The final two chapters can also be deferred for later studies. The text contains numerous examples and end-of-chapter exercises.

Contents: Preface for student; Preface for instructor, 1. The Lagrange equations of motion; 2. Mechanical vibrations: practice using the Lagrange equations; 3. Review of the basics of the finite element method for simple elements; 4. FEM equations of motion for elastic systems; 5. Damped structural systems; 6. Natural frequencies and mode shapes; 7. The modal transformation; 8. Continuous dynamic models; 9. Numerical integration of the equations; Appendix I; Appendix II; Index.

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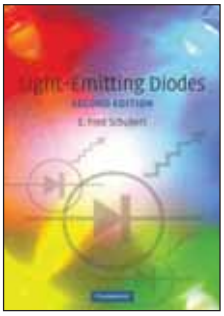
Light-Emitting Diodes

2nd Edition

E. Fred Schubert
Renssealaer Polytechnic Institute, New York



Revised and fully up-dated, the second edition of this graduate textbook offers a comprehensive explanation of the technology and physics of LEDs such as infrared, visible-spectrum, ultraviolet, and white LEDs made from III-V semiconductors. Elementary properties such as electrical and optical characteristics are reviewed, followed by the analysis of advanced device structures. With nine additional chapters, the treatment of LEDs has been vastly expanded, including new material on device packaging, reflectors, UV LEDs, III-V nitride materials, solid-state sources for illumination applications, and junction temperature. Radiative and non-radiative recombination dynamics, methods for improving light extraction, high-efficiency and high-power device designs, white-light emitters with wavelength-converting phosphor materials, optical reflectors, and spontaneous recombination in resonant-cavity structures are discussed in detail. With exercises, solutions, and illustrative examples, this textbook will be of interest to scientists and engineers working on LEDs and graduate students in electrical engineering, applied physics, and materials science.

Contents: Preface; 1. History of light-emitting diodes; 2. Radiative and non-radiative recombination; 3. Theory of radiative recombination; 4. LED basics: electrical properties; 5. LED basics: optical properties; 6. Junction and carrier temperature; 7. High internal efficiency designs; 8. Design of current flow; 9. High extraction efficiency structures; 10. Reflectors; 11. Packaging; 12. Visible-spectrum LEDs;13. The AlGaInN material system and ultraviolet emitters; 14. Spontaneous emission from resonant cavities; 15. Resonant cavity light-emitting diodes; 16. Human eye sensitivity and photometric qualities; 17. Colorimetry; 18. Planckian sources and color temperature; 19. Color mixing and color rendering; 20. White-light sources based on LEDs; 21. White-light sources based on wavelength converters; 22. Optical communication; 23. Communication LEDs; 24. LED modulation characteristics.

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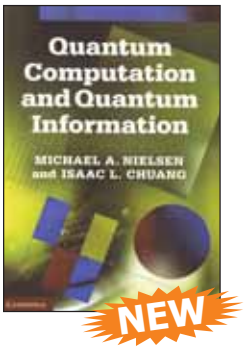
ELECTRICAL & ELECTRONIC ENGINEERING

Quantum Computation and Quantum Information

Michael Nielsen
Freelance Writer

& Isaac Chuang
Massachusetts Institute of Technology



One of the most cited books in physics of all time, *Quantum Computation and Quantum Information* remains the best textbook in this exciting field of science. This 10th Anniversary Edition includes a new Introduction and Afterword from the authors setting the work in context.

This comprehensive textbook describes such remarkable effects as fast quantum algorithms, quantum teleportation, quantum cryptography, and quantum error-correction. Quantum mechanics and computer science are introduced, before moving on to describe what a quantum computer is, how it can be used to solve problems faster than "classical" computers, and its real-world implementation. It concludes with an in-depth treatment of quantum information.

Containing a wealth of figures and exercises, this well-known textbook is ideal for courses on the subject, and will interest beginning graduate students and researchers in physics, computer science, mathematics, and electrical engineering.

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Quantum Mechanics for Scientists and Engineers

David A. B. Miller
Stanford University, California

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If you need a book that relates the core principles of quantum mechanics to modern applications in engineering, physics, and nanotechnology, this is it. Students will appreciate the book's applied emphasis, which illustrates theoretical concepts with examples of nanostructured materials, optics, and semiconductor devices. The many worked examples and more than 160 homework problems help students to problem solve and to practice applications of theory. Without assuming a prior knowledge of high-level physics or classical mechanics, the text introduces Schrodinger's equation, operators, and approximation methods. Systems, including the hydrogen atom and crystalline materials, are analyzed in detail. More advanced subjects, such as density matrices, quantum optics, and quantum information, are also covered. Practical applications and algorithms for the computational analysis of simple structures make this an ideal introduction to quantum mechanics for students of engineering, physics, nanotechnology, and other disciplines. Additional resources available from www.cambridge.org/9780521897839.

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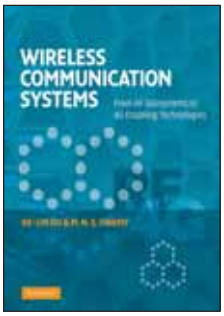
Wireless Communication Systems

From RF Subsystems to 4G Enabling Technologies

Ke-Lin Du
Concordia University, Montréal

& M. N. S. Swamy
Concordia University, Montréal



This practically-oriented, all-inclusive guide covers all the major enabling techniques for current and next-generation cellular communications and wireless networking systems. Technologies covered include CDMA, OFDM, UWB, turbo and LDPC coding, smart antennas, wireless ad hoc and sensor networks, MIMO, and cognitive radios, providing readers with everything they need to master wireless systems design in a single volume. Uniquely, a detailed introduction to the properties, design, and selection of RF subsystems and antennas is provided, giving readers a clear overview of the whole wireless system. It is also the first textbook to include a complete introduction to speech coders and video coders used in wireless systems. Richly illustrated with over 400 figures, and with a unique emphasis on practical and state-of-the-art techniques in system design, rather than on the mathematical foundations, this book is ideal for graduate students and researchers in wireless communications, as well as for wireless and telecom engineers.

Contents: 1. Introduction; 2. An overview of wireless communications; 3. Channel and propagation; 4. Cellular and multiple-user systems; 5. Diversity; 6. Channel estimation and equalization; 7. Modulation and detection; 8. Spread spectrum communications; 9. Orthogonal frequency division multiplexing; 10. Antennas; 11. RF and microwave subsystems; 12. A/D and D/A conversions; 13. Signals and signal processing; 14. Fundamentals of information theory; 15. Channel coding; 16. Source coding I: speech and audio coding; 17. Source coding II: image and video coding; 18. Multiple antennas: smart antenna systems; 19. Multiple antennas: MIMO systems; 20. Ultra wideband communications; 22. Wireless ad hoc/ sensor networks; The Q-function; Wirtinger calculus.

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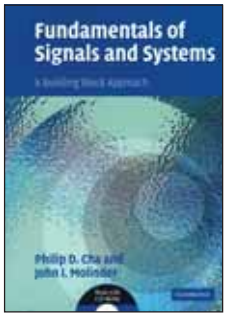
Fundamentals of Signals and Systems

A Building Block Approach

Philip D. Cha
Harvey Mudd College, California

& John I. Molinder
Harvey Mudd College, California



This innovative textbook provides a solid foundation in both signal processing and systems modeling using a building block approach. The authors show how to construct signals from fundamental building blocks (or basis functions), and demonstrate a range of powerful design and simulation techniques in Matlab, recognizing that signal data are usually received in discrete samples, regardless of whether the underlying system is discrete or continuous in nature. The book begins with key concepts such as the orthogonality principle and the discrete Fourier transform. Using the building block approach as a unifying principle, the modeling, analysis and design of electrical and mechanical systems are then covered, using various real-world examples. The design of finite impulse response filters is also described in detail. Containing many worked examples, homework exercises, and a range of Matlab laboratory exercises, this is an ideal textbook for undergraduate students of engineering, computer science, physics, and other disciplines.

Contents: 1. Introduction to signals and systems; 2. Constructing signals from building blocks; 3. Sampling and data acquisition; 4. Lumped element modeling of mechanical systems; 5. Lumped element modeling of electrical systems; 6. Solution to differential equations; 7. Input-output relationships using frequency response; 8. Digital signal processing (DSP); 9. Applications; 10. Summary; Laboratory exercises

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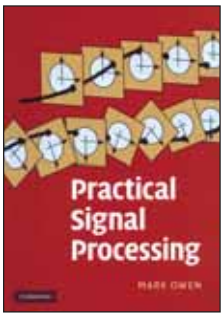
Practical Signal Processing

Mark Owen



The principles of signal processing are fundamental to the operation of many everyday devices. This book introduces the basic theory of digital signal processing, with emphasis on real-world applications. Sampling, quantisation, the Fourier transform, filters, Bayesian methods and numerical considerations are covered, then developed to illustrate how they are used in audio, image, and video processing and compression, and in communications. The book concludes with methods for the efficient implementation of algorithms in hardware and software. Intuitive arguments rather than mathematical ones are used wherever possible, and links between various signal processing techniques are stressed. The advantages and disadvantages of different approaches are presented in the context of real-world examples, enabling the reader to choose the best solution to a given problem. With over 200 illustrations and over 130 exercises (including solutions), this book will appeal to practitioners working in signal processing, and undergraduate students of electrical and computer engineering.

Contents: Preface; Part I. Foundations: 1. Introduction; 2. Sampling; 3. Conversion between analogue and digital; 4. The frequency domain; 5. Filters; 6. Likelihood methods; 7. Numerical considerations; Part II. Applications: 8. Audio; 9. Still images; 10. Moving images; 11. Communications; 12. Implementations; Answers to chapter exercises.

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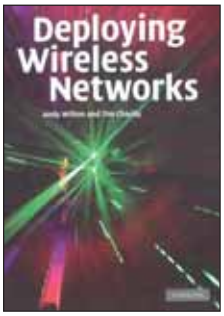
Deploying Wireless Networks

Andy Wilton
Motorola Ltd, Swindon

& Tim Charity
Motorola Ltd, Swindon



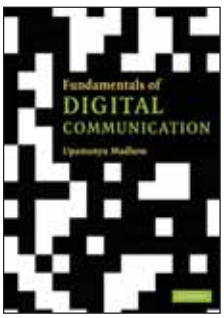
Do you want your wireless network to be profitable? Wireless operators will find this practical, hands-on guide to network deployment invaluable. Based on their own extensive experience, the authors describe an end-to-end network planning process to deliver the guaranteed Quality of Service (QoS) that enables today's wireless IP services such as VoIP, WWW and streaming video. The trade-off between enhanced user experience and operator cost is explored in the context of an enhanced business model. Comprehensive examples are provided for: • GSM/GPRS/EDGE • WCDMA-UMTS/HSDPA • OFDM-WiMAX/LTE • mesh WiFi • packet backhaul. Topics addressed include: • capacity/peak data rates • service latency • link budgets • lifecycle costs • network optimisation. With a focus on practical design, the book is ideal for radio and core network planners, designers, optimisers and business development staff at operators and network equipment manufacturers. Extensive references also make it suitable for graduate and postgraduate students.

Contents: Foreword; Preface; Acknowledgements; Author's disclaimer; 1. Introduction; 2. Wireless network systems; 3. Principles of access network planning; 4. Introduction to RAN planning and design; 5. GSM RAN planning and design; 6. UMTS RAN planning and design; 7. Cellular OFDM RAN planning and design; 8. Mesh network planning and design; 9. Core network and transmission; 10. Network operation and optimisation; Acronyms; Index.

ISBN: 9780521181921 384pp ₹ 545.00

Fundamentals of Digital Communication

Upamanyu Madhow
University of California, Santa Barbara



This is a concise presentation of the concepts underlying the design of digital communication systems, without the detail that can overwhelm students. Many examples, from the basic to the cutting-edge, show how the theory is used in the design of modern systems and the relevance of this theory will motivate students. The theory is supported by practical algorithms so that the student can perform computations and simulations. Leading edge topics in coding and wireless communication make this an ideal text for students taking just one course on the subject.

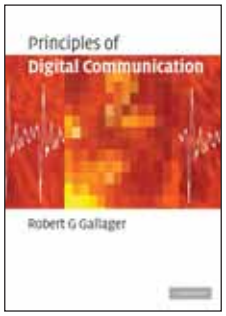
Fundamentals of Digital Communication has coverage of turbo and LDPC codes in sufficient detail and clarity to enable hands-on implementation and performance evaluation, as well as 'just enough' information theory to enable computation of performance benchmarks to compare them against. Other unique features include space-time communication and geometric insights into noncoherent communication and equalization.

Contents: Preface; 1. Introduction; 2. Modulation; 3. Demodulation; 4. Synchronization and noncoherent communication; 5. Channel equalization; 6. Information-theoretic limits and their computation; 7. Channel coding; 8. Wireless communication; Appendices: A. Probability, random variables and random processes; B. The Chernoff bound; C. Jensen's inequality

ISBN: 9780521171571 518pp ₹ 845.00

Principles of Digital Communication

Robert Gallager
Massachusetts Institute of Technology



The renowned communications theorist Robert Gallager brings his lucid writing style to the study of the fundamental system aspects of digital communication for a one-semester course for graduate students. With the clarity and insight that has characterized his teaching and earlier textbooks, he develops a simple framework and then combines this with careful proofs to help the reader understand modern systems and simplified models in an intuitive yet precise way. A strong narrative and links between theory and practice reinforce this concise, practical presentation. The book begins with data compression for arbitrary sources, Gallager then describes how to modulate the resulting binary data for transmission over wires, cables, optical fibers, and wireless channels. Analysis and intuitive interpretations are developed for channel noise models, followed by coverage of the principles of detection, coding, and decoding. The various concepts covered are brought together in a description of wireless communication, using CDMA as a case study.

Contents: Preface; 1. Introduction to digital communication; 2. Coding for discrete sources; 3. Quantization; 4. Source and channel waveforms; 5. Vector spaces and signal space; 6. Channels, modulation, and demodulation; 7. Random processes and noise; 8. Detection, coding and decoding; 9. Wireless digital communication.

ISBN: 9780521182065 422pp ₹ 595.00

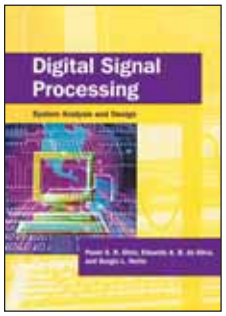
Digital Signal Processing

System Analysis and Design

Paulo S.R. Diniz
Universidade Federal do Rio de Janeiro

Eduardo A.B. da Silva
Universidade Federal do Rio de Janeiro

& Sergio L. Netto
Universidade Federal do Rio de Janeiro



This book covers all the major topics in digital signal processing (DSP) design and analysis, supported by MatLab examples and other modelling techniques. An ideal textbook for students, it will also be a useful reference for engineers working on the development of signal processing systems.

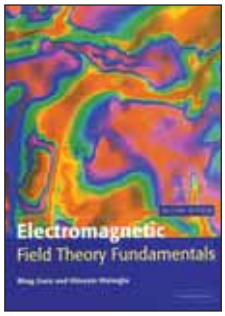
Contents: Preface; Introduction; 1. Discrete-time systems; 2. The z and Fourier transforms; 3. Discrete transforms; 4. Digital filters; 5. FIR filter approximations; 6. IIR filter approximations; 7. Finite precision effects; 8. Multirate systems; 9. Filter banks and wavelets;10. Efficient FIR structures; 11. Efficient IIR structures; 12. Implementation of DSP systems; Index.

ISBN: 9780521540834 626pp ₹ 545.00

Electromagnetic Field Theory Fundamentals

Bhag Guru
Kettering University, Michigan

& Huseyin Hiziroglu
Kettering University, Michigan



Guru and Hiziroglu have produced an accessible and user-friendly text on electromagnetics that will appeal to both students and professors teaching this course. This lively book includes many worked examples and problems in every chapter, as well as chapter summaries and background revision material where appropriate. The book introduces undergraduate students to the basic concepts of electrostatic and magnetostatic fields, before moving on to cover Maxwell's equations, propagation, transmission and radiation. Chapters on the Finite Element and Finite Difference method, and a detailed appendix on the Smith chart are additional enhancements.

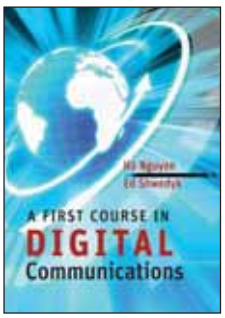
Contents: Preface; 1. Electromagnetic field theory; 2. Vector analysis; 3. Electrostatics; 4. Steady electrical currents; 5. Magnetostatics; 6. Applications of static fields; 7. Time-varying electromagnetic fields; 8. Plane wave propagation; 9. Transmission lines; 10. Waveguides and cavity resonators; 11. Antennas; 12. Computer-aided analysis of electromagnetic fields; Appendix A. Smith chart and its applications; Appendix B. Computer programs for various problems; Appendix C. Useful mathematical tables; Index.

ISBN: 9780521670425 696pp ₹ 545.00

A First Course in Digital Communications

Ha H. Nguyen
University of Saskatchewan, Canada

& Ed Shwedyk
University of Manitoba, Canada



Communication technology has become pervasive in the modern world, and ever more complex. Focusing on the most basic ideas, this carefully paced, logically structured textbook is packed with insights and illustrative examples, making this an ideal introduction to modern digital communication. Examples with step-by-step solutions help with the assimilation of theoretical ideas, and MATLAB exercises develop confidence in applying mathematical concepts to real-world problems. Right from the start the authors use the signal space approach to give students an intuitive feel for the modulation/demodulation process. After a review of signals and random processes, they describe core topics and techniques such as source coding, baseband transmission, modulation, and synchronization. The book closes with coverage of advanced topics such as trellis-coding, CMDA, and space-time codes to stimulate further study. This is an ideal textbook for anyone who wants to learn about modern digital communication.

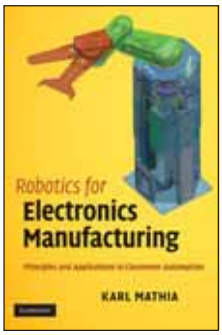
Contents: Preface; Acknowledgements; 1. Introduction; 2. Deterministic signal characterization and analysis; 3. Probability theory, random variables and random processes; 4. Sampling and quantization; 5. Optimum receiver for binary data transmission; 6. Baseband data transmission; 7. Basic digital passband modulation; 8. M-ary signaling techniques; 9. Signaling over bandlimited channels; 10. Signaling over fading channels; 11. Advanced modulation techniques; 12. Synchronization; Index.

ISBN: 9781107652804 562pp ₹ 650.00

Robotics for Electronics Manufacturing

Principles and Applications in Cleanroom Automation

Karl Mathia
Zitech Engineering, LLC



Understand the design, testing, and application of cleanroom robotics and automation with this practical guide. From the history and evolution of cleanroom automation to the latest applications and industry standards, this book provides the only complete overview of the topic available. With over 20 years' industry experience in robotics design, Karl Mathia provides numerous real-world examples to enable you to learn from professional experience, maximize the design quality and avoid expensive design pitfalls. You'll also get design guidelines and hands-on tips for reducing design time and cost. Compliance with industry and de-facto standards for design, assembly, and handling is stressed throughout, and detailed discussions of recommended materials for atmospheric and vacuum robots are included to help shorten product development cycles and avoid expensive material testing. This book is the perfect practical reference for engineers working with robotics for electronics manufacturing in a range of industries that rely on cleanroom manufacturing.

Contents: 1. Industrial robotics; 2. Cleanroom robotics; 3. Design of atmospheric robots; 4. Design of vacuum robots; 5. Kinematics; 6. Dynamics and control; 7. Test and characterization.

ISBN: 9780521187343 250pp ₹ 395.00

Theory and Design of Digital Communication Systems

Tri T. Ha
Naval Postgraduate School, Monterey, California

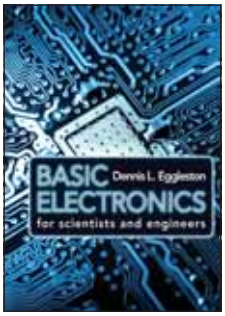
Providing the underlying principles of digital communication and the design techniques of real-world systems, this textbook prepares senior undergraduate and graduate students for the engineering practices required in industry. Covering the core concepts, including modulation, demodulation, equalization, and channel coding, it provides step-by-step mathematical derivations to aid understanding of background material. In addition to describing the basic theory, the principles of system and subsystem design are introduced, enabling students to visualize the intricate connections between subsystems and understand how each aspect of the design supports the overall goal of achieving reliable communications. Throughout the book, theories are linked to practical applications with over 250 real-world examples, whilst 370 varied homework problems in three levels of difficulty enhance and extend the text material. With this textbook, students can understand how digital communication systems operate in the real world, learn how to design subsystems, and evaluate end-to-end performance with ease and confidence.

Contents: 1. Introduction; 2. Deterministic signal analysis; 3. Random signal analysis; 4. Information theory and channel coding; 5. Communication link analysis; 6. Modulation; 7. Demodulation; 8. Spread spectrum; 9. Intersymbol interference and equalization; 10. Fading channels.

ISBN: 9781107659537 668pp ₹ 795.00

Basic Electronics for Scientists and Engineers

Dennis L. Eggleston
Occidental College, Los Angeles



Companion Website available

Ideal for a one-semester course, this concise textbook covers basic electronics for undergraduate students in science and engineering. Beginning with the basics of general circuit laws and resistor circuits to ease students into the subject, the textbook then covers a wide range of topics, from passive circuits through to semiconductor-based analog circuits and basic digital circuits. Using a balance of thorough analysis and insight, readers are shown how to work with electronic circuits and apply the techniques they have learnt. The textbook's structure makes it useful as a self-study introduction to the subject. All mathematics is kept to a suitable level, and there are several exercises throughout the book. Password-protected solutions for instructors, together with eight laboratory exercises that parallel the text, are available online at www.cambridge.org/Eggleston.

Contents: Preface; 1. Basic concepts and resistor circuits; 2. AC circuits; 3. Band theory and diode circuits; 4. Bipolar junction transistors; 5. Field-effect transistors; 6. Operational amplifiers; 7. Oscillators; 8. Digital circuits and devices; Appendices; Index.

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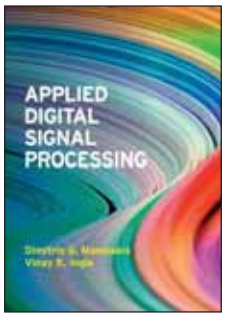
Applied Digital Signal Processing

Theory and Practice

Dimitris G. Manolakis
Massachusetts Institute of Technology

& Vinay K. Ingle
Northeastern University, Boston



Online Resource available

Master the basic concepts and methodologies of digital signal processing with this systematic introduction, without the need for an extensive mathematical background. The authors lead the reader through the fundamental mathematical principles underlying the operation of key signal processing techniques, providing simple arguments and cases rather than detailed general proofs. Coverage of practical implementation, discussion of the limitations of particular methods and plentiful MATLAB illustrations allow readers to better connect theory and practice. A focus on algorithms that are of theoretical importance or useful in real-world applications ensures that students cover material relevant to engineering practice, and equips students and practitioners alike with the basic principles necessary to apply DSP techniques to a variety of applications. Chapters include worked examples, problems and computer experiments, helping students to absorb the material they have just read. Lecture slides for all figures and solutions to the numerous problems are available to instructors.

Contents: 1. Introduction; 2. Discrete-time signals and systems; 3. The z-transform; 4. Fourier representation of signals; 5. Transform analysis of LTI systems; 6. Sampling of continuous-time signals; 7. The discrete Fourier transform; 8. Computation of the discrete Fourier transform; 9. Structures for discrete-time systems; 10. Design of FIR filters; 11. Design of IIR filters; 12. Multirate signal processing; 13. Random signals; 14. Random signal processing; 15. Finite wordlength effects.

ISBN: 9781107616738 1008pp ₹ 995.00

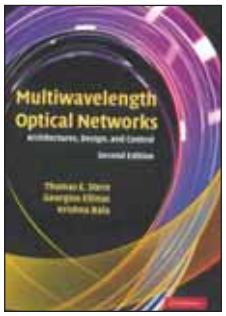
Multiwavelength Optical Networks

Architecture, Design and Control
2nd Edition

Thomas E. Stern
Columbia University, New York

Georgios Ellinas
University of Cyprus

& Krishna Bala
Xtellus, New Jersey



Updated and expanded, this second edition of the acclaimed *Multiwavelength Optical Networks* provides a detailed description of the structure and operation of modern optical networks. It also sets out the analytical tools for network performance evaluation and optimization for current and next generation networks, as well as the latest advances in enabling technologies. Backbone optical networks are evolving to mesh topologies using intelligent network elements; a new optical control plane is taking shape based on GMPLS; and significant advances have occurred in Fiber to the Home/Premises (the 'last mile'), metropolitan area networks, protection and restoration, and IP over WDM. New research on all-optical packet switched networks is also covered in depth. Also included are current trends and new applications on the commercial scene. This book is an invaluable resource for graduate and senior undergraduate students in electrical engineering, computer science, and applied physics, and for practitioners in the telecommunications industry.

Contents: Figures; Tables; Preface to the Second Edition; Acknowledgments; 1. The Big Picture; 2. The Layered Architecture and Its Resources; 3. Network Connections; 4. Enabling Technology; 5. Static Multipoint Networks; 6. Wavelength/ Waveband-Routed Networks; 7. Logically-Routed Networks; 8. Survivability: Protection and Restoration; 9. Optical Control Plane; 10. Optical Packet Switched Networks; 11. Current Trends in Multiwavelength Optical Networking; A Graph Theory; B Fixed Scheduling Algorithm; C Markov Chains and Queues; D A Limiting-Cut Heuristic; E An Algorithm for Minimum-Interference Routing in Linear Lightwave Networks; F Synopsis of the SONET Standard; G A Looping Algorithm; Acronyms; Index

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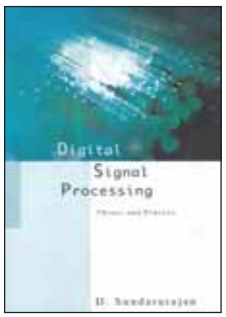
Digital Signal Processing

Theory and Practice

D. Sundararajan
Newtech Software Pvt. Ltd., India

(World Scientific)



This concise and clear text is intended for a senior undergraduate and graduate level, one-semester course on digital signal processing. Emphasis on the use of the discrete Fourier transform (the heart of practical digital signal processing) and comprehensive coverage of the design of commonly used digital filters are the key features of the book. The large number of visual aids such as figures, flow graphs, and tables makes the mathematical topic easy to learn. The numerous examples and the set of Matlab programs (a supplement to the book) for the design of optimal equiripple FIR digital filters help greatly in understanding the theory and algorithms.

Contents: Preface; Chapter 1 Introduction; Chapter 2 Discrete Signals; Chapter 3 Time-Domain Analysis of LTI Discrete Systems; Chapter 4 The Discrete Fourier Transform; Chapter 5 The Discrete-Time Fourier Transform; Chapter 6 The z-Transform; Chapter 7 Frequency-Domain Analysis of Discrete Systems; Chapter 8 Digital Filters – Characterization and Realization; Chapter 9 Linear-Phase FIR Filters - I; Chapter 10 Linear-Phase FIR Filters - II; Chapter 11 IIR Filters; Chapter 12 Computation of the DFT; Chapter 13 Quantization Effects; Appendix A Analog Filter Design; Appendix B Sampling and Reconstruction of Signals; Solutions to Selected Exercises; Index

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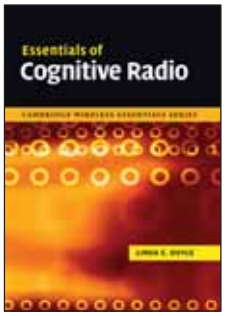
Essentials of Cognitive Radio

Linda E. Doyle
Trinity College, Dublin



Do you need to get quickly up to speed on cognitive radio? This concise, practical guide presents the key concepts and challenges you need to know about, including issues associated with security, regulation, and designing and building cognitive radios. Written in a descriptive style and using minimum mathematics, complex ideas are made easily understandable, providing you with a perfect introduction to the technology and preparing you to face its many future challenges.

Contents: Acknowledgements; 1. A cognitive radio world; 2. The essentials - an overview; 3. Taking action; 4. Observing the outside world; 5. Making decisions; 6. Security in cognitive radio; 7. Cognitive radio platforms; 8. Cognitive radio regulation and standardisation; 9. Conclusions; About the author; Index.

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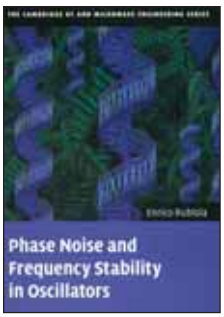
Phase Noise and Frequency Stability in Oscillators

Enrico Rubiola
FEMTO-ST Institute, Université de Franche Comté, Besançon



Presenting a comprehensive account of oscillator phase noise and frequency stability, this practical text is both mathematically rigorous and accessible. An in-depth treatment of the noise mechanism is given, describing the oscillator as a physical system, and showing that simple general laws govern the stability of a large variety of oscillators differing in technology and frequency range. Inevitably, special attention is given to amplifiers, resonators, delay lines, feedback, and flicker (1/f) noise. The reverse engineering of oscillators based on phase-noise spectra is also covered, and end-of-chapter exercises are given. Uniquely, numerous practical examples are presented, including case studies taken from laboratory prototypes and commercial oscillators, which allow the oscillator internal design to be understood by analyzing its phase-noise spectrum. Based on tutorials given by the author at the Jet Propulsion Laboratory, international IEEE meetings, and in industry, this is a useful reference for academic researchers, industry practitioners, and graduate students in RF engineering and communications engineering.

Contents: Foreword Lute Maleki; Foreword David B. Leeson; Preface; List of symbols; 1. Phase noise and frequency stability; 2. Phase noise in semiconductors and amplifiers; 3. Heuristic approach to the Leeson effect; 4. Phase noise and linear feedback theory; 5. Noise in delay-line oscillators and lasers; 6. Oscillator hacking; A Laplace transform; Bibliography.

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RF Power Amplifier Behavioral Modelling

Edited by
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Katholieke Universiteit Leuven, Belgium

Máirtín O'Droma
University of Limerick

Anthony A. Goacher
University of Limerick

& Michael Gadringer
Vienna University of Technology

If you are an engineer or RF designer working with wireless transmitter power amplifier models, this comprehensive and up-to-date review of nonlinear theory and power amplifier modeling techniques is an absolute must-have. Including a detailed treatment of nonlinear theory, as well as chapters on memory effects, implementation in commercial circuit simulators, and validation, this one-stop reference makes power amplifier modeling more accessible by connecting the mathematics with the practicalities of RF power amplifier design. Uniquely, the book explains how systematically to evaluate a model's accuracy and validity, compares model types and offers recommendations as to which model to use in which situation.

Contents: 1. Power amplifier modelling overview; 2. Properties of behavioural models; 3. Nonlinear memoryless models; 4. Nonlinear models with linear memory; 5. Nonlinear models with non-linear memory; 6. Validation and comparison of PA models; 7. Aspects of system simulation; Appendices: A. Recent wireless standards; B. Abbreviations; C. Authors and contributors.

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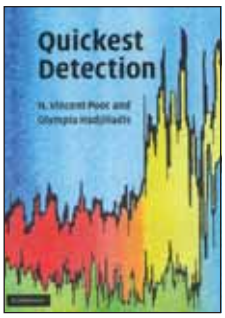
Quickest Detection

H. Vincent Poor
Princeton University, New Jersey

& Olympia Hadjiliadis
Brooklyn College, City University of New York



The problem of detecting abrupt changes in the behavior of an observed signal or time series arises in a variety of fields, including climate modeling, finance, image analysis, and security. Quickest detection refers to real-time detection of such changes as quickly as possible after they occur. Using the framework of optimal stopping theory, this book describes the fundamentals underpinning the field, providing the background necessary to design, analyze, and understand quickest detection algorithms. For the first time the authors bring together results which were previously scattered across disparate disciplines, and provide a unified treatment of several different approaches to the quickest detection problem. This book is essential reading for anyone who wants to understand the basic statistical procedures for change detection from a fundamental viewpoint, and for those interested in theoretical questions of change detection. It is ideal for graduate students and researchers of engineering, statistics, economics, and finance.

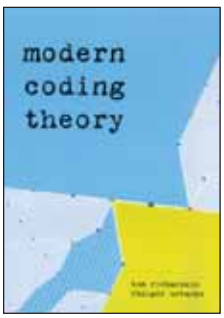
Contents: 1. Introduction; 2. Probabilistic framework; 3. Markov optimal stopping theory; 4. Sequential detection; 5. Bayesian quickest detection; 6. Non-bayesian quickest detection; 7. Additional topics.

ISBN: 9780521621045 244pp ₹ 2950.00

Modern Coding Theory

Tom Richardson
Flarion Technologies, Inc., New Jersey

& Ruediger Urbanke
École Polytechnique Fédérale, Lausanne



Companion Website available

Having trouble deciding which coding scheme to employ, how to design a new scheme, or how to improve an existing system? This summary of the state-of-the-art in iterative coding makes this decision more straightforward. With emphasis on the underlying theory, techniques to analyse and design practical iterative coding systems are presented. Using Gallager's original ensemble of LDPC codes, the basic concepts are extended for several general codes, including the practically important class of turbo codes. The simplicity of the binary erasure channel is exploited to develop analytical techniques and intuition, which are then applied to general channel models. A chapter on factor graphs helps to unify the important topics of information theory, coding and communication theory. Covering the most recent advances, this text is ideal for graduate students in electrical engineering and computer science, and practitioners. Additional resources, including instructor's solutions and figures, available online: www.cambridge.org/9780521852296.

Contents: Preface; 1. Introduction; 2. Factor graphs; 3. Binary erasure channel; 4. Binary memoryless symmetric channels; 5. General channels ; 6. Convolutional codes and turbo codes; 7. General ensembles; 8. Expander codes and the flipping algorithm; Appendices: A. Encoding low-density parity-check codes; B. Efficient implementation of density evolution; C. Concentration inequalities; D. Formal power sums.

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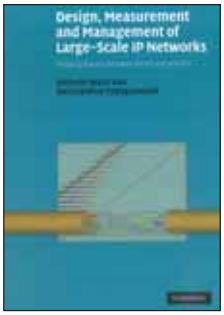
Design, Measurement and Management of Large-Scale IP Networks

Bridging the Gap Between Theory and Practice

Antonio Nucci
Narus Inc., Mountain View, California

& Konstantina Papagiannaki
Intel, Pittsburgh, Pennsylvania



Designing efficient IP networks and maintaining them effectively poses a range of challenges, but in this highly competitive industry it is crucial that these are overcome. Weaving together theory and practice, this text sets out the design and management principles of large-scale IP networks, and the need for these tasks to be underpinned by actual measurements. Discussions of the types of measurements available in IP networks are included, along with the ways in which they can assist both in the design phase as well as in the monitoring and management of IP applications. Other topics covered include IP network design, traffic engineering, network and service management and security. A valuable resource for graduate students and researchers in electrical and computer engineering and computer science, this is also an excellent reference for network designers and operators in the communication industry.

Contents: 1. Introduction; 2. Background and context; Part I. Network Monitoring and Management: 3. The need for monitoring in ISP network design and management; 4. Understanding through-router delay; 5. Traffic matrices: measurement, inference and modeling; Part II. Network Design and Traffic Engineering: 6. Principles of network design and traffic engineering; 7. Topology design resilient to long-lived failures; 8. Achieving topology resilience using multi-parallel links; 9. Performance enhancement and resilience to short-lived failures via routing optimization; 10. Measuring the shared

fate of IGP engineering: considerations and takeaway; 11. Capacity planning; Part III. From Bits to Services: 12. From bits to services: information is power; 13. Traffic classification in the dark; 14. Classification of multimedia hybrid flows in real time; 15. Detection of data place malware: DoS and computer worms; 16. Detection of control place anomalies: beyond prefix hijacking; Appendix A. How to link original and measured flow characteristics when packet sampling is used: bytes, packets and flows; Appendix B. Application specific payload bit strings; Appendix C. BLINC implementation details; Appendix D. Validation of direction-conforming rule.

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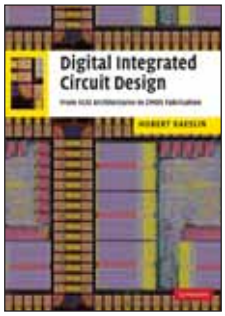
Digital Integrated Circuit Design

From VLSI Architecture to CMOS Fabrication

Hubert Kaeslin
ETH Zurich



Companion Website available

This practical, tool-independent guide to designing digital circuits takes a unique, top-down approach, reflecting the nature of the design process in industry. Starting with architecture design, the book comprehensively explains the why and how of digital circuit design, using the physics designers need to know, and no more. Covering system and component aspects, design verification, VHDL modeling, signal integrity, clocking and more, the scope of the book is uniquely comprehensive. With a focus on CMOS technology, numerous examples - VHDL and Verilog code, architectural concepts, and failure reports - practical guidelines, and design checklists, this engaging textbook for senior undergraduate and graduate courses on digital ICs will prepare students for the realities of real-world circuit design. Practitioners will also find the book valuable for its insights and its practical approach. Instructor only solutions and lecture slides are available at: www.cambridge.org/Kaeslin.

Contents: Preface; Acknowledgements; 1. Introduction to microelectronics; 2. From algorithms to architectures; 3. Functional verification; 4. Modelling hardware with VHDL; 5. The case for synchronous design; 6. Clocking of synchronous circuits; 7. Acquisition of asynchronous data; 8. Gate- and transistor-level design; 9. Energy efficiency and heat removal; 10. Signal integrity; 11. Physical design; 12. Design verification; 13. VLSI economics and project management; 14. A primer on CMOS technology; 15. Outlook; Appendices: A. Elementary digital electronics; B. Finite state machines; C. VLSI designer's checklist; D. Symbols and constants.

ISBN: 9780521127356 854pp ₹ 1495.00

Introduction to Nanoelectronics

Science, Nanotechnology, Engineering and Applications

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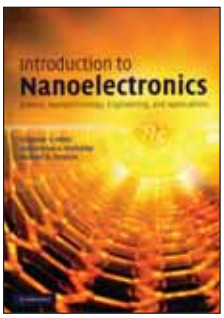


Companion Website available

This textbook is a comprehensive, interdisciplinary account of the technology and science underpinning nanoelectronics, covering the underlying physics, nanostructures, nanomaterials, and nanodevices. It provides a unifying framework for the basic ideas needed to understand the developments in the field. After introducing the recent trends in semiconductor and device nanotechnologies, as well as novel device concepts, the methods of growth, fabrication and characterization of materials for nanoelectronics are discussed. Coverage then moves to an analysis of nanostructures including recently-discovered nanoobjects, and concludes with a discussion of devices that use a 'simple' scaling-down approach to copy well-known microelectronic devices, and nanodevices based on new principles that cannot be realized at the macroscale. With numerous illustrations and homework problems, this textbook is suitable for advanced undergraduate and graduate students in electrical and electronic engineering, nanoscience, materials, bioengineering and chemical engineering. Additional resources, including instructor-only solutions and Java applets, are available from www.cambridge.org/9780521881722.

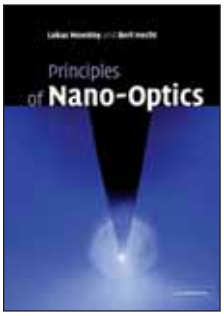
Contents: Preface; Notations; 1. Towards the nanoscale; 2. Particles and waves; 3. Wave mechanics; 4. Materials for nanoelectronics; 5. Growth, fabrication, and measurement techniques for nanostructures; 6. Electron transport in semiconductors and nanostructures; 7. Electrons in traditional low-dimensional structures; 8. Nanostructure devices; Index.

ISBN: 9780521166843 348pp ₹ 495.00

Principles of Nano-Optics

Lukas Novotny
University of Rochester, New York

& Bert Hecht
Universitat Basel, Switzerland



Nano-optics is the study of optical phenomena and techniques on the nanometer scale, that is, near or beyond the diffraction limit of light. It is an emerging field of study, motivated by the rapid advance of nanoscience and nanotechnology which require adequate tools and strategies for fabrication, manipulation and characterization at this scale. In *Principles of Nano-Optics* the authors provide a comprehensive overview of the theoretical and experimental concepts necessary to understand and work in nano-optics. With a very broad perspective, they cover optical phenomena relevant to the nanoscale across diverse areas ranging from quantum optics to biophysics, introducing and extensively describing all of the significant methods. This is the first textbook specifically on nano-optics. Written for graduate students who want to enter the field, it includes problem sets to reinforce and extend the discussion. It is also a valuable reference for researchers and course teachers.

Contents: 1. Introduction; 2. Theoretical foundations; 3. Propagation and focusing of optical fields; 4. Spatial resolution and position accuracy; 5. Nanoscale optical microscopy; 6. Near-field optical probes; 7. Probe-sample distance control; 8. Light emission and optical interaction in nanoscale environments; 9. Quantum emitters; 10. Dipole emission near

planar interfaces; 11. Photonic crystals and resonators; 12. Surface plasmons; 13. Forces in confined fields; 14. Fluctuation-induced phenomena; 15. Theoretical methods in nano-optics; Appendices; Index.

ISBN: 9780521149037 558pp ₹ 695.00

Electromagnetic Theory for Telecommunications

C.S. Liu
University of Maryland

& V.K. Tripathi
Indian Institute of Technology, Delhi

Online resource available

This book presents the fundamental principles and applications of electromagnetic theory, with emphasis on applications in communication. The underlying theory for technological advances like medium and short wave communication, cellular communication, radar and satellite communication, laser and optical communication, remote sensing and geological and earth observing applications have also been explained lucidly. Thus, given the breadth of its coverage, besides being used as a textbook for electrodynamics for beginner and advanced undergraduate students of physics and engineering, this book may also serve as an effective reference source for telecommunication engineers, physicists and researchers.

Key features:

- rigorous mathematical details provided for involved physical concepts
- in-text problems with complete solutions at relevant places in the chapters
- unsolved problems with hints and answers
- list of references at the end of each unit for interested readers
- extensive figures annotating the text

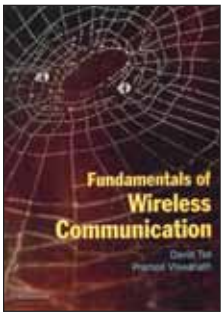
Contents: Preface; 1 Electromagnetic Fields; 2 Plane Waves; 3 Guided Waves; 4 Radiation; 5 Radio Communication and Radar; 6 Satellite Communication; 7 Laser and Optical Fibre Communication; 8 Geological Seismic and Remote Sensing; 9 Relativistic Covariance of Electrodynamics; 10 Radiation from Accelerated Charges; Appendix A; Appendix B; Index

ISBN: 9788175965447 315pp ₹ 345.00

Fundamentals of Wireless Communication

David Tse
University of California, Berkeley

& Pramod Viswanath
University of Illinois, Urbana-Champaign



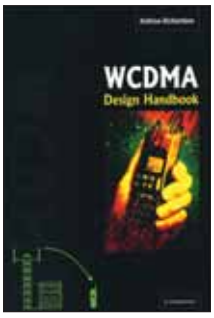
The past decade has seen many advances in physical layer wireless communication theory and their implementation in wireless systems. This textbook takes a unified view of the fundamentals of wireless communication and explains the web of concepts underpinning these advances at a level accessible to an audience with a basic background in probability and digital communication. Topics covered include MIMO (multi-input, multi-output) communication, space-time coding, opportunistic communication, OFDM and CDMA. The concepts are illustrated using many examples from real wireless systems such as GSM, IS-95 (CDMA), IS-856 (1 x EV-DO), Flash OFDM and UWB (ultra-wideband). Particular emphasis is placed on the interplay between concepts and their implementation in real systems. An abundant supply of exercises and figures reinforce the material in the text. This book is intended for use on graduate courses in electrical and computer engineering and will also be of great interest to practicing engineers.

Contents: 1. Introduction; 2. The wireless channel; 3. Point-to-point communication: detection, diversity and channel uncertainty; 4. Cellular systems: multiple access and interference management; 5. Capacity of wireless channels; 6. Multiuser capacity and opportunistic communication; 7. MIMO I: spatial multiplexing and channel modeling; 8. MIMO II: capacity and multiplexing architectures; 9. MIM0 III: diversity-multiplexing tradeoff and universal space-time codes; 10. MIMO IV: multiuser communication; A. Detection and estimation in additive Gaussian noise; B. Information theory background.

ISBN: 9780521687492 585pp ₹ 595.00

WCDMA Design Handbook

Andrew Richardson
Imagicom Ltd, Newmarket



Developed out of a successful professional engineering course, this practical handbook provides a comprehensive explanation of the Wideband CDMA (Code Division Multiple Access) air interface of 3rd generation UMTS cellular systems. The book addresses all aspects of the design of the WCDMA radio interface from the lower layers to the upper layers of the protocol architecture. The book considers each of the layers in turn, to build a complete understanding of the design and operation of the WCDMA radio interface including the physical layer, RF and baseband processing, MAC, RLC, PDCP/BMP, Non-Access stratum and RRC. An ideal course book and reference for professional engineers, undergraduate and graduate students.

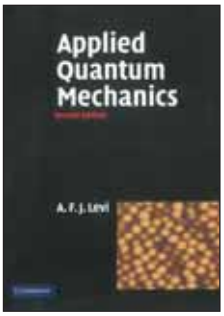
Contents: 1. Introduction; 2. WCDMA in a nutshell; 3. Spreading codes and modulation; 4. Physical layer; 5. RF aspects; 6. Symbol rate processing functions. 7. Chip rate processing functions. 8. Layer 2 - MAC; 9. Layer 2 - RLC; 10. PDCP and BMC protocols; 11. Non access stratum; 12. Idle mode functions; 13. Layer 3-RRC;14. Measurements; Index.

ISBN: 9780521670371 590pp ₹ 545.00

Applied Quantum Mechanics

2nd edition

A.F.J. Levi
University of Southern California



Companion Website available

Electrical and mechanical engineers, materials scientists and applied physicists will find Levi's uniquely practical explanation of quantum mechanics invaluable. This updated and expanded edition of the bestselling original text now covers quantization of angular momentum and quantum communication, and problems and additional references are included. Using real-world engineering examples to engage the reader, the author makes quantum mechanics accessible and relevant to the engineering student. Numerous illustrations, exercises, worked examples and problems are included; Matlab source codes to support the text are available from www.cambridge.org/9780521860963.

Contents: Preface to the second edition; Preface to the first edition; Matlab programs; 1. Introduction; 2. Toward quantum mechanics; 3. Using the Schrödinger wave equation; 4. Electron propagation; 5. Eigenstates and operators; 6. The harmonic oscillator; 7. Fermions and bosons; 8. Time-dependent perturbation; 9. The semiconductor laser; 10. Time-independent perturbation; 11. Angular momentum and the hydrogenic atom; A. Physical values; B. Coordinates; C. Expansions, differentiation, integrals, and mathematical relations; D. Matrices and determinants; E. Vector calculus and Maxwell's equations; F. The Greek alphabet; Index.

ISBN: 9780521138444 574pp ₹ 545.00

The Art of Electronics

2nd Edition

Paul Horowitz
Harvard University, Massachusetts

& Winfield Hill
Rowland Institute for Science, Cambridge, Massachusetts

This is the thoroughly revised and updated second edition of the hugely successful *The Art of Electronics.* Widely accepted as the single authoritative text and reference on electronic circuit design, both analog and digital, the original edition sold over 125,000 copies worldwide and was translated into eight languages. The book revolutionized the teaching of electronics by emphasizing the methods actually used by circuit designers - a combination of some basic laws, rules to thumb, and a large non-mathematical treatment that encourages circuit values and performance. It is an ideal first textbook on electronics for scientists and engineers, and an indispensable reference for anyone, professional or amateur, who works with electronic circuits.

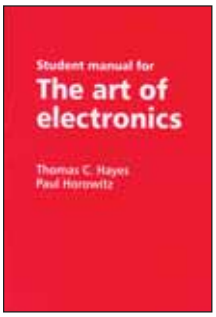
Contents: List of tables, Preface; Preface to first edition;1. Foundations; 2. Transistors; 3. Field-effect transistors; 4. Feedback and operational amplifiers; 5. Active filters and oscillators; 6. Voltage regulators and power circuits; 7. Precision circuits and low-noise techniques; 8. Digital electronics; 9. Digital meets analog; 10. Microcomputers; 11. Microprocessors; 12. Electronic construction techniques; 13. High-frequency and high-speed techniques; 14. Low-power design; 15. Measurements and signal processing; Appendixes; Bibliography; Index.

ISBN: 9780521689175 1148pp ₹ 895.00

Student Manual for The Art of Electronics

Thomas C. Hayes

& Paul Horowitz
Harvard University, Massachusetts



This manual satisfies two needs for students and teachers using *The Art of Electronics* as a text:

- It sets forth 23 laboratory exercises that can form the backbone of a one or two-semester course in electronics, both analog and digital
- It supplements the text's explanations of selected topics which have been chosen for their importance to a student, rather than a practitioner who uses the text as a reference.

The manual is a product of many years' teaching at Harvard University, where the authors have tested and refined both lab exercises and explanations. The result is a set of course materials tailored to students' needs moving quickly where appropriate and slowly on those concepts that students have found most difficult.

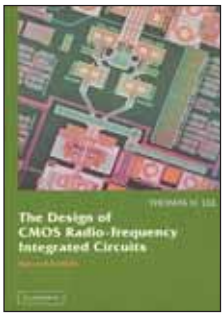
Contents: 1. Foundations; 2. Transistors (bipolar); 3. Field effect transistors; 4. Feedback and operational amplifiers; 5. Active fillers and oscillators; 6. Voltage regulators and power circuits; 7. Digital electronics; 8. Digital meets analog; 9. Microcomputers; Microprocessors; Appendices; Index.

ISBN: 9780521689182 620pp ₹ 425.00

The Design of CMOS Radio Frequency Integrated Circuits

2nd Edition

Thomas H. Lee
Stanford University, California



This is an expanded and thoroughly revised edition of Thomas H. Lee's acclaimed guide to the design of gigahertz RF integrated circuits.

In order to provide a bridge between system and circuit issues, there is a completely new chapter on the principles of wireless systems. The chapters on low-noise amplifiers, oscillators, and phase noise have been significantly expanded. The chapter on architectures now contains several examples of complete chip designs, including a GPS receiver and a wireless LAN transceiver, that bring together all the various theoretical and practical elements involved in producing a prototype chip. Every section has been revised and updated with the latest findings in the field and the book is packed with physical insights and design tips, and includes a historical overview that sets the whole field in context. Wtih hundreds of circuit diagrams and homework problems this is an ideal textbook for students taking courses on RF design and a valuable reference for practising engineers.

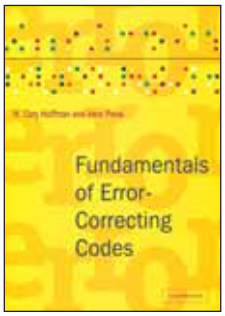
Contents: 1. A nonlinear history of radio; 2. Overview of wireless principles; 3. Passive RLC networks; 4. Charateristics of passive IC components; 5. A review of MOS device physics; 6. Distributed systems; 7. The Smith chart and S-parameters; 8. Bandwidth estimation techniques; 9. High-frequency amplifier design; 10. Voltage references and biasing; 11. Noise; 12. LNA design; 13. Mixers; 14. Feedback systems; 15. RF power amplifiers; 16. Phase-locked loops; 17. Oscillators and synthesizers; 18. Phase noise; 19. Architectures; 20. RF circuits through the ages.

ISBN: 9780521613897 815pp ₹ 695.00

Fundamentals of Error-Correcting Codes

W. Cary Huffman
Loyola University, Chicago

& Vera Pless
University of Illinois, Chicago



Fundamentals of Error-Correcting Codes is an in-depth introduction to coding theory from both an engineering and mathematical viewpoint. As well as covering classical topics, much coverage is included of recent techniques that until now could only be found in specialist journals and book publications. Numerous exercises and examples and an accessible writing style make this a lucid and effective introduction to coding theory for advanced undergraduate and graduate students, researchers and engineers, whether approaching the subject from a mathematical, engineering, or computer science background.

Contents: Preface; 1. Basic concepts of linear codes; 2. Bounds on size of codes; 3. Finite fields; 4. Cyclic codes; 5. BCH and Reed-Soloman codes; 6. Duadic codes; 7. Weight distributions; 8. Designs; 9. Self-dual codes; 10. Some favourite self-dual codes; 11. Covering radius and cosets;12. Codes over Z4;13. Codes from algebraic geometry; 14. Convolutional codes; 15. Soft decision and iterative decoding; Bibliography; Index.

ISBN: 9780521613880 664pp ₹ 695.00

Introduction to Semiconductor Devices

For Computing and Telecommunications Applications

Kevin Brennan
Georgia Institute of Technology

From semiconductor fundamentals to state-of-the-art semiconductor devices used in the telecommunications and computing industries, this book provides a solid grounding in the most important devices used in the hottest areas of electronic engineering today. The book includes coverage of future approaches to computing hardware and RF power amplifiers, and explains how emerging trends and system demands of computing and telecommunications systems influence the choice, design and operation of semiconductor devices. The book begins with a discussion of the fundamental properties of semiconductors. Next, state-of-the-art field effect devices are described, including MODFETs and MOSFETs. Short channel effects and the challenges faced by continuing miniaturization are then addressed. The rest of the book discusses the structure, behavior, and operating requirements of semiconductor devices used in lightwave and wireless telecommunications systems. This is both an excellent senior/graduate text and a valuable reference for engineers and researchers in the field.

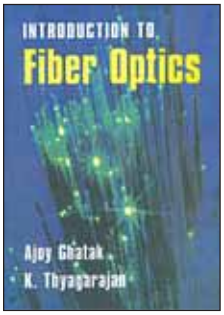
Contents: Preface; 1: Semiconductor fundamentals; 2: Carrier action; 3: Junctions; 4: Bipolar junction transistors; 5: JFETs and MESFETs; 6: Metal-insulator - semiconductor structures and MOSFETs; 7: Short channel effects and challenges to CMOS; 8: Beyond CMOS; 9: Telecommunications systems - an overview; 10: Optoelectronic devices - emitters, light amplifiers and detectors; 11: Transistors for high frequency, high power amplifiers for wireless systems; References; Appendix I. Physical constants; Appendix II. Material parameters for important semiconductors, Si and GaAs; Index.

ISBN: 9780521670364 334pp ₹ 495.00

Introduction to Fiber Optics

Ajoy Ghatak
Indian Institute of Techonology, Delhi

& K. Thyagarajan
Indian Institute of Techonology, Delhi



This comprehensive book provides an introduction to the physical principles of optical fibres, and discusses in detail their use in sensor technology and modern optical communication systems. It will be an ideal textbook for undergraduate or graduate students taking courses in optical fiber communications, photonics, or optoelectronics.

Contents: 1. Introduction; 2. Basic optics; 3. The optical fiber; 4. Ray analysis of planar optical waveguide; 5. Graded index optical fibers; 6. Material dispersion; 7. Planar waveguides; 8. Characteristics of a step-index fiber, 9. Graded Index fibers; 10. Waveguide dispersion and design considerations; 11. Sources for optical fiber communication; 12. Detectors for optical fiber and communication; 13. Fiber optic communication system design; 14. Optical fiber Amplifiers; 15. Dispersion compensation and chirping phenomenon; 16. Optical solitons;17. Single-mode fiber optic components; 18. Single mode optical fiber sensors; 19. Measurement methods in optical fiber: I; 20. Measurement methods in optical fibers: II; 21. Periodic interactions in waveguides; 22. Ray equation in Cartesian coordinates; 23. Ray paths; 24. Leaky modes.

ISBN: 9788175960626 317pp ₹ 495.00

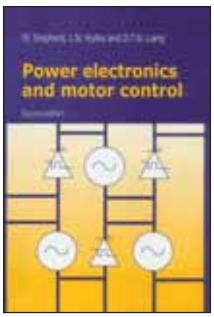
Power Electronics and Motor Control

2nd Edition

W. Shepherd
University of Bradford

L.N. Hulley
University of Bradford

& D.T.W. Liang
University of Bradford



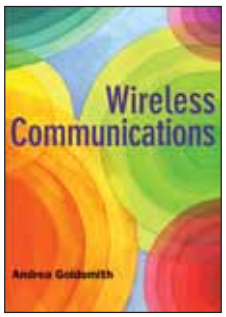
This clear and concise advanced textbook is a comprehensive introduction to power electronics. In this second edition, a completely new chapter dealing with the application of PWM techniques in induction motor speed control has been added and the chapters dealing with electronic switching devices and with adjustable speed drives have been entirety rewritten.With numerous worked examples, exercises and the many diagrams, advanced undergraduates and postgraduates will find this a readable and immensely useful introduction to the subject of power electronics.

Contents: Preface to second edition; Preface to first edition; List of principal symbols; 1. Power switching theory; 2. Switching devices and control electrode requirements; 3. System realisation; 4. Adjustable speed drives; 5. DC motor control using a DC chopper; 6. Controlled bridge rectifiers with DC motor load; 7. Three-phase naturally-commutated bridge circuit as rectifier or inverter; 8. Single-phase voltage controllers; 9. Three-phase induction motor with constant frequency supply; 10. Induction motor slip energy recovery; 11. Induction motor speed control by the use of Adjustable-Voltage, Adjustable-Frequency, Step-Wave Inverters; 12. Induction motor speed control by the use of adjustable frequency PWM inverters; Appendix: General expressions for Fourier series; Answers to problems; References and Bibliography; Index.

ISBN: 9788175960381 539pp ₹ 495.00

Wireless Communications

Andrea Goldsmith
Stanford University, California



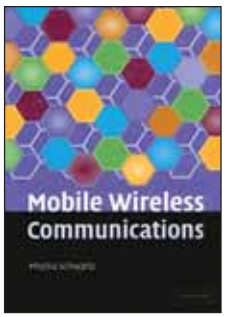
Wireless technology is a truly revolutionary paradigm shift, enabling multimedia communications between people and devices from any location. It also underpins exciting applications such as sensor networks, smart homes, telemedicine, and automated highways. This book provides a comprehensive introduction to the underlying theory, design techniques and analytical tools of wireless communications, focusing primarily on the core principles of wireless system design. The book begins with an overview of wireless systems and standards. The characteristics of the wireless channel are then described, including their fundamental capacity limits. Various modulation, coding, and signal processing schemes are then discussed in detail, including state-of-the-art adaptive modulation multicarrier, spread spectrum, and multiple antenna techniques. The concluding chapters deal with multiuser communications, cellular system design, and ad-hoc network design. Design insights and tradeoffs are emphasized throughout the book. It contains many worked examples, over 200 figures, almost 300 homework exercises, over 700 references, and is an ideal textbook for students. The book is also a valuable reference for engineers in the wireless industry.

Contents: Preface; 1. Overview of wireless communications; 2. Path loss and shadowing; 3. Statistical multipath channel models; 4. Capacity of wireless channels; 5. Digital modulation and detection; 6. Performance of digital modulation over wireless channels; 7. Diversity; 8. Coding for wireless channels; 9. Adaptive modulation and coding; 10. Multiple antennas and space-time communications; 11. Equalization; 12. Multicarrier modulation; 13. Spread spectrum; 14. Multiuser systems; 15. Cellular systems and infrastructure-based wireless networks; 16. Ad-hoc networks; Appendices; Bibliography.

ISBN: 9780521704168 672pp ₹ 545.00

Mobile Wireless Communications

Mischa Schwartz
Columbia University, New York



Solutions Manual available

Wireless communication has become a ubiquitous part of modern life, from global cellular telephone systems to local and even personal-area networks. This book provides a tutorial introduction to digital mobile wireless networks, illustrating theoretical underpinnings with a wide range of real-world examples. The book begins with a review of propagation phenomena, and goes on to examine channel allocation, modulation techniques, multiple access schemes, and coding techniques. GSM and IS-95 systems are reviewed and 2.5 and 3G packet-switched systems are discussed in detail. Performance analysis and accessing and scheduling techniques are covered, and the book closes with a chapter on wireless LANs and personal-area networks. Many worked examples and homework exercises are provided and a solutions manual is available for instructors. This book is an ideal text for electrical engineering and computer science students taking courses in wireless communication and an invaluable reference for practising engineers.

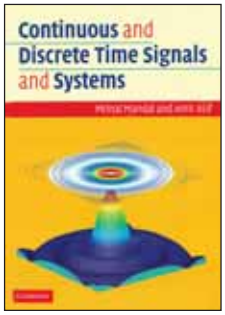
Contents: Preface; 1. Introduction and overview; 2. Characteristics of the mobile radio environment-propagation phenomena; 3. Cellular concept and channel allocation; 4. Dynamic channel allocation and power control; 5. Modulation techniques; 6. Multiple access techniques: FDMA, TDMA, CDMA; system capacity comparisons; 7. Coding for error detection and correction; 8. Second-generation, digital, wireless systems; 9. Performance analysis: admission control and handoffs;10. 2.5G/3G Mobile wireless systems: packet-switched data; 11. Access and scheduling techniques in cellular systems; 12. Wireless LANs and personal-area networks; References; Index.

ISBN: 9780521146326 470pp ₹ 795.00

Continuous and Discrete Time Signals and Sytems

Mrinal Mandal
University of Alberta

& Amir Asif
York University, Toronto



Companion Website available

Signals and systems is a core topic for electrical and computer engineers. This textbook presents an introduction to the fundamental concepts of continuous-time (CT) and discrete-time (DT) signals and systems, treating them separately in a pedagogical and self-contained manner. Emphasis is on the basic signal processing principles, with underlying concepts illustrated using practical examples from signal processing and multimedia communications. The text is divided into three parts. Part I presents two introductory chapters on signals and systems, Part II covers the theories, techniques, and applications of CT signals and systems and Part III discusses these topics for DT signals and systems, so that the two can be taught independently or together. The focus throughout is principally on linear time invariant systems. Accompanying the book is a CD-ROM containing MATLAB code for running illustrative simulations included in the text; data files containing audio clips, images and interactive programs used in the text, and two animations explaining the convolution operation. With over 300 illustrations, 287 worked examples and 409 homework problems, this textbook is an ideal introduction to the subject for undergraduates in electrical and computer engineering. Further resources,

including solutions for instructors, are available online at www.cambridge.org/9780521854559.

Contents: Preface Part I: Introduction to signals and systems: 1. Introduction to signals; 2. Introduction to systems Part II: Continuous-time signals and systems: 3 Time-domain analysis of LTIC systems; 4. Signal representation using Fourier series; 5. Continuous-time Fourier transform 6. Laplace transform 7. Continuous-time filters 8. Case studies for CT systems; Part III: Discrete-time signals and systems: 9. Sampling and quantization; 10.Time-domain analysis of discrete-time systems 11. Discrete-time Fourier series and transform; 12. Discrete Fourier transform; 13. The z-transform; 14. Digital Filters; 15. FIR filter design 16. IIR filter design; 17. Applications of digital signal processing; Appendix A: Mathematical preliminaries; Appendix B: Introduction to the complex-number system; Appendix C: Linear constant-coefficient differential equations; Appendix D: Partial fraction expansion; Appendix E: Introduction to Matlab; Appendix F: About the CD; Bibliography; Index

ISBN: 9780521733137 880pp ₹ 695.00

Essentials of UMTS

Christopher Cox
Chris Cox Consulting Ltd., Cambridge, UK.

The third generation (3G) cellular system UMTS is advanced, optimised and complex. The many existing books on UMTS attempt to explain all the intricacies of the system and as a result are large and equally complex. This book takes a different approach and explains UMTS in a concise, clear and readily understandable style. Written by a professional technical trainer, and based on training courses delivered on UMTS to telecommunication companies worldwide, *Essentials of UMTS* will enable you to grasp the key concepts quickly. It assumes no previous knowledge of mobile telecommunication theory, and is structured around the operation of the system, clearly setting out how the different components interact with each other, and how the system as a whole behaves. Engineers, project managers and marketing executives working for equipment manufacturers and network operators will find this concise guide to UMTS invaluable.

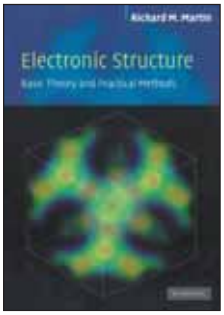
Contents: Preface; 1. Introduction to mobile telecommunications; 2. Introduction to UMTS; 3. Radio transmission and reception; 4. Operational procedures; 5. Services and their implementation; 6. Future developments; Bibliography; List of abbreviations.

ISBN: 9780521187329 256pp ₹ 395.00

Electronic Structure

Basic Theory and Practical Methods

Richard M. Martin
University of Illinois, Urbana-Champaign



The study of the electronic structure of materials is at a momentous stage, with new algorithms and computational methods and rapid advances in basic theory. Many properties of materials can now be determined directly from the fundamental equations for the electrons, providing new insights into critical problems in physics, chemistry, and materials science. This book provides a unified exposition of the basic theory and methods of electronic structure, together with instructive examples of practical computational methods and real-world applications. Appropriate for both graduate students and practising scientists, this book describes the approach most widely used today, density functional theory, with emphasis upon understanding the ideas, practical methods and limitations. Many references are provided to original papers, pertinent reviews, and widely available books. Included in each chapter is a short list of the most relevant references and a set of exercises that reveal salient points and challenge the reader.

Contents: Preface; Acknowledgements; Notation; Part I. Overview and Background Topics: 1. Introduction; 2. Overview; 3. Theoretical background; 4. Periodic solids and electron bands; 5. Uniform electron gas and simple metals; Part II. Density Functional Theory: 6. Density functional theory: foundations; 7. The Kohn–Sham ansatz; 8. Functionals for exchange and correlation; 9. Solving the Kohn–Sham equations; Part III. Important Preliminaries on Atoms: 10. Electronic structure of atoms; 11. Pseudopotentials; Part IV. Determination of Electronic Structure, The Three Basic Methods: 12. Plane waves and grids: basics; 13. Plane waves and grids: full calculations; 14. Localized orbitals: tight binding; 15. Localized orbitals: full calculations; 16. Augmented functions: APW, KKR, MTO; 17. Augmented functions: linear methods; Part V. 12. TDD wireless systems. Predicting Properties of Matter from Electronic Structure – Recent Developments: 18. Quantum molecular dynamics (QMD); 19. Response functions: photons, magnons ...; 20. Excitation spectra and optical properties; 21. Wannier functions; 22. Polarization, localization and Berry's phases; 23. Locality and linear scaling O (N) methods; 24. Where to find more; Appendixes; References; Index.

ISBN: 9780521534406 648pp £ 45.00

Dynamic Spectrum Access and Management in Cognitive Radio Networks

Ekram Hossain
University of Manitoba, Canada

Dusit Niyato
Nanyang Technological University, Singapore

& Zhu Han
University of Houston

Are you involved in designing the next generation of wireless networks? With spectrum becoming an ever scarcer resource, it is critical that new systems utilize all available frequency bands as efficiently as possible. The revolutionary technology presented in this book will be at the cutting edge of future wireless communications. *Dynamic Spectrum Access and Management in Cognitive Radio Networks* provides you with an all-inclusive introduction to this emerging technology, outlining the fundamentals of cognitive radio-based wireless communication and networking, spectrum sharing models, and the requirements for dynamic spectrum access. In addition to the different techniques and their applications in designing dynamic spectrum access methods, you'll also find state-of-the-art dynamic spectrum access schemes, including classifications of the different schemes and the technical details of each scheme. This is a perfect introduction for graduate students and researchers, as well as a useful self-study guide for practitioners.

ISBN: 9780521898478 504pp ₹ 65.00

A Foundation in Digital Communication

Amos Lapidoth
Eidgenössische Technische Hochschule Zürich

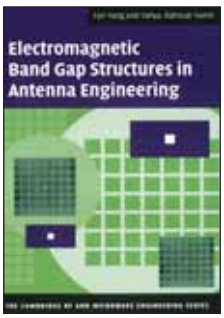
This intuitive yet rigorous introduction derives the core results of digital communication from first principles. Theory, rather than industry standards, motivates the engineering approaches, and key results are stated with all the required assumptions. The book emphasizes the geometric view, opening with the inner product, the matched filter for its computation, Parseval's theorem, the sampling theorem as an orthonormal expansion, the isometry between passband signals and their baseband representation, and the spectral-efficiency optimality of quadrature amplitude modulation (QAM). Subsequent chapters address noise, hypothesis testing, Gaussian stochastic processes, and the sufficiency of the matched filter outputs. Uniquely, there is a treatment of white noise without generalized functions, and of the power spectral density without artificial random jitters and random phases in the analysis of QAM. This systematic and insightful book, with over 300 exercises, is ideal for graduate courses in digital communication, and for anyone asking 'why' and not just 'how'.

ISBN: 9780521193955 750pp £ 46.00

Electromagnetic Band Gap Structures in Antenna Engineering

Fan Yang
The University of Mississippi

& Yahya Rahmat-Samii
University of California, Los Angeles



This comprehensive, applications-oriented survey of the state-of-the art in Electromagnetic Band Gap (EBG) engineering explains the theory, analysis, and design of EBG structures. It helps you to understand EBG applications in antenna engineering through an abundance of novel antenna concepts, a wealth of practical examples, and complete design details. You discover a customized FDTD method of EBG analysis, for which accurate and efficient electromagnetic software is supplied (www.cambridge.org/9780521889919) to provide you with a powerful computational engine for your EBG designs. The first book covering EBG structures and their antenna applications, this provides a dynamic resource for engineers, and researchers and graduate students working in antennas, electromagnetics and microwaves.

Contents: Preface; 1. Introduction; 2. FDTD Method for periodic structure analysis; 3. EBG Characterizations and classifications; 4. Design and optimizations of EBG structures; 5. Patch antennas with EBG structures; 6. Low profile wire antennas on EBG surfaces; 7. Surface wave antennas; Appendix: EBG literature review

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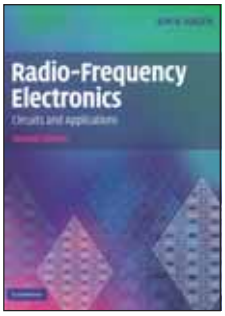
Radio-Frequency Electronics

Circuits and Applications
2nd Edition

Jon B. Hagen
Cornell University, New York



This second, updated edition of the best-selling *Radio-Frequency Electronics* introduces the basic concepts and key circuits of radio-frequency systems. It covers the fundamental principles applying to all radio devices, from wireless single-chip data transceivers to high-power broadcast transmitters. This new edition is extensively revised and expanded throughout, including additional chapters on radar, digital modulation, GPS navigation, and S-parameter circuit analysis. New worked examples and end-of-chapter problems are included to aid and test understanding of the topics covered, as well as numerous extra figures to provide a visual aid to learning. Key topics covered include filters, amplifiers, oscillators, modulators, low-noise amplifiers, phase lock loops, transformers, waveguides, and antennas. Assuming no prior knowledge of radio electronics, this is a perfect introduction to the subject. It is an ideal textbook for junior or senior courses in electrical engineering, as well as an invaluable reference for professional engineers in this area.

Contents: Preface; 1. Introduction; 2. Impedance matching; 3. Linear power amplifiers; 4. Basic filters; 5. Frequency converters; 6. Amplitude and frequency modulation; 7. Radio receivers; 8. Suppressed-carrier AM and quadrature AM (QAM); 9. Class-C, D, and E power RF amplifiers; 10. Transmission lines; 11. Oscillators; 12. Phase lock loops and synthesizers; 13. Coupled-resonator bandpass filters; 14. Transformers and baluns; 15. Hybrid couplers; 16. Waveguide circuits; 17. Small-signal RF amplifiers; 18. Demodulators and detectors; 19. Television systems; 20. Antennas and radio wave propagation; 21. Radar systems; 22. Digital modulation techniques; 23. Modulation, noise, and information; 24. Amplifier and oscillator noise analysis; 25. The GPS navigation system; 26. Radio and radar astronomy; 27. Radio spectrometry; 28. S-parameter circuit analysis; 29. Power supplies; 30. RF test equipment; Index.

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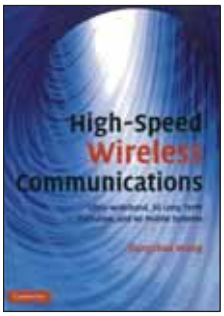
High-Speed Wireless Communications

Ultra-wideband, 3G Long Term Evolution, and 4G Mobile Systems

Jiangzhou Wang
University of Kent, Canterbury



Analysing and designing reliable and fast wireless networks requires an understanding of the theory underpinning these systems and the engineering complexities of their implementation. This text describes the underlying principles and major applications of high-speed wireless technologies, with emphasis on ultra-wideband (UWB) wireless systems, 3G long term evolution, and 4G mobile networks. Key topics such as cross-layer optimization are discussed in detail and various forms of UWB, including multi-band OFDM UWB, are covered. Recent research developments are described before identifying the scope and direction for future research. The overlay problem (interference problem) in UWB is discussed, and the author aims to illustrate that OFDM is not the best wireless access technique for high speed transmission. Covering the latest technologies in the area, this book will be a valuable resource for graduate students of electrical and computer engineering as well as practitioners in the wireless communications industry.

Contents: Preface; Acknowledgements; List of abbreviations; I. Introduction: 1. Introduction to high speed wireless communications; II. UWB Communications; 2. Multicarrier CDMA Overlay for UWB Communications; 3. Impulse radio overlay in UWB communications; 4. Rapid acquisition; III. Evolved 3G mobile communications; 5. TD Receiver with ideal channel state information; 6. TD receiver with imperfect channel state information; 7. QAM with Antenna Diversity; 8. QAM for Multicode CDMA with Interference Cancellation; IV. 4G Mobile Communications: 9. Optimal and MMSE detection for downlink OFCDM; 10. Hybrid detection for OFCDM systems; 11. Coded layered space-time-frequency architecture; 12.Sub-Packet Transmission for Hybrid ARQ Systems; Index.

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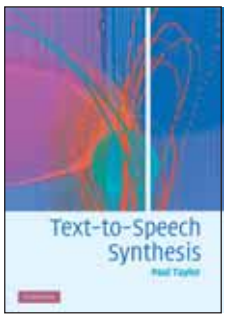
Text–to–Speech Synthesis

Paul Taylor
University of Cambridge



Text-to-Speech Synthesis provides a complete, end-to-end account of the process of generating speech by computer. Giving an in-depth explanation of all aspects of current speech synthesis technology, it assumes no specialised prior knowledge.

Introductory chapters on linguistics, phonetics, signal processing and speech signals lay the foundation, with subsequent material explaining how this knowledge is put to use in building practical systems that generate speech. Including coverage of the very latest techniques such as unit selection, hidden Markov model synthesis and statistical text analysis, explanations of the more traditional techniques such as format synthesis and synthesis by rule are also provided.

Weaving together the various strands of this multidisciplinary field, the book is designed for graduate students in electrical engineering, computer science and linguistics. It is also an ideal reference for practitioners in the fields of human communication interaction and telephony.

Contents: 1. Introduction; 2. Communication and language; 3. The text-to-speech problem; 4. Text segmentation and organisation; 5. Text decoding; 6. Prosody prediction from text; 7. Phonetics and phonology; 8. Pronunciation; 9. Synthesis of prosody; 10. Signals and filters; 11. Acoustic models of speech production; 12. Analysis of speech signals; 13. Synthesis techniques based on vocal tract models; 14. Synthesis by concatenation and signal processing modification; 15. Hidden Markov model synthesis; 16. Unit selection synthesis; 17. Further issues; 18. Conclusions.

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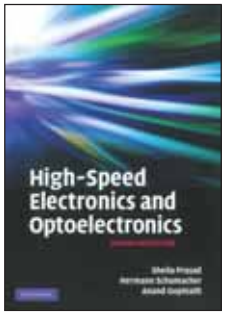
High-Speed Electronics and Optoelectronics

Devices and Circuits

Sheila Prasad
Northeastern University, Boston

Hermann Schumacher
Universität Ulm, Germany

& Anand Gopinath
University of Minnesota



This authoritative account of electronic and optoelectronic devices operating at frequencies greater than 1 GHz covers the concepts and fundamental principles of operation, and, uniquely, their circuit applications too.

Key features include:

- a comprehensive coverage of electron devices, such as MESFET, HEMT, RF MOSFET, BJT and HBT, and their models
- discussions of semiconductor devices fabricated in a variety of material systems, such as Si, III-V compound semiconductors, and Si-Ge
- a description of light-emitting diodes, semiconductor lasers and photodetectors
- plentiful real-world examples
- end-of-chapter problems to test understanding of the material covered from crystal structure to atomic bonding, recombination and radiation in semiconductors to p-n junctions and heterojunctions, a wide range of critical topics is covered.

Optimization algorithms, such as simulated annealing and neural network applications, are also discussed. Graduate students in electrical engineering, industry professionals and researchers will all find this a valuable resource.

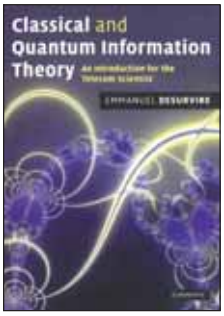
Contents: Preface; Part I. Devices: 1. Review of semiconductor device materials and physics; 2. Electronic devices; 3. Optimisation and parameter extraction of circuit models; 4. Optoelectronics; Part II. Circuits: 5. Building blocks for high-speed analogue circuits; Index.

ISBN: 9780521862837 440pp £ 57.00

Classical and Quantum Information Theory

An Introduction for the Telecom Scientist

Emmanuel Desurvire
Thales, France



Information theory lies at the heart of modern technology, underpinning all communications, networking, and data storage systems. This book sets out, for the first time, a complete overview of both classical and quantum information theory. Throughout, the reader is introduced to key results without becoming lost in mathematical details. Opening chapters present the basic concepts and various applications of Shannon's entropy, moving on to the core features of quantum information and quantum computing. Topics such as coding, compression, error-correction, cryptography and channel capacity are covered from classical and quantum viewpoints. Employing an informal yet scientifically accurate approach, Desurvire provides the reader with the knowledge to understand quantum gates and circuits. Highly illustrated, with numerous practical examples and end-of-chapter exercises, this text is ideal for graduate students and researchers in electrical engineering and computer science, and practitioners in the telecommunications industry. Further resources and instructor-only solutions are available at www.cambridge.org/9780521881715.

Contents: 1. Probabilities basics; 2. Probability distributions; 3. Measuring information; 4. Entropy; 5. Mutual information and more entropies; 6. Differential entropy; 7. Algorithmic entropy and Kolmogorov complexity; 8. Information coding; 9. Optimal coding and compression; 10. Integer, arithmetic and adaptive coding; 11. Error correction; 12. Channel entropy; 13. Channel capacity and coding theorem; 14. Gaussian channel and Shannon-Hartley theorem; 15. Reversible computation; 16. Quantum bits and quantum gates; 17. Quantum measurements; 18. Qubit measurements, superdense coding and quantum teleportation; 19. Deutsch/Jozsa algorithms and quantum fourier transform; 20. Shor's factorization algorithm; 21. Quantum information theory; 22. Quantum compression; 23. Quantum channel noise and channel capacity; 24. Quantum error correction; 25. Classical and quantum cryptography; Appendix A. Boltzmann's entropy; Appendix B. Shannon's entropy; Appendix C. Maximum entropy of discrete sources; Appendix D. Markov chains and the second law of thermodynamics; Appendix E. From discrete to continuous entropy; Appendix F. Kraft-McMillan inequality; Appendix G. Overview of data compression standards; Appendix H. Arithmetic coding algorithm; Appendix I. Lempel-Ziv distinct parsing; Appendix J. Error-correction capability of linear block codes; Appendix K. Capacity of binary communication channels; Appendix L. Converse proof of the Channel Coding Theorem; Appendix

M. Block sphere representation of the qubit; Appendix N. Pauli matrices, rotations and unitary operators; Appendix O. Heisenberg Uncertainty Principle; Appendix P. Two qubit teleportation; Appendix Q. Quantum Fourier transform circuit; Appendix R. Properties of continued fraction expansion; Appendix S. Computation of inverse Fourier transform in the factoring of N=21 through Shor's algorithm; Appendix T. Modular arithmetic and Euler's Theorem; Appendix U. Klein's inequality; Appendix V. Schmidt decomposition of joint pure states; Appendix W. State purification; Appendix X. Holevo bound; Appendix Y. Polynomial byte representation and modular multiplication.

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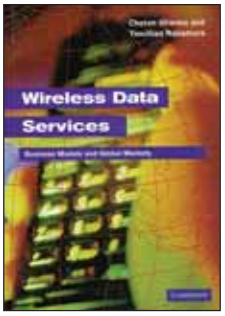
Wireless Data Services

Business and Global Markets

Chetan Sharma
Chetan Sharma Consulting

& Yasuhisa Nakamura
NTT DoCoMo



This book takes a deeper look into why certain technologies, business models, and adoption strategies succeed while others fail, and how all these elements will impact the future of wireless communications. With the help of examples, case studies, and interviews with industry luminaries, the authors identity the key factors behind the success or failure of different blueprints and provide insights into strategies of matching wireless technology and services to global markets.

Contents: List of figures; About the authors; Foreword; Acknowledgements; List of abbreviations; 1. Introduction; 2. The impact of globalization; 3. Adoption trends and analysis by region; 4. Subscriber needs and expectations; 5. The wireless value chain; 6. Global wireless technologies: systems and architectures; 7. Global wireless technologies: network, access, and software; 8. Business models and strategies; 9. Business issues and challenges; 10. Technology issues and challenges; 11. Case studies; 12. Perspectives; 13. Future of wireless technologies, applications and services; 14. Conclusions and recommendations; References and recommended reading; Index.

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RFID Technology and Applications

Stephen B. Miles
MIT Auto-ID Labs

Sanjay E. Sarma
MIT Auto-ID Labs

& John R. Williams
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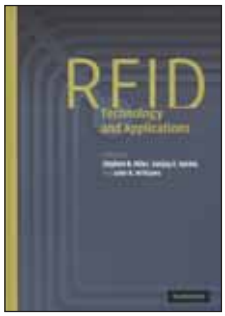

Companion Website available

Are you an engineer or manager working on the development and implementation of RFID technology? If so, this book is for you. Covering both passive and active RFID systems, the challenges to RFID implementation are addressed using specific industry research examples and common integration issues. Key topics include RF tag performance optimization, evaluation methodologies for RFID and Real-Time-Location Systems (RTLS) and sensors, EPC network simulation, RFID in the retail supply chain, and applications in product lifecycle management, anti-counterfeiting and cold chain management. The book brings together insights from world's leading research laboratories in the field, including the Auto-ID Labs at MIT, successor to the Auto-ID Center which developed the Electronic Product Code scheme which is set to become the global standard for product identification.MIT Auto-ID Labs's suite of Open Source code and tools for RFID implementation is available at www.cambridge.org/9780521880930.

Contents: Preface; List of contributors; 1. Introduction to RFID history and markets; 2. RFID technology and its applications; 3. RFID tag performance optimization - a chip perspective; 4. Resolution and integration of HF and UHF; 5. Integrating sensors and actuators into RFID tags; 6. Performance evaluation of WiFi RFID localization technologies; 7. Modeling supply chain network traffic; 8. Deployment considerations for active RFID systems; 9. RFID in the retail supply chain - issues and opportunities; 10. Reducing barriers to ID system adoption in the aerospace industry - the aerospace ID technologies programme; 11. The cold chain; 12. The application of RFID as anticounterfeiting technique - issues & opportunities; 13. Closing product information loops with product embedded information devices: RFID technology and applications, models and metrics; 14. Moving from RFID to autonomous cooperating logistic processes; 15. Conclusions; Appendix: Links to RFID technology and applications resources I. RFID interface specifications; II. Test capabilities (in the order of chapters as presented); III. Simulation environments.

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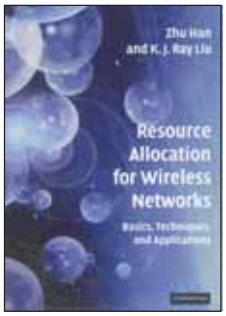
Resource Allocation for Wireless Networks

Basics, Techniques, and Applications

Zhu Han
University of Maryland, College Park

& K. J. Ray Liu
University of Maryland, College Park



Do you need to improve wireless system performance? Learn how to maximise the efficient use of resources with this systematic and authoritative account of wireless resource management. Basic concepts, optimization tools and techniques, and application examples, are thoroughly described and analysed, providing a unified framework for cross-layer optimization of wireless networks. State-of-the-art research topics and emerging applications, including dynamic resource allocation, cooperative networks, ad hoc/ personal area networks, UWB, and antenna array processing, are examined in depth. If you are involved in the design and development of wireless networks, as a researcher, graduate student or professional engineer, this is a must-have guide to getting the best possible performance from your network.

Contents: Preface; 1. Introduction; Part I. Basics Principles: 2. Wireless networks: an introduction; 3. Power control; 4. Rate adaptation; 5. Multiple access and spectrum access; Part II. Optimization Techniques for Resource Allocation: 6. Optimization formulation and analysis; 7. Mathematical programming; 8. Integer/ combinatorial optimization; 9. Game theory; Part III. Advanced Topics: 10. Resource allocation with antenna-array processing; 11. Dynamic resource allocation; 12. Resource allocation for cooperative networks; 13. Game-theoretic approaches for resource allocation; 14. Ad hoc/sensor/personal-area networks; 15. Resource allocation for wireless multimedia; Bibliography; Index.

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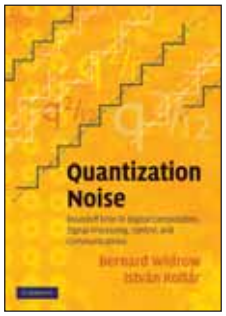
Quantization Noise

Roundoff Error in Digital Computation, Signal Processing, Control, and Communications

Bernard Widrow
Stanford University, California

& István Kollár
Budapest University of Technology and Economics



If you are working in digital signal processing, control or numerical analysis, you will find this authoritative analysis of quantization noise (roundoff error) invaluable. Do you know where the theory of quantization noise comes from, and under what circumstances it is true? Get answers to these and other important practical questions from expert authors, including the founder of the field and formulator of the theory of quantization noise, Bernard Widrow. The authors describe and analyze uniform quantization, floating-point quantization, and their applications in detail. Key features include: • Analysis of floating point round off • Dither techniques and implementation issues analyzed • Offers heuristic explanations along with rigorous proofs, making it easy to understand 'why' before the mathematical proof is given

Contents: Preface; Glossary of symbols; Acronyms and abbreviations; Part I. Background: 1. Introduction; 2. Sampling theory; 3. Probability density functions, characteristic functions, and moments; Part II. Uniform Quantization: 4. Statistical analysis of the quantizer output; 5. Statistical analysis of the quantization noise; 6. Crosscorrelations between quantization noise, quantizer input, and quantizer output; 7. General statistical relations among the quantization noise, the quantizer input, and the quantizer output; 8. Quantization of two or more variables - statistical analysis of the quantizer; 9. Quantization of two or more variables - statistical analysis of quantization noise; 10. Quantization of two or more variables - general statistical relations between the quantization noises, and the quantizer inputs and outputs; 11. Calculation of the moments and correlation functions of quantized Gaussian variables; Part III. Floating-point Quantization: 12. Floating-point quantization; 13. More on floating-point quantization; 14. Cascades of fixed-point and floating-point quantizers; Part IV. Quantization in Signal Processing, Feedback Control, and Computations: 15. Roundoff noise in FIR digital filters and in FFT calculations; 16. Roundoff noise in IIR digital filters; 17. Roundoff noise in digital feedback control systems; 18. Roundoff errors in nonlinear dynamic systems - a chaotic example; Part V. Applications of Quantization Noise Theory: 19. Dither; 20. Spectrum of quantization noise and conditions of whiteness; Part VI.Quantization of system parameters; 21. Coefficient quantization; Appendices: A. Perfectly bandlimited characteristic functions; B. General expressions of the moments of the quantizer output, and of the errors of Sheppard's Corrections; C. Derivatives of the sinc function; D. Proofs of quantizing theorems III and IV; E. Limits of applicability of the theory – Caveat reader; F. Some properties of the Gaussian PDF and CF; G. Quantization of a sinusoidal input; H. Application of the methods of appendix G to distributions other than sinusoidal; I. A Few properties of selected distributions; J. Digital dither; K. Roundoff noise in scientific computations; L. Simulating arbitrary-precision fixed-point and floating-point roundoff in Matlab; M. A Few papers from the literature of quantization theory; Bibliography; Index; Appendices N – V available online only: N. Comparison of the characteristic function method and Sheppard's approach; O. Interpolation of the cumulative distribution function from the histogram and numerical reconstruction of the Input PDF; P. Small bit-number correlation; Q. Noise shaping and sigma-delta modulation; R. Second-order statistical properties of a triangle-wave signal; S. Characteristic functions of quantities involved when using Dither; T. Kind corrections; U. Comparison of the engineers' Fourier transform and definition of the characteristic function; V. A few more papers from the literature of quantization theory.

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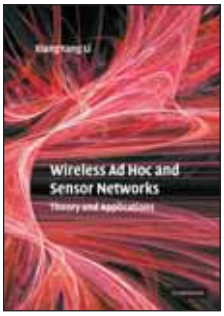
Wireless Ad Hoc and Sensor Networks

Theory and Applications

Xiang-Yang Li
Illinois Institute of Technology



Companion Website available

If you have to understand and optimize the performance of wireless ad hoc and sensor networks, this explanation provides you with the information and insights you need. It delivers an understanding of the underlying problems, and the techniques to develop efficient solutions and maximize network performance. Taking an algorithmic and theoretical approach, Li dissects key layers of a wireless network, from the physical and MAC layers (covering the IEEE 802.11 and 802.16 protocols, and protocols for wireless sensor networks and Bluetooth) through to the network routing layer. In doing so he reviews the practical protocols, formulates problems mathematically, solve them algorithmically and then analyses the performance. Graduate students, researchers and practitioners needing an overview of the various algorithmic, graph theoretical, computational geometric and probabilistic approach to solving problems in designing these networks will find this an invaluable resource. Additional resources for this title are available online at www.cambridge.org/9780521865234.

Contents: Part I. Introduction: 1. History of wireless networks; 2. Wireless transmission fundamentals; Part II. Wireless MACs: 3. Wireless medium access control protocols; 4. TDMA channel assignment; 5. Spectrum channel assignment; 6. CDMA code channel assignment; Part III. Topology Control and Clustering: 7. Clustering and network backbone; 8. Weighted network backbone; 9. Topology control with flat structures; 10. Power assignment; 11. Critical transmission ranges for connectivity; 12. Other transition phenomena; Part IV. Wireless Network Routing Protocols: 13. Energy efficient unicast routing; 14. Energy efficient broadcast/multicast routing; 15. Routing with selfish terminals; 16. Joint routing, channel assignment and link scheduling; Part V. Other Issues: 17. Localization and location tracking; 18. Performance limitations of random wireless ad hoc networks; 19. Security of wireless ad hoc networks.

ISBN: 9780521865234 616pp £ 82.00

Next Generation Mobile Access Technologies

Implementing TDD

Edited by
Harald Haas
Universitat Bremen

& Stephen McLaughlin
University of Edinburgh

Companion Website available

Future generations of wireless networks will place great demands on the performance of radio access technology. This book describes the features of various mobile access technologies and assesses their strengths and weaknesses. In particular, it describes the underlying principles and practical implementation schemes for time division duplexing (TDD). The book begins with an overview of next generation wireless systems. It then describes the basics of duplex communication modes, interference in cellular systems, and multiple user access techniques. Focusing on TDD systems, dynamic channel assignment algorithms are discussed, as are multi-hop communications schemes, radio resource management, interference cancellation, and smart antennas. Real-world examples from UMTS, wireless LAN, and Bluetooth systems are described. The book is aimed at all those involved in the design and implementation of wireless systems, as well as at graduate students and researchers working in the area of wireless communications. For more information visit www.cambridge.org/9780521826228.

Contents: 1. Introduction; 2. Drivers for future wireless systems; 3. Duplex modes in wireless communications; 4. Interference modes in cellular systems; 5. Multiple user access; 6. The TDD underlay; 7. Dynamic channel assignment (DCA) algorithms; 8. Multihop wireless communication using TDD; 9. Radio resource metric estimation; 10. Interference cancellation techniques; 11. Smart antennas for TDD CDMA systems;

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Modeling and Characterization of RF and Microwave Power FETs

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Jaime A. Pla
Freescale Semiconductor, AZ

& John Wood
Freescale Semiconductor, AZ

This is a book about the compact modeling of RF power FETs. In it, you will find descriptions of characterization and measurement techniques, analysis methods, and the simulator implementation, model verification and validation procedures that are needed to produce a transistor model that can be used with confidence by the circuit designer. Written by semiconductor industry professionals with many years' device modeling experience in LDMOS and III-V technologies, this is the first book to address the modeling requirements specific to high-power RF transistors. A technology-independent approach is described, addressing thermal effects, scaling issues, nonlinear modeling, and in-package matching networks. These are illustrated using the current market-leading high-power RF technology, LDMOS, as well as with III-V power devices. This book is a comprehensive exposition of FET modeling, and is a must-have resource for seasoned professionals and new graduates in the RF and microwave power amplifier design and modeling community.

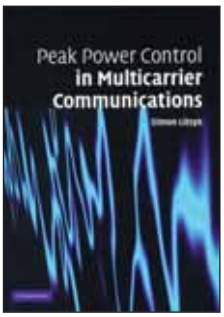
Contents: 1. RF and microwave power transistors; 2.An introduction to the compact modeling of high power FETs; 3. Electrical measurement techniques; 4. Passive components: simulation and modeling; 5. Thermal characterization and modeling; 6. Modeling the

active transistor; 7. Function approximation for compact modeling; 8. Model implementation in CAD tools; 9. Model validation; About the authors; Index.

ISBN: 9780521870665 388pp £ 80.00

Peak Power Control in Multicarrier Communications

Simon Litsyn
Tel-Aviv University



Companion Website available

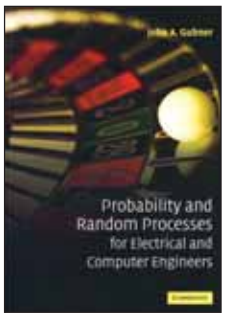
Peak signal power is an important factor in the implementation of multicarrier (MC) modulation schemes like OFDM, in wireless and wireline communication systems. This book describes tools necessary for analyzing and controlling the peak-to-average power ratio in MC systems, and how these techniques are applied in practical designs. The author starts with an overview of multicarrier signals and basic tools and algorithms, before discussing properties of MC signals in detail: discrete and continuous maxima; statistical distribution of peak power, codes with constant peak-to-average power ratio are all covered, concluding with methods to decrease peak power in MC systems. Current knowledge, problems, methods and definitions are summarized using rigorous mathematics, with an overview of the tools for the engineer. The book is aimed at graduate students and researchers in electrical engineering, computer science and applied mathematics, and practitioners in the telecommunications industry. Further information on this title is available at www.cambridge.org/ 9780521855969.

Contents: 1. Introduction; 2. Multicarrier signals; 3. Basic tools and algorithms; 4. Discrete and continuous maxima in MC signals; 5. Statistical distribution of peak power in MC signals; 6. Coded MC signals; 7. MC signals with constant PMEPR; 8. Methods to decrease peak power in MC systems.

ISBN: 9780521855969 292pp £ 77.00

Probability and Random Processes for Electrical and Computer Engineers

***John A.* Gubner**
University of Wisconsin, Madison



Companion Website available

The theory of probability is a powerful tool that helps electrical and computer engineers to explain, model, analyze, and design the technology they develop. The text begins at the advanced undergraduate level, assuming only a modest knowledge of probability, and progresses through more complex topics mastered at graduate level. The first five chapters cover the basics of probability and both discrete and continuous random variables. The later chapters have a more specialized coverage, including random vectors, Gaussian random vectors, random processes, Markov Chains, and convergence. Describing tools and results that are used extensively in the field, this is more than a textbook; it is also a reference for researchers working in communications, signal processing, and computer network traffic analysis. With over 300 worked examples, some 800 homework problems, and sections for exam preparation, this is an essential companion for advanced undergraduate and graduate students. Further resources for this title, including solutions (for Instructors only), are available online at www.cambridge.org/9780521864701.

Contents: Preface; 1. Introduction to probability; 2. Introduction to discrete random variables; 3. More about discrete random variables; 4. Continuous random variables; 5. Cumulative distribution functions and their applications; 6. Statistics; 7. Bivariate random variables; 8. Introduction to random vectors; 9. Gaussian random vectors; 10. Introduction to random processes; 11. Advanced concepts in random processes; 12. Introduction to Markov chains; 13. Mean convergence and applications; 14. Other modes of convergence; 15. Self similarity and long-range dependence; Bibliography; Index.

ISBN: 9780521864701 640pp £ 49.00

An Analog Electronic Companion

Basic Circuit Design for Engineers and Scientists

Scott Hamilton
University of Manchester

Intended for electronicists and for engineers and scientists who have to get involved in circuit design. From mature designers who may have forgotten techniques or who trained before the days of circuit simulation, to neophytes seeking to widen their horizon. A series of largely self-contained essays that may be dipped into at any point. Encourages analysis of circuits supported by simulation to confirm and extend understanding. Includes a CD containing the student version of the powerful and fully functional simulation package PSpice, limited only in the size of circuit it will accept. Includes ready to run schematics for all the applications discussed.

The first three parts of the book cover the maths and physics needed to understand circuit function, analysis and design. Part 4 examines some basic circuit components with reference to their physical and simulation properties. The final and largest part examines the design and function of a wide range of analog systems, using simulation to demonstrate the relationship between analysis and performance. Many references to the literature and the web are provided throughout to allow ready access to further information.

Contents: Preface; List of symbols and abbreviations; 1. Mathematical techniques; 2. Physics; 3. Introduction to circuit mathematics; 4. Circuit elements; 5. SPICE circuit applications; Bibliography; Name index; Subject index; Part index.

ISBN: 9780521687805 668pp £ 56.00

Electronic Concepts

An Introduction

Jerrold H. Krenz
University of Colorado, Boulder

Electronic Concepts is a clear, self-contained introduction to modern microelectronics. Analog and digital circuits are stressed equally from the outset, and the applications of particular devices and circuits are described within the context of actual electronic systems. A combination of bottom up and top-down approaches is used to integrate this treatment of devices, circuits, and systems.

The author begins with an overview of several important electronic systems, discussing in detail the types of signals that circuits are used to process. In the following chapters he deals with individual devices such as the bipolar junction transistor. For each device he presents a brief physical description and demonstrates the use of different models in describing the device's behavior in a particular circuit application. Throughout the book, he uses SPICE computer simulations extensively to supplement analytic descriptions.

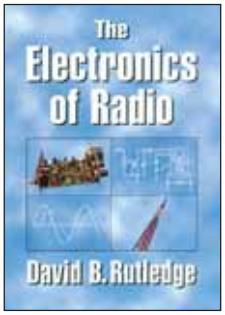
The book contains over 500 circuit diagrams and figures, over 400 homework problems, and over 100 simulation and design exercises. It includes many worked examples and is an ideal textbook for introductory courses in electronics. It can also be used for self-study. Laboratory experiments related closely to the material covered in the book are available via the World Wide Web.

Contents: Preface; 1. Electronic Systems: A Century of Progress; 2. The Semiconductor Junction Diode: The Basis of Modern Electronics; 3. The Bipolar Junction Transistor: An Active Electronic Device; 4. The Metal-Oxide Field-Effect Transistor: Another Active Device; 5. Negative Feedback and Operational Amplifiers; 6. Electronic Power Supplies; Appendix A. Fabrication of Integrated Circuits; Appendix B. The Design Process; Index.

ISBN: 9780521662826 468pp £ 118.00

The Electronics of Radio

David B. Rutledge
California Institute of Technology



This innovative book provides a stimulating introduction to analog electronics by analyzing the design and construction of a radio transceiver. Essential theoretical background is given at each step, along with carefully designed laboratory and homework exercises. This structured approach ensures a good grasp of basic electronics as well as an excellent foundation in wireless communications systems.

The author begins with a thorough description of basic electronic components and simple circuits. He then goes on to describe the key elements of radio electronics, including fillers, amplifiers, oscillators, mixers, and antennas. In the laboratory exercises, he leads the reader through the design, construction, and testing of a popular radio transceiver (the NorCal 40A), thereby illustrating and reinforcing the theoretical material. A diskette containing the widely known circuit simulation software, *Puff* is included in the book. This is the first book to deal with elementary electronics in the context of radio. It can be used as a textbook for introductory analog electronics courses, for more advanced undergraduate classes on radio-frequency electronics and will also be of great interest to electronics hobbyists and radio enthusiasts.

Contents: Preface; 1. The Wireless World; 2. Components; 3. Phasors; 4. Transmission Lines; 5. Fillers; 6. Transformers; 7. Acoustics; 8. Transistor Switches; 9. Transistor Amplifiers; 10. Power Amplifiers; 11. Oscillators; 12. Mixers; 13. Audio Circuits; 14. Noise and Intermodulation; 15. Antennas and Propagation; A Equipment and Parts; B Fourier Series; C Puff 2.1; D Component Data; Index.

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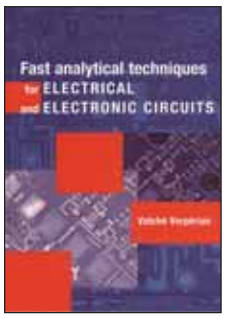
Fast Analytical Techniques for Electrical and Electronic Circuits

Vatche Vorperian
California Institute of Technology



In this unique book, Vorperian describes remarkable alternative techniques to solve, almost by inspections, complicated linear circuits in symbolic form and obtain meaningful analytical answers for any transfer function or impedance.

Although not intended to replace traditional computer-based methods, these techniques provide engineers with a powerful set of tools for tackling circuit design problems. They also have great value in enhancing student's understanding of circuit operation. The numerous problems and worked examples in this book make it an ideal textbook for senior/graduate courses or a reference book.

This book will show you how to:

- use less algebra and do most of it directly on the circuit diagram,
- obtain meaningful analytical solutions to complex circuits with reactive elements and dependent sources by reducing them to a set of simple and purely resistive circuits which can be analyzed by inspection,
- analyze feedback amplifiers easily using the simplest and most natural formulation,
- analyze PWM converters easily using the model of the PWM switch.

Contents: Preface; 1. Introduction; 2. Transfer functions; 3. The extra element theorem; 4. The N-extra element theorem; 5. Electronic negative feedback; 6. High-frequency and microwave circuits; 7. Passive filters; 8. PWM switching DC-to-DC converters; Index.

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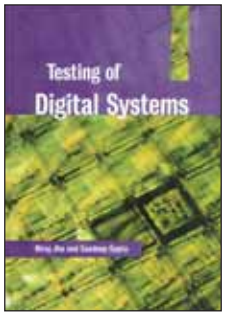
Testing of Digital Systems

Niraj Jha
Princeton University, New Jersey

& Sandeep Gupta
University of Southern California



Device testing represents the single largest manufacturing expense in the semiconductor industry, costing over $40 billion a year. The most comprehensive and wide ranging book of its kind, *Testing of Digital Systems* covers everything you need to know about this vitally important subject. Starting right from the basics, the authors take the reader through automatic test pattern generation, design for testability and built-in self-test of digital circuits before moving on to more advanced topics such as IDDQ testing, functional testing, delay fault testing, CMOS testing, memory testing, and fault diagnosis. The book includes detailed treatment of the latest techniques including test generation for various fault models, discussion of testing techniques at different levels of integrated circuit hierarchy and a chapter on system-on-a-chip synthesis. Written for students and engineers, it is both an excellent senior graduate level textbook and a valuable reference.

Contents: Preface; List of gate symbols; 1. Introduction; 2. Fault models; 3. Combinational logic and fault simulation; 4. Test generation for combinational circuits; 5. Sequential ATPG; 6. IDDQ testing; 7. Functional testing; 8. Delay fault testing; 9. CMOS testing; 10. Fault diagnosis; 11. Design for testability; 12. Built-in self-test; 13. Synthesis for testability; 14. Memory testing; 15. High-level test synthesis; 16. System-on-a-chip test synthesis; Index.

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High-speed heterostructure devices

From device concepts to circuit modeling

Patrick Roblin
Ohio State University

& Hans Rohdin
Hewlett Packard Laboratories, Palo Alto, California

High-Speed Heterostructure Devices is a textbook on modern high-speed semiconductor devices. This book is concerned with the underlying physics of heterostructures as well as practical analytical techniques for modeling and simulating these devices. Emphasis is placed on heterostructure devices of the present and of the immediate future such as the MODFET, HBT and RTD. The principles of operation of other devices such as the Bloch Oscillator, RITD, Gunn diode, quantum cascade laser and SOI and LD MOSFETs are also introduced.

The book comes with a complete set of homework solutions and a web link to MATLAB programs supporting the lecture material.

Contents: Preface; Acknowledgements; List of abbreviations; Introduction; 1. Heterostructure materials; 2. Semiclassical theory of heterostructures; 3. Quantum theory of heterostructures; 4. Quantum heterostructure devices; 5. Scattering processes in heterostructures; 6. Scattering-assisted tunneling; 7. Frequency response of quantum devices from DC to infrared; 8. Charge control of the two-dimensional electron gas; 9. High electric field transport; 10. Current Voltage model of the MODFET;11. Small-and large-signal AC models for the long-channel MODFET;12. Small-and large-signal AC models for the short-channel MODFET;13. DC and microwave electrothermal modeling of RETs;14. Analytical DC analysis of short-gate MODFETs; 15. Small-signal AC analysis of the short-gate velocity-saturated MODFET;16. Gate resistance and the Schottky-barrier interface; 17. MODFETS high-frequency performance; 18. Modeling high-performance HBTs;19. Practical high-frequency HBTs; Index

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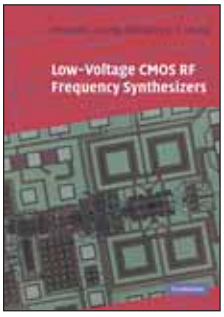
Low-Voltage CMOS RF Frequency Synthesizers

Howard Cam Luong
Hong Kong University of Science and Technology

& Gerry Chi Tak Leung
Hong Kong University of Science and Technology



A frequency synthesizer is one of the most critical building blocks in any wireless transceiver system. Its design is getting more and more challenging as the demand for low-voltage, low-power high frequency wireless systems continuously grows. As the supply voltage is decreased, many existing design techniques are no longer applicable. This book provides the reader with architectures and design techniques that enable CMOS frequency synthesizers to operate at low supply voltages, at high frequencies with good phase noise and with low power consumption. In addition to updating the reader on many of these techniques in depth, this book will also introduce useful guidelines and step-by-step procedures on behaviour simulations of frequency synthesizers. Finally, three successfully demonstrated CMOS synthesizer prototypes with detailed design consideration and description will be presented to illustrate potential applications of the architectures and design techniques described. For engineers and researchers working in radio-frequency integrated circuit-design for wireless applications.

Contents: List of figures; List of tables; Preface; Acknowledgements; 1. Introduction; 2. Synthesizer fundamentals; 3. Design of building blocks; 4. Low-voltage design considerations and techniques; 5. Behavioral simulation; 6. A 2-V 900 MHz monolithic CMOS dual-loop frequency synthesizer for GSM receivers; 7. A 1.5-V 900 MHz monolithic CMOS fast-switching frequency synthesizer for wireless applications; 8. A 1-V 5.2 GHzfully integrated CM0S synthesizer for WLAN IEEE 802.11 a; 9. Conclusion; References, Index.

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COMPUTER SCIENCE

Web Data Management

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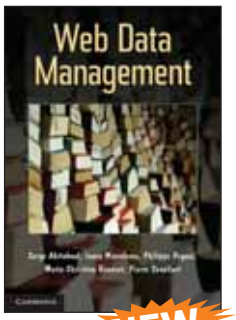

NEW

The Internet and World Wide Web have revolutionized access to information. Users now store information across multiple platforms from personal computers, to smartphones, to Web sites such as YouTube and Picasa. As a consequence, data management concepts, methods, and techniques are increasingly focused on distribution concerns. That information largely resides in the network, as do the tools that process this information.

This book explains the foundations of XML, the Web standard for data management, with a focus on data distribution. It covers the many facets of distributed data management on the Web, such as description logics, that are already emerging in today's data integration applications and herald tommorow's semantic Web. It also introduces the machinery used to manipulate the unprecedented amount of data collected on the Web. Several "Putting into Practice" chapters describe detailed practical applications of the technologies and techniques.

Striking a balance between the conceptual and the practical, the book will serve as an introduction to the new global information systems for Web professionals as well as for master's level courses.

Contents: Part I. Modeling Web Data: 1. Data model; 2. XPath and Xquery; 3. Typing; 4. XML query evaluation; 5. Putting into practice: managing an XML database with EXIST; 6. Putting into practice: tree pattern evaluation using SAX; Part II. Web Data Semantics and Integration: 7. Ontologies, RDF, and OWL; 8. Querying data through ontologies; 9. Data integration; 10. Putting into practice: wrappers and data extraction with XSLT; 11. Putting into practice: ontologies in practice; 12. Putting into practice: mashups with YAHOO! PIPES and XProc; Part III. Building Web Scale Applications: 13. Web search; 14. An introduction to distributed systems; 15. Distributed access structures; 16. Distributed computing with MAPREDUCE and PIG; 17. Putting into practice: full-text indexing with LUCENE; 18. Putting into practice: recommendation methodologies; 19. Putting into practice: large-scale management with HADOOP; 20. Putting into practice: COUCHDB, a JSON semi-structured database.

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Enterprise Java™ Computing

Applications and Architecture

Govind Seshadri
Java Report Online

NEW

From the founding editor-in-chief of *Java Report Online* comes advanced information on JDBC, servlets, JNI, RMI, Java IDL, and EJBs – the basic building blocks of any significant corporate business application. *Enterprise Java Computing* is the ideal hands-on reference, not only for mastering these cutting-edge concepts, but also for gaining hard knowledge on practical design and deployment issues.

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- Develop sophisticated servlet-based middleware
- Design multi-tier EJB applications
- Write Jini services
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This book empowers corporate developers to deliver mission-critical Java applications that can be deployed in the real world. With *Enterprise Java Computing* the reader will master the critical building blocks that are necessary for developing robust client/server applications, without getting bogged down in the specifics of the Java Language and syntax.

Contents: Foreword; Acknowledgments; Introduction; 1. Introduction to enterprise java computing; 2. Java database connectivity; 3. Deploying java servlets; 4. Melding java with legacy systems using JNI; 5. Object serialization; 6. Remote method invocation; 7. Java IDL: java meets CORBA; Enterprise JavaBeans; Index.

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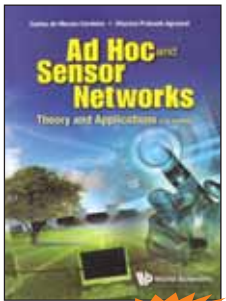
Ad Hoc and Sensor Networks

Theory and Applications, 2nd Edition

Carlos de Morais Cordeiro
Intel Corporation, USA

& Dharma Prakash Agrawal
University of Cincinnati, USA
(World Scientific)



NEW

This book provides a comprehensive yet easy coverage of ad hoc and sensor networks and fills the gap of existing literature in this growing field. It emphasizes that there is a major interdependece among various layers of the networks protocol stack. Contary to wired or even one-hop cellular networks, the lack of a fixed infrastructure, the inherent mobility, the wireless channel, and the underlying routing mechanism by ad hoc and sensor networks introduce a number of technological challenges that are difficult to address within the boundaries of a single protocol layer.

Key Features

- This is the second edition of a very successful first edition, which updates the most recent advances in ad hoc and sensor networks
- The first book to discuss directional antennas from a networking perspective, including medium access control and routing issues
- Includes an exhaustive list of potential application areas and technological solutions in sensor networks

Contents: Introduction; Routing in Ad Hoc Networks; Broadcasting, Multicasting and Geocasting; Wireless LANs; Wireless PANs;

Wireless Mesh Networks; Directional Antenna Systems; Cognitive Radio and Networks; TCP over Ad Hoc Networks; Applications of Sensor Networks; Sensor Networks Design Considerations; Sensor Networks in Controlled Environment and Actuators; Security in Ad Hoc and Sensor Networks; Integrating MANETs, WLANs, and Cellular Networks

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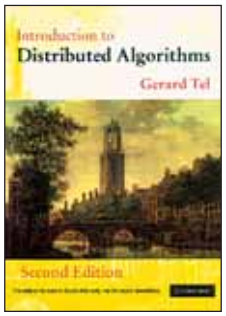
Introduction to Distributed Algorithms

2nd Edition

Gerard Tel
Universiteit Utrecht,
The Netherlands



The second edition of this successful textbook provides an up-to-date introduction both to the topic, and to the theory behind the algorithms. The clear presentation makes the book suitable for advanced undergraduate or graduate courses, whilst the coverage is sufficiently deep to make it useful for practising engineers and researchers.

The author concentrates on algorithms for the point-to-point message passing model, and includes algorithms for the implementation of computer communication networks. Other key areas discussed are algorithms for the control of distributed applications (wave, broadcast, election, termination detection, randomized algorithms for anonymous networks, snapshots, deadlock detection, synchronous systems), and fault tolerance achievable by distributed algorithms. The two new chapters on sense of direction and failure detectors are state-of-the-art and will provide an entry to research in these still developing topics.

Contents: Preface; 1. Introduction: distributed systems; Part I. Protocols: 2. The model; 3. Communication protocols; 4. Routing algorithms; 5. Deadlock-free packet switching; Part II. Fundamental Algorithms: 6. Waves and traversal algorithms; 7. Election algorithms; 8. Termination detection; 9. Anonymous networks; 10. Snapshots; 11. Sense of direction and orientation; 12. Synchrony in networks; Part III: 13. Fault tolerance in distributed systems; 14. Fault tolerance in asynchronous systems; 15. Fault tolerance in synchronous systems; 16. Failure detection; 17. Stabilization; Part IV. Appendices: A. Pseudocode conventions; B. Graphs and networks; References; Index.

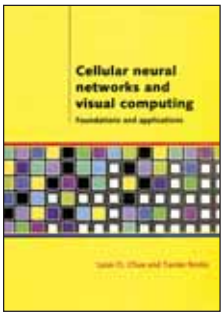
ISBN: 9780521605670 608pp ₹ 545.00

Cellular Neural Networks and Visual Computing

Foundations and Applications

Leon O. Chua
University of California, Berkeley

& Tamas Raska
Academy of Sciences, Budapest



This unique undergraduate level textbook is an ideal introduction to CNNs and analogic cellular computing for students, researchers and engineers from a wide range of disciplines. The book contains many examples and exercises, including CNN simulator software available via the Internet. Although its focus is on visual computing, the concepts described in the book will be of great interest to those working in other areas of CNN research. Leon Chua, co-inventor of the CNN, and Tamas Raska are highly respected pioneers in the field.

Contents: 1. Once over lightly; 2. Introduction - notations, definitions and mathematical foundation; 3. Characteristics and analysis of simple CNN templates; 4. Simulation of the CNN dynamics; 5. Binary CNN characterization via Boolean functions; 6. Uncoupled CNNs: unified theory and applications; 7. Introduction to the CNN universal machine; 8. Back to basics: nonlinear dynamics and complete stability; 9. The CNN universal machine (CNN - UM); 10. Template design tools; 11. CNNs for linear image processing; 12. Coupled CNN with linear synaptic weights; 13. Uncoupled standard CNNs with nonlinear synaptic weights; 14. Standard CNNs with delayed synaptic weights and motion analysis; 15. Visual microprocessors-analog and digital VLSI implementation of the CNN universal machine; 16. CNN models in the visual pathway and the 'bionic eye'; Appendix A. A CNN template library; Appendix B. Using a simple multi-layer CNN analogic dynamic template and algorithm simulator (CANDY); Appendix C. A program for binary CNN template design and optimization (TEMPO).

ISBN: 9780521540803 408pp ₹ 495.00

Emerging Wireless Technologies and the Future Mobile Internet

Dipankar Raychaudhuri
Rutgers University,
New Jersey

& Mario Gerla
University of California,
Los Angeles

This book provides a preview of emerging wireless technologies and their architectural impact on the future mobile Internet. The reader will find an overview of architectural considerations for the mobile Internet, along with more detailed technical discussion of new protocol concepts currently being considered at the research stage. The first chapter starts with a discussion of anticipated mobile/wireless usage scenarios, leading to an identification of new protocol features for the future Internet. This is followed by several chapters that provide in-depth coverage of next-generation wireless standards, ad hoc and mesh network protocols, opportunistic delivery and delay tolerant networks, sensor network architectures and protocols, cognitive radio networks, vehicular networks, security and privacy, and experimental systems for future Internet research. Each of these contributed chapters includes a discussion of new networking requirements for the wireless scenario under consideration, architectural concepts and specific protocol designs, many still at research stage.

Contents: 1. Emerging wireless technologies and their impact on future Internet architecture; 2. Next-generation wireless standards and their integration with the Internet; 3. Ad hoc and mesh network protocols, and their integration with the Internet; 4. Opportunistic content delivery services and delay tolerant networks; 5. Sensor networks architectures and protocols; 6. Participatory sensing; 7. Cognitive radio networks; 8. Vehicular networks; 9. Security and privacy in future wireless networks; 10. Experimental systems for next-generation wireless networking; 11. Concluding remarks

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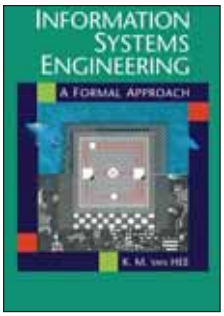
Information Systems Engineering

A Formal Approach

Kees M. van Hee



Engineers and scientists need powerful formalisms to make conceptual models of systems in order to analyse and design them. These models can be used to verify the behaviour of the systems, or as an executable specification of them. In this textbook, Professor van Hee concentrates on discrete dynamic systems, e.g. computer hardware, and information and logistical systems. He develops an integrated formalism which can be used as a prototyping language. It has three components: Petri nets, extended with time, token values and hierarchy; a specification language that is a subset of Z; and a binary data model, extended with complex objects. Much attention is paid to methods for constructing models of systems and analysing their behaviour, i.e. putting the theory into practice. The text is designed for use by advanced undergraduate and beginning graduate students, in computer science, electrical and industrial engineering, or applied mathematics; indeed, it is based on courses taught by the author in Holland and Canada. However, its contemporary flavour will mean it also has appeal to professionals or researchers in these areas.

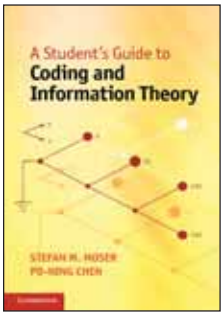
Contents: Preface; Part I. System Concepts; Part II. Frameworks; Part III. Modelling Methods; Part IV. Analysis Methods; Part V. Specification Language; Glossary; Appendices; Bibliography; Index.

ISBN: 9780521110648 436pp ₹ 1995.00

A Student's Guide to Coding and Information Theory

Stefan M. Moser
National Chiao Tung University, Taiwan

& Po-Ning Chen
National Chiao Tung University, Taiwan



This easy-to-read guide provides a concise introduction to the engineering background of modern communication systems, from mobile phones to data compression and storage. Background mathematics and specific engineering techniques are kept to a minimum so that only a basic knowledge of high-school mathematics is needed to understand the material covered. The authors begin with many practical applications in coding, including the repetition code, the Hamming code and the Huffman code. They then explain the corresponding information theory, from entropy and mutual information to channel capacity and the information transmission theorem. Finally, they provide insights into the connections between coding theory and other fields. Many worked examples are given throughout the book, using practical applications to illustrate theoretical definitions. Exercises are also included, enabling readers to double-check what they have learned and gain glimpses into more advanced topics, making this perfect for anyone who needs a quick introduction to the subject.

Contents: 1. Introduction; 2. Error-detecting codes; 3. Repetition and hamming codes; 4. Data compression: efficient coding of a random message; 5. Entropy and Shannon's source coding theorem; 6. Mutual information and channel capacity; 7. Achieving the Shannon limit by turbo coding; 8. Other aspects of coding theory

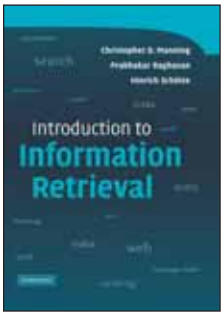
ISBN: 9781107684577 206pp ₹ 295.00

Introduction to Information Retrieval

Christopher D. Manning
Stanford University, California

Prabhakar Raghavan
Yahoo, Inc.

& Hinrich Schütze
Universität Stuttgart



Class-tested and coherent, this textbook teaches classical and web information retrieval, including web search and the related areas of text classification and text clustering from basic concepts. It gives an up-to-date treatment of all aspects of the design and implementation of systems for gathering, indexing, and searching documents; methods for evaluating systems; and an introduction to the use of machine learning methods on text collections. All the important ideas are explained using examples and figures, making it perfect for introductory courses in information retrieval for advanced undergraduates and graduate students in computer science. Based on feedback from extensive classroom experience, the book has been carefully structured in order to make teaching more natural and effective. Slides and additional exercises (with solutions for lecturers) are also available through the book's supporting website to help course instructors prepare their lectures.

Contents:1. Information retrieval using the Boolean model; 2. The dictionary and postings lists; 3. Tolerant retrieval; 4. Index construction; 5. Index compression; 6. Scoring and term weighting; 7. Vector space retrieval; 8. Evaluation in information retrieval; 9. Relevance feedback and query expansion; 10. XML retrieval; 11. Probabilistic information retrieval; 12. Language models for information retrieval;

13. Text classification and Naive Bayes; 14. Vector space classification; 15. Support vector machines and kernel functions; 16. Flat clustering; 17. Hierarchical clustering; 18. Dimensionality reduction and latent semantic indexing; 19. Web search basics; 20. Web crawling and indexes; 21. Link analysis.

ISBN: 9781107666399 496pp ₹ 495.00

A Guide to MATLAB

For Beginners and Experienced Users
2nd Edition

Brian R. Hunt
University of Maryland, College Park

Ronald L. Lipsman
University of Maryland, College Park

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University of Maryland, College Park

Kevin R. Coombes
University of Texas, M. D. Anderson Cancer Center

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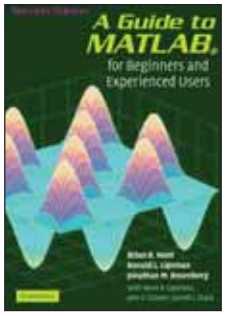
University of Maryland, College Park,

& Garrett J. Stuck
University of Maryland, College Park



This is a short, focused introduction to MATLAB, a comprehensive software system for mathematical and technical computing. It contains concise explanations of essential MATLAB commands, as well as easily understood instructions for using MATLAB's programming features, graphical capabilities, simulation models, and rich desktop interface. Written for MATLAB 7, it can also be used with earlier (and later) versions of MATLAB. This book teaches how to graph functions, solve equations, manipulate images, and much more. It contains explicit instructions for using MATLAB's companion software, Simulink, which allows graphical models to be built for dynamical systems. MATLAB's new "publish" feature is discussed, which allows mathematical computations to be combined with text and graphics, to produce polished, integrated, interactive documents.

Contents: Preface; 1. Getting started; 2. MATLAB basics; 3. Interacting with MATLAB; 4. Beyond the basics; 5. MATLAB graphics; 6. M-Books; 7. MATLAB programming; 8. SIMULINK and GUIs; 9. Applications; 10. MATLAB and the internet; 11. Troubleshooting; Solutions to the practice sets; Glossary; Index.

ISBN: 9781107641129 328pp ₹ 395.00

Essentials of Mobile Handset Design

Abhi Naha
Zone V Ltd.

& Peter Whale
Qualcomm, Cambridge

Discover the challenges and best-in-show approaches involved in designing the world's most popular and advanced consumer electronics product ever. With this essential guide, you'll learn about the key market forces and technology evolution issues that together have a profound impact on shaping the diversity of handset designs available today. Explore the complete design life cycle starting from the design of core technology components such as chipsets and software, through to the complete process of taking those technology building blocks and creating a number of highly differentiated handsets for a range of global markets. Learn about step-by-step design principles and guidelines to follow in order to reduce design time and cost and maximise opportunities to create a successful product. Also included are a range of real-world case studies to illustrate key insights and provide practical advice as well as a look at the emerging trends in the handset industry and the impact these trends could have on future devices.

Contents: 1. Beginnings; 2. Design influences; 3. Design architecture; 4. Hardware design; 5. Software design; 6. Product design; 7. Future trends; 8. Conclusion; Appendix. User interaction and experience design phrases; Glossary; Index.

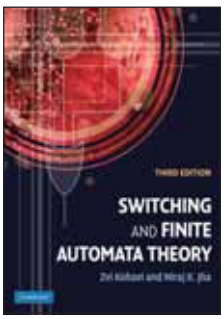
ISBN: 9781107610446 230pp ₹ 395.00

Switching and Finite Automata Theory

3rd Edition

Zvi Kohavi
Technion-Israel Institute of Technology, Haifa

& Niraj K. Jha
Princeton University, New Jersey



Understand the structure, behaviour, and limitations of logic machines with this thoroughly updated third edition. Many new topics are included, such as CMOS gates, logic synthesis, logic design for emerging nanotechnologies, digital system testing, and asynchronous circuit design, to bring students up-to-speed with modern developments. The intuitive examples and minimal formalism of the previous edition are retained, giving students a text that is logical and easy to follow, yet rigorous. Kohavi and Jha begin with the basics, and then cover combinational logic design and testing, before moving on to more advanced topics in finite-state machine design and testing. Theory is made easier to understand with 200 illustrative examples, and students can test their understanding with over 350 end-of-chapter review questions.

Contents: Preface; Part I. Preliminaries: 1. Number systems and codes; 2. Sets, relations, and lattices; Part II. Combinational Logic: 3. Switching algebra and its applications; 4. Minimisation of switching functions; 5. Logic design; 6. Multilevel logic synthesis; 7. Threshold logic for nanotechnologies; 8. Testing of combinational circuits; Part III. Finite State Machines: 9. Introduction to synchronous sequential circuits and iterative networks; 10. Capabilities, minimisation, and transformation of sequential machines; 11. Asynchronous sequential circuits; 12. Structure of sequential machines; 13. State-identification experiments and testing of sequential circuits; 14. Memory, definiteness, and information losslessness of finite automata; 15. Linear sequential machines; 16. Finite-state recognisers; Index.

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Microprocessor Architecture

From Simple Pipelines to Chip Multiprocessors

Jean-Loup Baer
University of Washigton

This book gives a comprehensive description of the architecture of microprocessors from simple in-order short pipeline designs to out-of-order superscalars. It discusses topics such as:

- The policies and mechanisms needed for out-of-order processing such as register renaming, reservation stations, and reorder buffers
- Optimizations for high performance such as branch predictors, instruction scheduling, and load-store speculations
- Design choices and enhancements to tolerate latency in the cache hierarchy of single and multiple processors
- State-of-the-art multithreading and multiprocessing emphasizing single chip implementations

Topics are presented as conceptual ideas, with metrics to assess the performance impact, if appropriate, and examples of realization. The emphasis is on how things work at a black box and algorithmic level. The author also provides sufficient detail at the register transfer level so that readers can appreciate how design features enhance performance as well as complexity.

Contents: 1. Introduction; 2. The basics; 3. Superscalar processors; 4. Front-end: branch prediction, instruction fetching, and register renaming; 5. Back-end: instruction scheduling, memory access instructions, and clusters; 6. The cache hierarchy; 7. Multiprocessors; 8. Multithreading and (chip) multiprocessors; 9. Current limitations and future challenges.

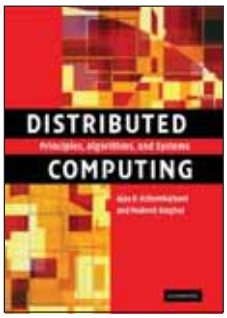
ISBN: 9780521187350 382pp ₹ 745.00

Distributed Computing

Principles, Algorithms, and Systems

Ajay D. Kshemkalyani
University of Illinois, Chicago

& Mukesh Singhal
University of Kentucky



Companion Website available

Designing distributed computing systems is a complex process requiring a solid understanding of the design problems and the theoretical and practical aspects of their solutions. This comprehensive textbook covers the fundamental principles and models underlying the theory, algorithms and systems aspects of distributed computing. Broad and detailed coverage of the theory is balanced with practical systems-related issues such as mutual exclusion, deadlock detection, authentication, and failure recovery. Algorithms are carefully selected, lucidly presented, and described without complex proofs. Simple explanations and illustrations are used to elucidate the algorithms. Important emerging topics such as peer-to-peer networks and network security are also considered. With vital algorithms, numerous illustrations, examples and homework problems, this textbook is suitable for advanced undergraduate and graduate students of electrical and computer engineering and computer science. Practitioners in data networking and sensor networks will also find this a valuable resource. Additional resources are available online at www.cambridge.org/9780521876346.

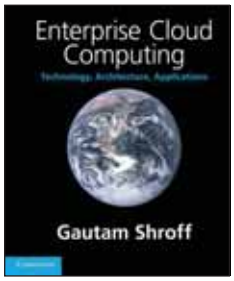
Contents: 1. Introduction; 2. A model of distributed computations; 3. Logical time; 4. Global state and snapshot recording algorithms; 5. Terminology and basic algorithms; 6. Message ordering and group communication; 7. Termination detection; 8. Reasoning with knowledge; 9. Distributed mutual exclusion algorithms; 10. Deadlock detection in distributed systems; 11. Global predicate detection; 12. Distributed shared memory; 13. Checkpointing and rollback recovery; 14. Consensus and agreement algorithms; 15. Failure detectors; 16. Authentication in distributed system; 17. Self-stabilization; 18. Peer-to-peer computing and overlay graphs; Index.

ISBN: 9781107648906 756pp ₹ 795.00

Enterprise Cloud Computing

Technology, Architecture, Applications

Gautam Shroff
TCS Innovation Lab, Delhi



Cloud computing promises to revolutionize IT and business by making computing available as a utility over the internet. This book is intended primarily for practising software architects who need to assess the impact of such a transformation. It explains the evolution of the internet into a cloud computing platform, describes emerging development paradigms and technologies, and discusses how these will change the way enterprise applications should be architected for cloud deployment. Gautam Shroff provides a technical description of cloud computing technologies, covering cloud infrastructure and platform services, programming paradigms such as MapReduce, as well as 'do-it-yourself' hosted development tools. He also describes emerging technologies critical to cloud computing. The book also covers the fundamentals of enterprise computing, including a technical introduction to enterprise architecture, so it will interest programmers aspiring to become software architects and serve as a reference for a graduate-level course in software architecture or software engineering.

Contents: Preface; Part I. Computing Platforms: 1. Enterprise computing: a retrospective; 2. The internet as a platform; 3. Software as a service and cloud computing; 4. Enterprise architecture: role and evolution; Part II. Cloud Platforms: 5. Cloud computing platforms; 6. Cloud computing economics; Part III. Cloud Technologies: 7. Web services, AJAX and mashups; 8. Virtualization technology; 9. Multi-tenant software; Part IV. Cloud Development: 10. Data in the cloud; 11. MapReduce and extensions; 12. Dev 2.0 platforms; Part V. Software Architecture: 13. Enterprise software: ERP, SCM, CRM; 14. Custom enterprise applications and Dev 2.0; 15. Workflow and business processes; 16. Enterprise analytics and search; Part VI. Enterprise Cloud Computing: 17. Enterprise cloud computing ecosystem; 18. Roadmap for enterprise cloud computing; List of abbreviations; References; Index.

ISBN: 9781107648890 290pp ₹ 495.00

Software Testing

Yogesh Singh
University School of Information Technology, Guru Gobind Singh Indraprastha University, Delhi, India

Software Testing is conducted to provide stakeholders with information about the quality of a product under test. The book aims to present testing concepts and methods that can be implemented in practice. It has been developed as a result of the author's 20 years of teaching experience. The text will help to learn how to find software faults before it is made available to its users. A judicious mix of software testing concepts, solved examples and real-life case studies makes it ideal for a basic course on software testing. The book will be a useful resource for students, academicians, software practitioners and researchers.

Key features

- Presents the important concepts of software testing
- Discusses techniques that can be effectively applied in practice
- Promotes verification testing as an integral to modern software testing
- Explains the issues, challenges, and difficulties of testing web applications
- Provides important testing metrics and models
- Signifies the importance of automated test data generation along with search and constraint based testing
- Presents numerous solved examples and 200 practice exercises

Contents: Preface; 1. Introduction; 2. Functional Testing; 3. Essentials of Graph Theory, 4. Structural Testing, 5. Software Verification; 6. Creating Test Cases from Requirement and Use Cases; 7. Selection, Minimization and Prioritization of Test Cases for Regression Testing; 8. Software Testing Activities; 9. Object Oriented Testing; 10. Metrics and Models in Software Testing; 11. Testing Web Applications; 12. Automated Test Data Generation; References; Appendix I – SRS of University Registration System; Appendix II – Test Cases from Use Cases; Appendix III – Validity Checks; Answers to Multiple Choice Questions

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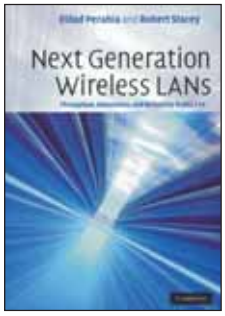
Paperback		
ISBN: 9781107652781	650pp	₹ 595.00

Next Generation Wireless LANs

Throughput, Robustness, and Reliability in 802.11n

Eldad Perahia
Intel Corporation, Hillsboro, Oregon

& Robert Stacey
Intel Corporation, Hillsboro, Oregon



If you've been searching for a way to get up to speed quickly on IEEE 802.11n without having to wade through the entire standard, then look no further. This comprehensive overview describes the underlying principles, implementation details, and key enhancing features of 802.11n. A detailed discussion of the key throughput, robustness, and reliability enhancing features (such as MIMO, 40 MHz channels, and packet aggregation) is given, in addition to a clear summary of the issues surrounding legacy interoperability and coexistence. Advanced topics such as beamforming and fast link adaption are also covered. With numerous MAC and physical layer examples and simulation results included to highlight the benefits of the new features, this is an ideal reference for designers of WLAN equipment, and network managers whose systems adopt the new standard. It is also a useful distillation of 802.11n technology for graduate students and researchers in the field of wireless communication.

Contents: Preface; Foreword; 1. Introduction; Part I. Physical layer: 2. Orthogonal frequency division multiplexing; 3. MIMO/SDM basics; 4. PHY interoperability with 11a/g legacy OFDM devices; 5. High throughput; 6. Robust performance; Part II. Media access control layer: 7. Media access control; 8. MAC throughput enhancements; 9. Advanced channel access techniques; 10. Interoperability and coexistence; 11. MAC frame formats; Part III. Transmit beamforming: 12. Transmit beamforming; Acronyms; Index.

ISBN: 9780521758338	416pp	₹ 595.00

Fixed-Mobile Wireless Networks Convergence

Technologies, Solutions, Services

Joseph Ghetie
TCOM and NET, Fort Lee, New Jersey

Do you need to understand the solutions that allow multimedia communications between mobile networks and fixed wireless communications? If so, this practical book, presenting the fundamentals of individual fixed and mobile wireless technologies in terms of architectures, standards, management capabilities and quality of service issues, is essential reading. Adopting the term Fixed-Mobile Convergence (FMC), an analysis of the interworking between cellular networks and a variety of wireless technologies, such as WLAN, WiMAX, RFID and UWB, is provided. An in-depth study of the convergent solutions offered by UMA and IMS is also given, together with up-to-date information about products, vendors and current service offerings. You'll also find criteria for analyzing and evaluating fixed-mobile convergent products and services, and numerous diagrams and feature/component tables. This practical text is ideal for engineers and practitioners in the field of telecommunications and wireless communications, as well as graduate students of electrical and computer engineering.

Contents: Part I. Wireless Communications: Networking and Management: 1. Wireless communications and networking; 2. Network management; 3. Service management; Part II. Cellular Mobile Radio Networking and Management: 4. Cellular mobile radio networking; 5. Cellular mobile radio networks management and services; Part III. Fixed Wireless

Technologies: Networking and Management: 6. Wireless local area networking; 7. Wireless personal area networking; 8. Wireless metropolitan area networking; 9. Wireless near-field sensor networking; Part IV. Fixed Wireless Cellular Mobile Networks Convergence and Integration: 10. Fixed mobile convergence overview; 11. Wireless LAN cellular mobile convergence; 12. Wireless PAN cellular mobile convergence; 13. Wireless MAN cellular mobile convergence; 14. Wireless sensor networks cellular mobile convergence; Part V. Fixed wireless cellular mobile convergence: standardized networking solutions; 15. UMA-based fixed wireless and cellular mobile networking solutions and products; 16. Session initiation protocol; 17. IMS-based fixed wireless and cellular mobile networking solutions and protocols; Part VI. Fixed Mobile Convergence Services, Industry Trends, and Implementation Issues: 18. QOS in fixed wireless cellular mobile convergent networks; 19. The economics of fixed wireless cellular mobile networks integration; 20. Fixed mobile convergence implementation: status, trends, and issues.

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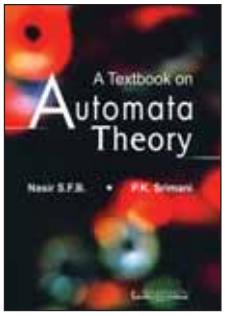
A Textbook on Automata Theory

P.K. Srimani
Bangalore University

& Nasir S.F.B.
Al-Ameen College, Bangalore



A Textbook on Automata Theory has been designed for students of computer science. Adopting a comprehensive approach to the subject, the book presents various concepts with adequate explanations. The logical and structured treatment of the subject promotes better understanding and assimilation. Lucid and well-structured presentation makes the book user-friendly. The book covers the curricula for M.C.A., B.E. (Computer Science) and M.Sc. (Computer Science) at various universities and gives students a strong foundation for advanced studies in the field.

Key features:

- A wide array of solved examples and applications
- Numerous illustrations supporting theoretical inputs
- Exercises at the end of each chapter for practice
- Notation for describing machine models
- A brief history of mathematicians and computer scientists

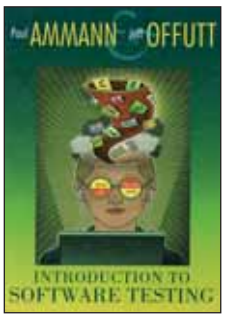
Contents: Preface; Acknowledgement; 1. Fundamentals of Automata; 2. Formal Language Theory; 3. Regular Expression and Languages; 4. Finite Automata; 5. Equivalent Automata; 6. Minimisation/Optimisation of DFA; 7. Finite Automata and Regular Expressions; 8. Transducers; 9. Context-Free Grammars and Context-Free Languages; 10. Simplification of Context-free Grammar; 11. Pushdown Automata; 12. Pumping Lemma; 13. Turing Machine; 14. TM Extensions and Languages 15. Formal Languages/Grammar Hierarchy; Appendices; Index

ISBN: 9788175965454 617pp ₹ 495.00

Introduction to Software Testing

Paul Ammann
George Mason University

& Jeff Offutt
George Mason University



Companion Website available

Extensively class-tested, this textbook takes an innovative approach to software testing: it defines testing as the process of applying a few well-defined, general-purpose test criteria to a structure or model of the software. It incorporates the latest innovations in testing, including techniques to test modern types of software such as OO, web applications, and embedded software. The book contains numerous examples throughout. An instructor's solution manual, PowerPoint slides, sample syllabi, additional examples and updates, testing tools for students, and example software programs in Java are available on an extensive website.

Contents: Part I. Overview: 1. Introduction; Part II. Coverage Criteria: 2. Graph testing; 3. Logic coverage; 4. Input space partitioning; 5. Syntax-based testing; Part III. Applying Criteria in Practice: 6. Practical considerations; 7. Engineering criteria for technologies; 8. Building testing tools; 9. Challenges in testing software.

ISBN: 9780521175821 344pp ₹ 595.00

Mobile Computing Principles

Designing and Developing Mobile Applications with UML and XML

Reza B'Far
Voice Genesis and Semantic Messaging Systems Inc.

Written to address technical concerns that mobile developers face regardless of the platform (J2ME, WAP, Windows CE, etc.), this book explores the differences between mobile and stationary applications and the architectural and software development concepts needed to build a mobile application. Using UML as a tool, Reza B'far guides the developer through the development process, showing how to document the design and implementation of the application. He focuses on general concepts, while using platforms as examples or as possible tools. After introducing UML, XML, and derivative tools necessary for developing mobile software applications, B'far shows how to build user interfaces for mobile applications. He covers location sensitivity, wireless connectivity, mobile agents, data synchronization, security, and push-based technologies, and finally homes in on the practical issues of mobile application development including the development cycle for mobile applications, testing mobile applications, architectural concerns, and a case study.

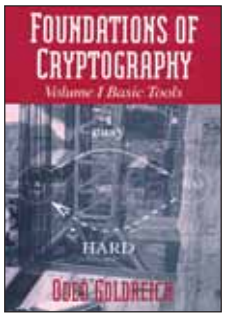
Contents: Part I. Introductions to the Main Topics:1. Introduction to mobile computing; 2. Introduction to mobile development frameworks and tools; 3. XML: document and meta-data format for mobile; 4; Introduction to UML; Part II. Device Independent and Multi-Channel User Interface Development Using UML: 5. Generic user interface development; 6. Developing mobile GUIs; 7. Voice user Interfaces and mobile applications; 8. Multi-channel and multi-modal user interfaces; Part III. Additional Dimensions of Mobile Application Development: 9. Mobile agents and peer-to-peer architectures for mobile computing; 10. Wireless connectivity and mobile applications; 11. Synchronization and replication of mobile data; 12. Mobility and location

information; 13. Active transactions; 14. Mobile security; Part IV. Putting the Project Together: 15. The mobile development process; 16. Architecture, design, and technology selection; 17. Mobile application implementation hurdles; 18. Testing; 19. A case study.

ISBN: 9780521696234 878pp ₹ 595.00

Foundations of Cryptography Vol. 1: Basic Tools

Oded Goldreich
Weizmann Institute of Science, Israel



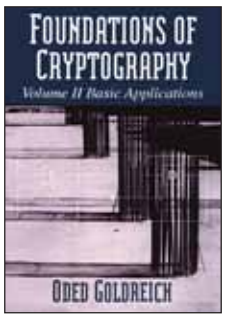
Cryptography is concerned with the conceptualization, definition and construction of computing systems that address security concerns. The design of cryptographic systems must be based on firm foundations. This book presents a rigorous and systematic treatment of the foundational issues: defining cryptographic tasks and solving new cryptographic problems using existing tools. It focuses on the basic mathematical tools: computational difficulty (one-way functions), pseudorandomness and zero-knowledge proofs. The emphasis is on the clarification of fundamental concepts and on demonstrating the feasibility of solving cryptographic problems, rather than on describing ad-hoc approaches. The author assumes basic familiarity with the design and analysis of algorithms; some knowledge of complexity theory and probability is also useful.

Contents: Preface; 1. Introduction; 2. Computational difficulty; 3. Pseudorandom generators; 4. Zero-knowledge proof systems.

ISBN: 9780521670524 392pp ₹ 595.00

Foundations of Cryptography Vol. 2: Basic Applications

Oded Goldreich
Weizmann Institute of Science, Israel



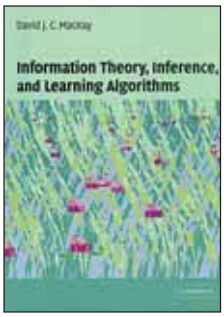
The second volume contains a rigorous treatment of three basic applications: Encryption, Signatures, and General Cryptographic Protocols. It builds on the previous volume which provided a treatment of one-way functions, pseudorandomness and zero-knowledge proofs. It is suitable for use in a graduate course on cryptography and as a reference book for experts. The author assumes basic familiarity with the design and analysis of algorithms and knowledge of complexity theory and probability.

Contents: *Volume II: Basic Applications:* 5. Encryption schemes; 6. Signatures and message authentication; 7. General cryptographic protocols; C. Correction and additions to Volume I.

ISBN: 9780521670418 448pp ₹ 595.00

Information Theory, Inference and Learning Algorithms

David J.C. Mackay
University of Cambridge



Information theory and inference, taught together in this exciting textbook, lie at the heart of many important areas of modern technology - communication, signal processing, data mining, machine learning, pattern recognition, computational neuroscience, bioinformatics and cryptography. The book introduces theory in tandem with applications. Uniquely, the book covers state-of-the art error-correcting codes, including low-density-parity-check codes, turbo codes, and digital fountain codes - the twenty-first-century standards for satellite communications, disk drives, and data broadcast. Richly illustrated, filled with worked examples and over 400 exercises, some with detailed solutions, the book is ideal for self-learning, and for undergraduate or graduate courses. It also provides an unparalleled entry point for professionals in areas as diverse as computational biology, financial engineering and machine learning.

Contents:1. Introduction to information theory; 2. Probability, entropy, and inference; 3. More about inference; Part I. Data Compression: 4. The source coding theorem; 5. Symbol codes; 6. Stream codes; 7. Codes for integers; Part II. Noisy-Channel Coding: 8. Correlated random variables; 9. Communication over a noisy channel; 10. The noisy-channel coding theorem; 11. Error-correcting codes and real channels; Part III. Further Topics in Information Theory: 12. Hash codes: codes for efficient information retrieval; 13. Binary codes; 14. Very good linear codes exist; 15. Further exercises on information theory; 16. Message passing; 17. Communication over constrained noiseless channels; 18. Crosswords and codebreaking;19. Why have sex? Information acquisition and evolution; Part IV. Probabilities and Inference: 20. An example inference task: clustering; 21. Exact inference by complete enumeration; 22. Maximum likelihood and clustering; 23. Useful probability distributions; 24. Exact marginalization; 25. Exact marginalization in trellises; 26. Exact marginalization in graphs; 27. Laplace's method; 28. Model comparison and Occam's razor; 29. Morris Carlo methods; 30. Efficient Monte Carlo methods; 31. Ising models; 32. Exact Monte Carlo sampling; 33. Variational methods; 34. Independent component analysis and latent variable modelling; 35. Random inference topics; 36. Decision theory; 37. Bayesian inference and sampling theory; Part V. Neural Networks: 38. Introduction to neural networks; 39. The single neuron as a classifier; 40. Capacity of a single neuron; 41. Learning as inference; 42. Hopfield networks; 43. Boltzmann machines; 44. Supervised learning in multilayer networks; 45. Gaussian processes; 46. Deconvolution; Part VI. Sparse Graph Codes: 47. Low-density parity-check codes; 48. Convolutional codes and turbo codes; 49. Repeat-accumulate codes; 50. Digital fountain codes; Part VII. Appendices: A. Notation; B. Some physics; C. Some mathematics; Bibliography; Index.

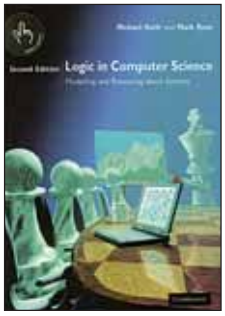
ISBN: 9780521670517 640pp ₹ 695.00

Logic in Computer Science

Modelling and Reasoning About Systems
2nd Edition

Michael Huth
Imperial College of Science, Technology and Medicine, London

& Mark Ryan
University of Birmingham



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Recent years have seen the development of powerful tools for verifying hardware and software systems, as companies worldwide realise the need for improved means of validating their products. There is increasing demand for training in basic methods in formal reasoning so that students can gain proficiency in logic-based verification methods. The second edition of this successful textbook addresses both those requirements, by continuing to provide a clear introduction to formal reasoning which is both relevant to the needs of modern computer science and rigorous enough for practical application. Improvements to the first edition have been made throughout, with extra and expanded sections on SAT solvers, existential/ universal second-order logic, micro-models, programming by contract and total correctness. The coverage of model-checking has been substantially updated. Further exercises have been added. Internet support for the book includes worked solutions for all exercises for teachers, and model solutions to some exercises for students.

Contents: Foreword; 1. Propositional logic; 2. Predicate logic; 3. Verification by model checking; 4. Program verification; 5. Modal logics and agents; 6. Binary decision diagrams; Bibliography; Index.

ISBN: 9780521670890 440pp ₹ 595.00

Digital Systems Engineering

William J. Dally
Stanford University, California

& John W. Poulton
University of North Carolina, Chapel Hill

What makes some computers slow? Why do some digital systems operate reliably for years while others fail mysteriously every few hours? How can some systems dissipate kilowatts while others operate off batteries? These questions of speed, reliability, and power are all determined by the system-level electrical design of a digital system.

Digital Systems Engineering presents a comprehensive treatment of these topics. It combines a rigorous development of the fundamental principles in each area with real world examples of circuits and methods. The book not only serves as an undergraduate textbook, filling the gap between circuit design and logic design, but can also help practising digital designers keep pace with the speed and power of modern integrated circuits.

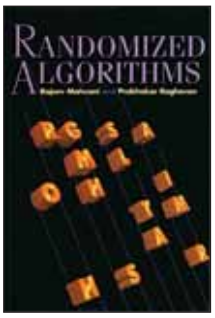
Contents: 1. Introduction to digital systems engineering; 2. Packaging of digital systems; 3. Modeling and analysis of wires; 4. Circuits; 5. Power distribution; 6. Noise in digital systems; 7. Signalling conventions; 8. Advanced signalling techniques; 9. Timing conventions; 10. Synchronization; 11. Signalling circuits; 12. Timing circuits; Index.

ISBN: 9780521670449 688pp ₹ 695.00

Randomized Algorithms

Rajeev Motwani
Stanford University, California

& Prabhakar Raghavan
Yahoo Research, Santa Clara, California



This text by two well-known experts in the field presents the basic concepts in the design and analysis of randomized algorithms at a level accessible to beginning graduate students.

The first part of the book presents basic tools from probability theory and probabilistic analysis that are recurrent in algorithmic applications. Algorithmic examples are given to illustrate the use of each tool in a concrete setting. In the second part of the book each of the seven chapters focuses on one important area of application of randomized algorithms: data structures, geometric algorithms, graph algorithms, giving a comprehensive and representative selection of the algorithms in these areas. This first book on the subject should prove invaluable as a reference for researchers and professional programmers, as well as for students.

Contents: Part I. Tools and Techniques: 1. Introduction; 2. Game-theoretic techniques; 3. Moments and deviations; 4. Tail inequalities; 5. The probabilistic method; 6. Markov chains and random walks; 7. Algebraic techniques; Part II. Applications: 8. Data structures; 9. Geometric algorithms and linear programming; 10. Graph algorithms; 11. Approximate counting; 12. Parallel and distributed algorithms; 13. Online algorithms; 14. Number theory and algebra; Appendix A. Notational index; Appendix B. Mathematical background; Appendix C. Basic probability theory.

ISBN: 9780521613903 492pp ₹ 595.00

Modern Compiler Implementation in Java

Andrew W. Appel
Princeton University, New Jersey

This textbook describes all phases of a modern compiler, including current techniques in code generation and register allocation, for imperative, functional and object-oriented languages. In a concise and practical way the author describes the fundamentals of compilation and then moves on to advanced topics such as SSA form, loop scheduling, and optimization for cache-memory hierarchies. The new edition features a redesigned compiler project in Java, for a subset of Java itself, covering both front-end and back-end phases.

Contents: Part I. Fundamentals of Compilation: 1. Introduction; 2. Lexical analysis; 3. Parsing; 4. Abstract syntax; 5. Semantic analysis; 6. Activation records; 7. Translation to intermediate code; 8. Basic blocks and traces; 9. Instruction selection; 10. Liveness analysis; 11. Register allocation; 12. Putting it all together; Part II. Advanced Topics: 13. Garbage collection; 14. Object-oriented languages; 15. Functional programming languages; 16. Polymorphic types; 17. Dataflow analysis; 18. Loop optimizations; 19. Static single-assignment form; 20. Pipelining and scheduling; 21. The memory hierarchy; Appendix: Mini-Java reference manual.

ISBN: 9788175960725 548pp ₹ 445.00

Algorithms on Strings, Trees and Sequences

Dan Gusfield
University of California, Davis

String algorithms are a traditional area of study in computer science. In recent years their importance has grown dramatically with the huge increase of electronically stored text and of molecular sequence data (DNA or protein sequences) produced by various genome projects. This book is a general text on computer algorithms for string processing. In addition to pure computer science, the book contains extensive discussions on biological problems that are cast as string problems, and on methods developed to solve them. It emphasises the fundamental ideas and techniques central to today's applications. New approaches to this complex material simplify methods that up to now have been for the specialist alone. With over 400 exercises to reinforce the material and develop additional topics, the book is suitable for graduate or advanced undergraduate students in computer science, computational biology, or bioinformatics. Its discussion of current algorithms and techniques also makes it a reference for professionals.

Contents: Part I. Exact String Matching: The Fundamental String Problem: 1. Exact matching: fundamental preprocessing and first algorithms; 2. Exact matching: classical comparison-based methods; 3. Exact matching: a deeper look at classical methods; 4. Semi-numerical string matching; Part II. Suffix Trees And Their Uses: 5. Introduction to suffix trees; 6. Linear time construction of suffix trees; 7. First applications of suffix trees; 8. Constant time lowest common ancestor retrieval; 9. More applications of suffix trees; Part III. Inexact Matching, Sequence Alignment, And Dynamic Programming: 10. The importance of (sub)sequence comparison in molecular biology; 11. Core string edits, alignments, and dynamic programming; 12. Refining core string edits and alignments; 13. Extending the core problems; 14. Multiple string comparison: the Holy Grail; 15. Sequence database and their uses: the motherlode; Part IV. Currents, Cousins And Cameos: 16. Maps, mapping, sequencing and superstrings; 17. Strings and evolutionary trees; 18. Three short topics; 19. Models of genome-level mutations.

ISBN: 9780521670357 552pp ₹ 595.00

Modern Compiler Implementation in C

Andrew W. Appel
Princeton University, New Jersey

This textbook describes all phases of modern compiler: lexical analysis, parsing, abstract syntax, semantic actions, intermediate representations, instruction selection via tree matching, dataflow analysis, graph-coloring register allocation, and runtime systems. It includes good coverage of current techniques in code generation and register allocation, as well as functional and object-oriented languages, that is missing from most books. The most accepted and successful techniques are described in a concise way, rather than as an exhaustive catalogue of every possible variant. Detailed descriptions of the interfaces between modules of a compiler are illustrated with actual C header files.

Contents: Part I. Fundamentals of Compilation: 1. Introduction; 2. Lexical analysis; 3. Parsing; 4. Abstract syntax; 5. Semantic analysis; 6. Activation records; 7. Translation to intermediate code; 8. Basic blocks and traces; 9. Instruction selection; 10. Liveness analysis; 11. Register allocation; 12. Putting it all together; Part II: Advanced Topics: 13. Garbage collection; 14. Object-oriented languages; 15. Functional programming languages; 16. Polymorphic types; 17. Dataflow analysis; 18. Loop optimizations; 19. Static single-assignment form; 20. Pipelining and scheduling; 21. The memory hierarchy; Appendix.

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More Java Gems

Dwight Deugo
Carleton University, Ottawa

This book presents the best articles and columns published in Java Report between 1997 and 1999. Each article has been carefully selected for its timelessness and discusses practical Java topics and 'Real' applications that are not readily available in any single book.

Contents: Part I. Introduction: Part II. Getting Started with Java: 1. When in Rome: a guide to the Java paradigm; 2. Enumerating types with class; Part III. Migrating to Java: 3. How to successfully migrate to Java; 4. Kissin' cousins: communicating between Java and JavaScript; Part IV. Techniques: 5. Java permutations and combinations; 6. Prevention is better than cure; 7. International text in JDK 1.2; Part V. Modeling and Patterns: 8. The conceptual model: what's the object?; 9. Refining skills for expressive conceptual models; 10. Distributed observer chains; 11. Event notifier: a pattern for event notification; 12. Analysis patterns; Part VI. Java in a Distributed World: 13. Mobile agent system architecture; 14. Deployment strategies for Java client applications; 15. Locating CORBA objects from Java; Part VII. Threads: 16. Effective multithreading; 17. Multi-threaded assignment surprises; 18. Multithreaded exception handling in Java; 19. Writing more complex synchronization in Java; Part VIII. User Interfaces: 20. Constructing modular user interfaces in Java; 21. JFC's swing, Part I: model/view/controller; 22. Panel states: a user interface design pattern; Part IX. Security: 23. Using the Java security package; 24. Using

the Java cryptographic extensions; 25. Java application server security using capabilities; Part X. Testing: 26. Effective test strategies for enterprise-critical applications; 27. Putting Java beans to the test; 28. Test-infected: programmers love writing tests; Part XI. Performance: 29. Complex Java applications: breaking the speed limit; 30. Are distributed objects fast enough?; 31. Efficient text searching in Java; 32. Enterprise applets and archive functionality; Part XII. Reality Check: 33. Primitive types considered harmful; 34. Getting the numbers right: a cautionary tale; Index.

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C By Example

Noel Kalicharan
University of the West Indies

C is one of the most popular programming languages. It is flexible, efficient, and highly portable, and can be used to write many different types of programs - from compilers and assemblers to spreadsheets and games. This book is based on ANSI C, the recently adopted standard for the C language.

Contents: Preface; 1. Getting started with C; 2. More control structures and arrays; 3. Functions - the basics; 4. Character handling; 5. Functions and pointers; 6. Data types, operators and storage classes; 7. Basic structures and linked lists; B. Binary trees and other structures; 9. Standard input/output;10. Fil einput/output; 11. Miscellaneous topics; Appendices; Index.

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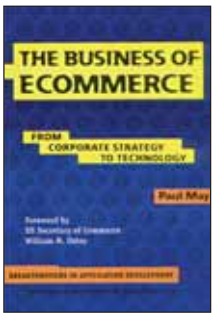
The Business of ECommerce

From Corporate Strategy to Technology

Paul May
Verista Consulting



The Business of Ecommerce explains how business and technology decision-makers can conduct business over the Web by describing the relevant business issues to technologists and the technical issues to business managers. Paul May combines his experience as a consultant to blue chip companies and Internet startups to provide models for ecommerce opportunities and to explore key application areas that readers can exploit in the real world. With shrewd wit and savvy, May covers all of the relevant technologies and makes them accessible to the reader by explaining each key topic and issue.

The Business of Ecommerce

- is accessible and useful to both technical and nontechnical readers
- equips both business and technology decision-makers with the knowledge necessary to do electronic commerce.
- describes emerging business models for electronic commerce that are applied to real-world projects.
- compiles and explains the core technologies that support electronic commerce.

This book is a practical tool to help business exploit the Internet. It is an intelligent good-read that will empower decision-makers to maximize the opportunities of ecommerce.

Contents: Foreword; Acknowledgments; Introduction; 1. Getting Here; 2. A generic business model for ecommerce; 3. Pathfinder Application Areas; 4. The technology landscape; 5. Architectures for electronic commerce; 6. Open issues; Recommended Resources; Glossary; Index.

ISBN: 9780521776981 288pp ₹ 345.00

Computational Discrete Mathematics

Combinatorics and Graph Theory with Mathematica®

Sriram Pemmaraju
Indian Institute of Technology, Bombay and University of Iowa

& Steven Skiena
State University of New York, Stony Brook

Combinatorica, an extension to the popular computer algebra system *Mathematica*®, is the most comprehensive software available for educational and research applications of discrete mathematics, particularly combinatorics and graph theory. This book is the definitive reference/user's guide to *Combinatorica*, with examples of all 450 Combinatorica functions in action, along with the associated mathematical and algorithmic theory. The authors cover classical and advanced topics on the most important combinatorial objects: permutations, subsets, partitions, and Young tableaux, as well as all important areas of graph theory: graph construction operations, invariants, embeddings, and algorithmic graph theory.

In addition to being a research tool, *Combinatorica* makes discrete mathematics accessible in new and exciting ways, by encouraging computational experimentation and visualization.

Contents: Preface; Chapter 1 Combinatorica: An Explorers Guide; Chapter 2 Permutations and Combinations; Chapter 3 Algebraic Combinatorics; Chapter 4 Partitions, Compositions, and Young Tableaux; Chapter 5 Graph Representation; Chapter 6 Generating Graphs; Chapter 7 Properties of Graphs; Chapter 8 Algorithmic Graph Theory; Appendix; Bibliography; Index.

ISBN: 9780521733113 494pp ₹ 545.00

Numerical Recipes in C

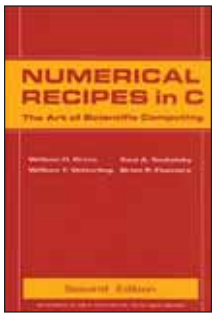
The Art of Scientific Computing
2nd Edition

William H. Press
Harvard University, Massachusetts

Saul A. Teukolsky
Polaroid Corporation

William T. Vetterling
Exxon Research and Engineering Company

& Brian P. Flannery
Cornell University, New York



This is the revised and greatly expanded Second Edition of the hugely popular *Numerical Recipes: The Art of Scientific Computing. Numerical Recipes* is a complete text and reference book on scientific computing. In a self-contained manner it proceeds from mathematical and theoretical considerations to actual practical computer routines. With over 100 new routines (now well over 300 in all), plus upgraded versions of many of the original routines, this book is more than ever the most practical, comprehensive handbook of scientific computing available today.

The book retains the informal, easy-to-read style that made the first edition so popular, with many new topics presented at the same accessible level. In addition, some sections of more advanced material have been introduced, set off in small type from the main body of the text. *Numerical Recipes* is an ideal textbook for scientists and engineers and an indispensable reference for anyone who works in scientific computing.

Highlights of the new material include:

- A new chapter on integral equations and inverse methods
- Multigrid methods for solving partial differential equations
- Improved random number routines
- Wavelet transforms
- The statistical bootstrap method
- A new chapter on "less-numerical" algorithms including compression coding and arbitrary precision arithmetic
- Band diagonal linear systems
- Linear algebra on sparse matrices .
- Cholesky and QR decomposition
- Calculation of numerical derivatives
- Pade approximants, and rational Chebyshev approximation
- New special functions
- MonteCarlo integration in high-dimensional spaces
- Globally convergent methods for sets of nonlinear equations
- An expanded chapter on fast Fourier methods
- Spectral analysis on unevenly sampled data
- Savitzky-Golay smoothing filter
- Two-dimensional Kolmogorov-Smirnoff test

All this is in addition to material on such basic topics as: linear equations, interpolation and extrapolation, integration, nonlinear root-finding, eigensystems, ordinary differential equations, evaluation of functions, sorting, optimization, statistical description and modeling of data, and two-point boundary value problems.

Contents: Preface to the Second Edition; Preface to the First Edition; Legal Matters; Computer Programs by Chapter and Section; 1. Preliminaries; 2. Solution of Linear Algebraic Equations; 3. Interpolation and Extrapolation; 4. Integration of Functions; 5. Evaluation of Functions; 6. Special Functions; 7. Random Numbers; 8. Sorting; 9. Root Finding and Nonlinear Sets of Equations; 10. Minimization or Maximization of Functions; 11. Eigensystems; 12. Fast Fourier Transform; 13. Fourier and Spectral Applications; 14. Statistical Description of Data; 15. Modeling of Data; 16. Integration of Ordinary Differential Equations; 17. Two Point Boundary Value Problems; 18. Integral Equations and Inverse Theory; 19. Partial Differential Equations; 20. Less-Numerical Algorithms; References; Appendix A. Table of Prototype Declarations; Appendix B. Utility Routines; Appendix C. Complex Arithmetic; Index of Programs and Dependencies; General Index.

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Numerical Recipes in C++

The Art of Scientific Computing
2nd Edition

William H. Press
Harvard University, Massachusetts

Saul A. Teukolsky
Polaroid Corporation

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& Brian P. Flanery
Cornell University, New York

Including and updating the full mathematical and explanatory contents of *Numerical Recipes in C,* this new version incorporates completely new C++ versions of the more than 300 Numerical Recipes routines that are widely recognized as the most accessible and practical basis for scientific computing.

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Numerical Recipes in Fortran

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William T. Vetterling
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Cornell University,
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Numerical Recipes is a complete text and reference book on scientific computing. In a self-contained manner it proceeds from mathematical and theoretical consideration to actual practical computer routines. With over 100 new routines (now well over 300 in all), plus upgraded versions of many of the original routines, this book is more than ever the most practical, comprehensive handbook of scientific computing available today.

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Numerical Recipes Source Code CD-ROM

The Art Of Scientific Computing
3rd Edition

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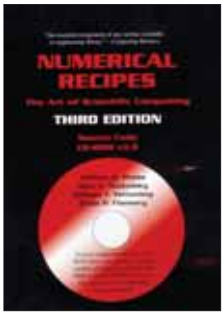

Do you want reliable code for the latest methods in scientific computing?

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Numerical Recipes, First Edition: complete source code in Pascal and BASIC plus third-party ports of the code to Modula 2 and Common Lisp

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11. Eigensystems; 12. Fast Fourier transform;
13. Fourier and spectral applications;
14. Statistical description of data; 15. Modeling of data; 16. Classification and inference;
17. Integration of ordinary differential equations;
18. Two point boundary value problems;
19. Integral equations and inverse theory;
20. Partial differential equations;
21. Computational geometry; 22. Less-numerical algorithms; References.

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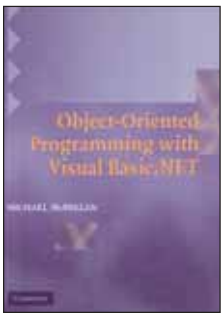
Object-Oriented Programming with Visual Basic.NET

Michael McMillan
Pulaski Technical College,
Arkansas



Michael McMillan provides a complete presentation of the object-oriented features of the Visual Basic.NET language for advanced Visual Basic programmers. Beginning with an introduction to abstract data types and their initial implementation using structures, he explains standard object-oriented programming (OOP) topics including class design, inheritance, access modifiers and scoping issues, abstract classes, design and implementation of interfaces and design patterns, and refactoring in Visual Basic.NET. More advanced OOP topics are included as well, such as reflection, object persistence, and serialization. To tie everything together, McMillan demonstrates sound OOP design and implementation principles through practical examples of standard Windows applications, database applications using ADO.NET, Web-based applications using ASP.NET, and Windows service applications.

Contents: Preface; 1. An Overview of the Visual Basic.NET Language; 2. An Overview of Object-Oriented Programming; 3. Structures; 4. Classes; 5. Access Modifiers; 6. Abstract Classes and Interfaces; 7. Implementing the IEnumerable and I Comparable Interfaces; 8. Designing and Implementing Exception Classes; 9. Design Patterns and Refactoring;10. Object Internals: Reflection and Attributes; 11. Object Persistence: Serialization; 12. Building a Windows Application; 13. Database Programming Using ADO.NET; References; Index.

ISBN: 9780521168304 315pp ₹ 545.00

Integration-Ready Architecture and Design

Software Engineering with XML, Java,.NET, Wireless, Speech, and Knowledge Technologies

Jeff Zhuk
Internet Technology School, Inc.

Integration-Ready Architecture and Design shows how to build presentation factories and seamless integration of VoiceXML, WAP, and Web technologies, providing access to corporate data and services not only through PCs and corporate workstations, but also through multiple types of wired and wireless devices and PDAs. The author integrates theory and practice, going from foundations and concepts to specific applications and architectures. Through deep insights into almost all areas of modern CIS and IT, he provides an entry into the new world of integrated knowledge and software engineering. Readers will learn the "what's, why's, and how's" on: J2EE, J2ME,.NET, JSAPI, JMS, JMF, SALT, VoiceXML, WAP, 802.11, CDNA, GPRS, CycL, XML, and multiple XML-based technologies including RDF, DAML, SOAP, UDDI, and WDSL.

For Internet and wireless service developers, the book contains unique recipes for creating "integration-ready" components. Architects, designers, coders, and even management benefit from innovative ideas and detailed examples for building multi-dimensional worlds of enterprise applications. Throughout, the book provides a "unified service" approach while creating a core of business frameworks and building applications for the distributed knowledge marketplace.

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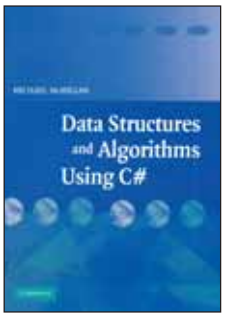
Data Structures and Algorithms Using C#

Michael McMillan
Pulaski Technical College, Arkansas



C# programmers: no more translating data structures from C++ or Java to use in your programs! Mike McMillan provides a tutorial on how to use data structures and algorithms plus the first comprehensive reference for C# implementation of data structures and algorithms found in the .NET Framework library, as well as those developed by the programmer.

The approach is very practical, using timing tests rather than Big O notation to analyze the efficiency of an approach. Coverage includes array and ArrayLists, linked lists, hash tables, dictionaries, trees, graphs, and sorting and searching algorithms, as well as more advanced algorithms such as probabilistic algorithms and dynamic programming. This is the perfect resource for C# professionals and students alike.

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Open Source

Technology and Policy

Fadi P. Deek
New Jersey Institute of Technology

& James A. M. McHugh
New Jersey Institute of Technology

The open source movement is a worldwide effort to promote an open style of software development more aligned with the accepted intellectual style of science than the proprietary modes of invention that have been characteristic of modern business. The idea is to keep the scientific advances created by software development openly available for everyone to use, understand, and improve. The very process of open source creation is highly transparent. This book addresses prominent projects in the open source movement, along with its enabling technologies, social characteristics, legal issues, business venues, and public and educational roles.

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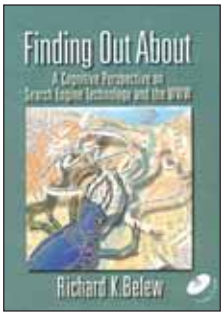
Finding Out About

A Cognitive Perspective on Search Engine Technology and the WWW

Richard K. Belew
University of California, San Diego



The Word Wide Web is rapidly filling with more text than anyone could have imagined even a short time ago, but the task of isolating relevant parts of this vast information has become just that much more daunting. Richard Belew brings a cognitive perspective to the study of information retrieval as a discipline within computer science. He introduces the idea of Finding Out About (FDA) as the process of actively seeking out information relevant to a topic of interest and describes its many facets - ranging from creating a good characterization of what the user seeks, to what documents actually mean, to methods of inferring semantic clues about each document, to the problem of evaluating whether our search engines are performing as we have intended.

Finding Out About explains how to build the tools that are useful for searching collections of text and other media. In the process it takes a close look at the properties of textual documents that do not become clear until very large collections of them are brought together and shows that the construction of effective search engines requires knowledge of the statistical and mathematical properties of linguistic phenomena, as well as an appreciation for the cognitive foundation we bring to the task as language users. The unique approach of this book is its even handling of the phenomena of both numbers and words, making it accessible to a wide audience.

The text is accompanied by a CD-ROM that contains a hypertext version of the book, including additional topics and notes not present in the printed edition. In addition, the CD contains the full text of C.J. "Keith" van Rijsbergen's famous textbook, *Information Retrieval* (now out of print). Many active links from Belew's to van Rijsbergen's hypertexts help to unite the material. Several test corpora and indexing tools are provided, to support the design of your own search engine. Additional exercises using these corpora and code are available to instructors. Also supporting this book is a Web site that will include recent additions to the book, as well as links to sites of new topics and methods.

ISBN: 9780521734462 388pp $ 54.00

Java Outside In

Ethan D. Bolker
University of Massachusetts, Boston

& Bill Campbell
University of Massachusetts, Boston

This book treats learning a programming language much like learning a spoken language: programming is best learned by immersion. Through building interesting programs and addressing real design issues much earlier than other texts, this one is able to move beyond the placement of semicolons and other syntactic details in order to discuss the architecture of serious programs: how delegation and inheritance allow objects to cooperate to do useful work.

Throughout the text, the authors deal with programs that implement applications close enough to real to be convincing. These programs are more like those students encounter in the real world than ones they are likely to find in traditional programming texts. The authors constantly revise the programs as they grow in sophistication so students learn another important aspect of programming - that, in the real world, programs are constantly updated and improved. Finally, in the exercises, the authors encourage students to write programs that interact with and extend programs discussed in the text and then ask them to write about those programs. After completing this one-semester course, students emerge as programmers.

ISBN: 9780521010870 328pp $ 68.00

Model-Based Software Testing and Analysis with C#

Jonathan Jacky
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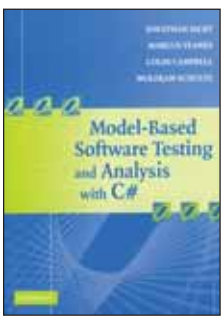


This book teaches model-based analysis and model-based testing, with important new ways to write and analyze software specifications and designs, generate test cases, and check the results of test runs. These methods increase the automation in each of these steps, making them more timely, more thorough, and more effective. Using a familiar programming language, testers and analysts will learn to write models that describe how a program is supposed to behave. The authors work through several realistic case studies in depth and detail, using a toolkit built on the C# language and the .NET framework. Readers can also apply the methods in analyzing and testing systems in many other languages and frameworks. Intended for professional software developers including testers, and for university students, this book is suitable for courses on software engineering, testing, specification, or applications of formal methods.

state; 13. Further reading; Part IV. Advanced Topics: 14. Compositional modeling; 15. Modeling objects; 16. Reactive systems; 17. Further reading; Part V. Appendices: A. Modeling library reference; B. Command reference; C. Glossary; D. Index.

ISBN: 9780521687614 366pp $ 58.00

Practical Algorithms for Image Analysis

2nd Edition

Lawrence O'Gorman
Avaya Labs, New Jersey

Michael J. Sammon
Avaya Labs, New Jersey

& Michael Seul
Bioarray Solutions

In the classic 'cookbook' style of the original, this new edition guides researchers and practitioners through techniques for the digital manipulation and analysis of images, from the simplest steps to advanced functions. Drawing on their long experience as users and developers of image analysis algorithms and software, the authors present a practical description and implementation of the most suitable procedures. Each section treats a single operation, describing typical situations that use the operation, and discusses the algorithm and implementation. Sections start with a 'before' and 'after' pictorial example and a reference listing typical applications, keywords, and related procedures. This new edition includes extra sections on Gabor filtering and threshholding by connectivity, an expanded program listing, and suggested classroom projects. The accompanying CD-ROM features C programs not only as source code for carrying out the procedures, but also as executables with a graphical user interface for Windows and Linux.

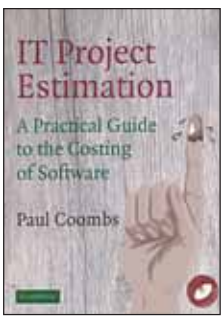
Contents: 1. Introduction; 2. Global image analysis; 3. Gray-scale image analysis; 4. Binary image analysis; 5. Analysis of lines and line patterns; 6. Analysis of point patterns; 7. Frequency domain; 8. Program descriptions; 9. Projects; Appendix: synopsis of important concepts.

ISBN: 9780521884112 368pp $ 74.00

IT Project Estimation

A Practical Guide to the Costing of Software

Paul Coombs
IT Project Estimation Ltd.



Software engineering is becoming more procedural and controlled, but the estimation of IT projects is still regarded as a "black art." *IT Project Estimation* shows why it doesn't have to be. In this concise, easy-to-read guide, author Paul Coombs provides practical, detailed advice on IT project estimation. He shows why accurate estimates are needed, what different estimating methods can be used, and how to analyse the risks in order to make appropriate contingency allowances. He also covers pricing and billing strategies, and discusses how experience of previous projects can be leveraged. Central to the book is a template for a cost model that incorporates task estimates, schedules, staff roles and costs, risk analysis, fixed costs, billing, and cashflow. Template Excel spread-sheets are included on the accompanying CD-ROM.

Putting everything into practise, the end of the book presents a complete case study, showing exactly how a simple example can be scaled up to a real-life problem.

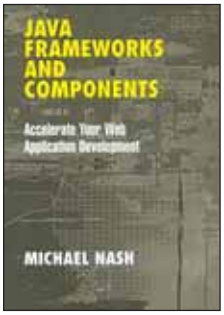
Contents: Chapter 1 Introduction; Chapter 2 Listing the Tasks; Chapter 3 Estimating Each Task; Chapter 4 Planning the Project; Chapter 5 Analysing the Risks; Chapter 6 Costing the Project; Chapter 7 Reviewing the Estimates; Chapter 8 Maintaining the Model; Chapter 9 Evaluating Success; Chapter 10 Case Study; Chapter 11 The Cost Model Template; Chapter 12 References and Resources; Index.

ISBN: 9780521532853 184pp $ 67.00

Java Frameworks and Components

Accelerate Your Web Application Development

Michael Nash
Freeport, Bahamas



This book is a practical tool for Java programmers. It provides the necessary information for them to find, evaluate, and select suitable application frameworks. This work explains in plain language the benefits of frameworks and component technologies, specifically in relation to web application development. It is unique in that it does not focus on any specific technology, but uses examples from several different frameworks to explain the underlying principles. It therefore has a broad appeal to developers who are not sure which framework is right for their purpose, and serves also as a practical tool. Application frameworks are large, often complex tools that many developers do not fully understand. Consequently, they cannot take advantage of the substantial benefits such technology can bring to their development project, as they are often left "reinventing the wheel." As the market for web applications begins its second wave, this book provides the critical information for developers to make the transition into componentized framework-based development, keeping them ahead in an increasingly competitive market. An emphasis on quality and globalization is maintained throughout, as these factors become essential in new projects.

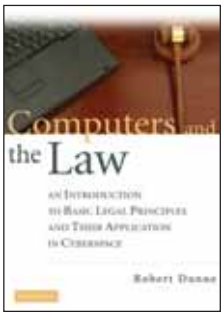
Contents: Acknowledgments; Chapter 1 Components and Application Frameworks; Chapter 2 Components: The Future of Web Application Development; Chapter 3 Application Frameworks: What do They Provide and What Are the Benefits?; Chapter 4 Choosing an Application Framework; Chapter 5 A Catalog of Application Frameworks; Chapter 6 Comparing Frameworks; Chapter 7 Open Source and Components/ Frameworks; Chapter 8 Development Methodologies and Design Patterns; Chapter 9 Integrated Development Environments; Chapter 10 Strategies for Using Frameworks: Best Practices; Chapter 11 Conclusions: The Future of Frameworks and Components; Appendix: Case Studies; Glossary; Index.

ISBN: 9780521520591 490pp $ 77.00

Computers and the Law

An Introduction To Basic Legal Principles and Their Application in Cyberspace

Robert Dunne
Yale University, Connecticut



Computers and the Law provides readers with an introduction to the legal issues associated with computing – particularly in the massively networked context of the Internet. Assuming no previous knowledge of the law or any special knowledge of programming or computer science, this textbook offers undergraduates of all disciplines and professionals in the computing industry an understanding of basic legal principles and an awareness of the peculiarities associated with legal issues in cyberspace. This is not a law school casebook; instead, a variety of relevant cases are presented in redacted form with the full cases available at an ancillary website.

The pervasiveness of computing in modern society has generated numerous legal ambiguities. This book introduces readers to the fundamental workings of the law in the non-virtual world while suggesting the opportunity to create new types of laws with nontraditional goals.

Contents: 1. The common law and statutory law; 2. Contracts; 3. Torts introduction; 4. Defamation; 5. Third-party liability; 6. Copyrights; 7. Trade secrets; 8. Trademarks; 9. The right of privacy; 10. E-mail; 11. The right of publicity; 12. Constitutional law; 13. Pornography and obscenity; 14. Advertising and spam; 15. Jurisdiction.

ISBN: 9780521886505 472pp $ 116.00

UML by Example

Ghinwa Jalloul
American University of Beirut

This step-by-step introduction to object-oriented software development is suitable for pedagogical training as well as for practicing software engineers seeking to add rigor to their techniques. The author presents seven complete case studies and several smaller examples documented in UML, derived from small software projects developed for and delivered to real users. These make use of a bridge process, which presents a systematic approach for developing analysis models and unfolding them incrementally and iteratively through to design models and implementation.

The process could be viewed as one instantiation of the unified software development process and has the potential of being scalable to large software problems. It also provides a model for organizing deliverables obtained throughout different phases of the software life cycle.

These case studies provide a medium for experimental use and act as templates that can be tailored by readers to fit their specific needs and circumstances.

Contents: List of Figures; List of Bridge Process Patterns; Preface; Part I: 1. Modeling Concepts, Artifacts, and Relations; 2. Bridge: A Systematic Process Model; Part II: 3. Reservations Online: Case Study 1; 4. Web Page Maker: Case Study 2; Part III: 5. Simulating a Robot Arm: Case Study 3; 6. Math Tutor: Case Study 4; 7. Distribution Case: Case Study 5; Appendix A Recommended Practice; Bibliography; Index.

ISBN: 9780521008815 445pp $ 52.00

UML Xtra-Light

How to Specify Your Software Requirements

Milan Kratochvil
Kiseldalens Metod AB

& Barry McGibben
Princeton Softech

If you are a non-technical person with a stake in the success of a software project, this book is for you. Business managers often find it impossible to communicate business objectives and specify their software requirements to technical members of staff. This beginner's guide teaches readers to communicate with software developers in a more focussed, effective way. It describes the basic diagrams of the UML modeling notation and show how they are used to specify requirement in an unambiguous way. When used on project, the risk of failure through unclear requirements is removed.

Contents: Foreword; Preface; Acknowledgments; About the Authors; How to Customize This Book; Chapter 1 Introduction: Software - Yet Another Knowledge Industry; Chapter 2 Aligning to the Business; Chapter 3 Adding Rigor to the Requirements; Chapter 4 Sketching the Inside Structure; Chapter 5 Sketching the Inside Dynamics; Chapter 6 Moving Toward Components; Chapter 7 Mapping from Classes to Data Models; Chapter 8 Concluding Remarks; Some Suggested Readings; Index.

ISBN: 9780521892421 445pp $ 33.99

The Elements of UML™ 2.0 Style

2nd Edition

Scott W. Ambler
Ronin International

For all developers who create models using the Unified Modeling Language (UML) 2.x *The Elements of UML™ 2.0 Style* sets the rules for style that will improve your productivity - especially in teams, where understandability and consistency are critical. Coming from renowned UML expert Scott Ambler, the book furnishes a set of rules for modelling in the UML and describes a collection of standards and guidelines for creating effective UML diagrams that will be concise and easy to understand. It provides conventions for: Class diagrams; Timing Diagrams; Use case diagrams; Composite Structure Diagrams; Sequence diagrams; Interaction Overview Diagrams; Activity diagrams; Object diagrams; State machine diagrams; Package diagrams; Communication diagrams; Deployment diagrams and Component diagrams. *The Elements of UML™ 2.0 Style* sets the rules for style that will improve your productivity.

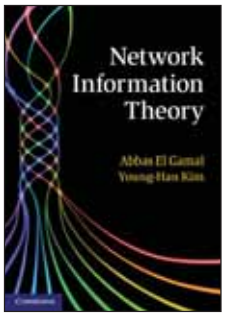
Contents: 1. Introduction; 2. General diagramming guidelines; 3. Guidelines for common UML modeling elements; 4. UML use case diagrams; 5. UML class diagrams; 6. UML package diagrams; 7. UML sequence diagrams; 8. UML communication diagrams; 9. UML state machine diagrams; 10. UML activity diagrams; 11. UML component diagrams; 12. UML deployment diagrams; 13. UML object diagrams; 14. UML composite structure diagrams; 15. UML interaction overview diagrams; 16. UML timing diagrams; 17. Agile modeling; 18. Summary; 19. Bibliography; 20. Index.

ISBN: 9780521616782 200pp $ 19.99

Network Information Theory

Abbas El Gamal
Stanford University

& Young-Han Kim
University of California, San Diego

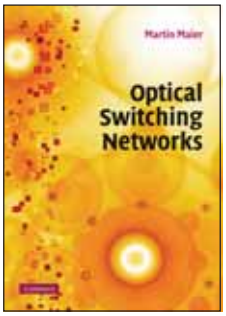


This comprehensive treatment of network information theory and its applications provides the first unified coverage of both classical and recent results. With an approach that balances the introduction of new models and new coding techniques, readers are guided through Shannon's point-to-point information theory, single-hop networks, multi-hop networks, and extensions to distributed computing, secrecy, wireless communication and networking. Elementary mathematical tools and techniques are used throughout, requiring only basic knowledge of probability, whilst unified proofs of coding theorems are based on a few simple lemmas, making the text accessible to newcomers. Key topics covered include successive cancellation and superposition coding, MIMO wireless communication, network coding and cooperative relaying. Also covered are feedback and interactive communication, capacity approximations and scaling laws, and asynchronous and random access channels. Featuring a wealth of illustrations, worked examples, bibliographic notes and over 250 problems, this book is ideal for use in the classroom and for self-study.

ISBN: 9781107008731 708pp £ 50.00

Optical Switching Networks

Martin Maier
Université du Québec, Montréal



Companion Website available

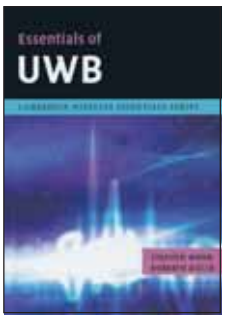
Optical Switching Networks describes all the major switching paradigms developed for modern optical networks, discussing their operation, advantages, disadvantages and implementation. Following a review of the evolution of optical WDM networks, an overview of the future trends out. The latest developments in optical access, local, metropolitan, and wide area networks are covered, including detailed technical descriptions of generalized multiprotocol label switching, waveband switching, photonic slot routing, optical flow, burst and packet switching. The convergence of optical and wireless access networks is also discussed, as are the IEEE 802.17 Resilient Packet Ring and IEEE 802.3ah Ethernet passive optical network standards and their WDM upgraded derivatives. The feasibility, challenges and potential of next-generation optical networks are described in a survey of state-of-the-art optical networking testbeds. Animations showing how the key optical switching techniques work are available via the web, as are lecture slides (www.cambridge.org/9780521868006).

ISBN: 9780521868006 244pp £ 71.00

Essentials of UWB

Stephen Wood
Intel, US

& Roberto Aiello
Staccato Communications, San Diego



If you are involved in designing, building, selling or regulating UWB devices, this concise and practical guide to UWB technology, standards, regulation, and intellectual property issues will quickly bring you up-to-speed. Packed with practical insights, implementation guidelines, and application examples, *Essentials of UWB* is a must-have resource for wireless professionals working in the field. Written by key figures in the development of UWB, the book describes UWB technology, and evaluates its suitability for applications in communications, radar, and imaging. UWB radios, protocols and implementation are covered, and a thorough account of UWB industry organization completes the picture. This is an invaluable guide for engineers involved in UWB device design, as well as for product marketing managers, sales support engineers and technical managers. It will also appeal to engineers with a deeper technical understanding of UWB who want to gain knowledge of the broader environment and future evolutionary expectations.

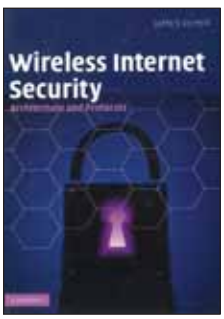
Contents: 1. Introducing ultra wideband; 2. Matching UWB to HDR applications; 3. The physical (PHY) layer; 4. The media access control (MAC) layer; 5. Implementation considerations; 6. Upper layer protocols; 7. UWB standardization; 8. Special interest groups; 9. UWB business issues; 10. Regulating UWB; 11. Tragedy of the commons.

ISBN: 9780521877831 214pp £ 46.00

Wireless Internet Security

Architecture and Protocols

James Kempf
DoCoMo Labs USA, Palo Alto, California



Approaching wireless Internet security from the position of system architecture, this text describes the cryptographic and protocol-based tools for Internet security with a focus on understanding the system architecture of existing Internet security, and on developing architectural changes for new security services. Introducing the topics of security threats in wireless networks, security services for countering those threats, and the process of defining functional architecture for network systems, the author also discusses examples of wireless Internet security systems such as wireless network access control, local IP subnet configuration and address resolution, and location privacy. Each chapter describes the basic network architecture and protocols for the system under consideration, the security threats faced, a functional architecture, and the important Internet protocols that implement the architecture. This is an ideal resource for graduate students of electrical engineering and computer science, as well as for engineers and system architects in the wireless network industry.

Contents: 1. Security basics; 2. Network system architecture basics; 3. Cryptographic algorithms and security primitives; 4. Wireless IP network access control; 5. Local subnet configuration and address resolution; 6. Security for global IP mobility; 7. Location privacy.

ISBN: 9780521887830 224pp £ 46.00

Cooperative Communications and Networking

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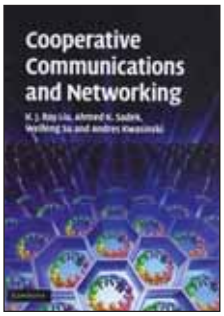
Weifeng Su
State University of New York, Buffalo

& Andres Kwasinski
Texas Instruments, Germantown, Maryland



Companion Website available

Presenting the fundamentals of cooperative communications and networking, this book treats the concepts of space, time, frequency diversity and MIMO, with a holistic approach to principal topics where significant improvements can be obtained. Beginning with background and MIMO systems, Part I includes a review of basic principles of wireless communications and space-time diversity and coding. Part II then presents topics on physical layer cooperative communications such as relay channels and protocols, performance bounds, multi-node cooperation, and energy efficiency. Finally, Part III focuses on cooperative networking including cooperative and content-aware multiple access, distributed routing, source-channel coding, and cooperative OFDM. Including end-of-chapter review questions, this text will appeal to graduate students of electrical engineering and is an ideal textbook for advanced courses on wireless communications. It will also be of great interest to practitioners in the wireless communications industry. Presentation slides for each chapter and instructor-only solutions are available at www.cambridge.org/9780521895132.

Contents: Preface; Part I. Background and MIMO Systems: 1. Introduction; 2. Space-time diversity and coding; 3. Space-time-frequency diversity and coding; Part II. Cooperative Communications: 4. Relay channels and protocols; 5. Cooperative communications with single relay; 6. Multi-node cooperative communications; 7. Distributed space-time and space-frequency coding; 8. Relay selection: when to cooperate with whom; 9. Differential modulation for cooperative communications; 10. Energy efficiency in cooperative sensor networks; Part III. Cooperative Networking: 11. Cognitive multiple-access via cooperation; 12. Content-aware cooperative multiple-access; 13. Distributed cooperative routing; 14. Source-channel coding with cooperation; 15. Asymptotic performance of distortion exponents; 16. Coverage expansion with cooperation; 17. Broadband cooperative communications; 18. Network lifetime maximization via cooperation; Bibliography; Index.

ISBN: 9780521895132 642pp £ 82.00

The Elements of C++ Style

Trevor Misfeldt
Centerspace, Oregon

Gregory Bumgardner

& Andrew Gray
Intellichem Inc.

The Elements of C++ Style is for all C++ practitioners, especially those working in teams where consistency is critical. Just as Strunk and White's *The Elements of Style* provides rules of usage for writing in the English language, this text furnishes a set of rules for writing in C++. The authors offer a collection of standards and guidelines for creating solid C++ code that will be easy to understand, enhance, and maintain.

This book provides conventions for
- formatting
- naming
- documentation
- programming
- and packaging

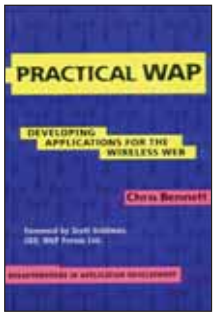
Contents: Preface; 1. Introduction; 2. General Principles; 3. Formatting Conventions; 4. Naming Conventions; 5. Documentation Conventions; 6. Programming Principles; 7. Programming Conventions; 8. Packaging Conventions; Summary; Glossary; Bibliography; Index.

ISBN: 9780521893084 190pp £ 12.99

Practical WAP

Developing Applications for the Wireless Web

Chris Bennett
Unisys Canada Inc.



Practical WAP teaches you to design and build useful WAP services. In a clear and lively style the author
- helps you identify suitable WAP applications,
- shows you around the WAP standards,
- guides you through the critical success factors in designing WAP applications (usability, scalability, security, etc.),
- helps you choose the right architecture for your WAP projects,
- and shows you how to build and test them!

The author also includes tutorials on WML (the HTML of the wireless web), WMLScript, and Push technologies. A complete Java/database WAP application and extensive real world examples round out this in-depth developer's guide.

Contents: Foreword; Acknowledgments; A Note on Companies and URLs; Part 1 A WAP Primer: 1. Introduction; 2. Technical Overview; 3. Applications; 4. Tools; Part 2 The WAP Development Standards: 5. Wireless Markup Language; 6. Wireless Markup Language - Beyond the Basics; 7. WMLScript; 8. Push Applications; Part 3 WAP in Practice: 9. Design Factors; 10. Architectures; 11. Usability and Testing; 12. Application Development Case Study; 13. Future of WAP; A WML 1.3 Reference; B Source Code; Glossary; Index.

ISBN: 9780521005616 445pp £ 43.00

Specifying Software

A Hands-On Introduction

R. D. Tennent
Queens University, Ontario

This innovative volume provides a hands-on introduction to techniques for specifying the behavior of software components. Featured topics include techniques for using programmer-friendly assertional notations to specify, develop, and verify small but nontrivial algorithms and data representations and for using state diagrams, grammars, and regular expressions to specify and develop recognizers for formal languages.

The presentation is based on numerous examples and case studies. Using this book will help readers improve their programming skills and develop a solid foundation for subsequent courses in advanced algorithms and data structures, software design, formal methods, compilers, programming languages, and theory.

Contents: Preface; Introduction; A Algorithms: Introduction to Part A:1. Specifying Algorithms; 2. Verifying Algorithms: Basic Techniques; 3. Verifying Algorithms: Some Examples; 4. Additional Verification Techniques; B Data Representations: Introduction to Part B: 5. Data Representation: A Case Study; 6. Data Representation: Additional Examples; C Language Recognizers: Introduction to Part C: 7. Basic Concepts; 8. State-Transition Diagrams; 9. Regular Languages; 10. Context-Free Languages; 11. Parsing; D Unimplementable Specifications: Introduction to Part D:12. A Taste of Computability Theory; Appendices: A Programming Language Reference; B Hints for selected Exercises; Index.

ISBN: 9780521004015 302pp £ 25.99

TCP/IP Essentials

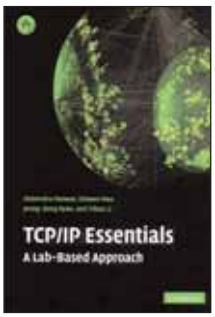
A Lab-Based Approach

Shivendra Panwar
Polytechnic University, New York

Shiwen Mao
Polytechnic University, New York

Jeong-dong Ryoo
Electronics and Telecommunications Research Unit, South Korea

& Yihan Li
Polytechnic University, New York



The TCP/IP family of protocols have become the de facto standard in the world of networking, are found in virtually all computer communication systems, and form the basis of today's Internet. *TCP/IP Essentials* is a hands-on guide to TCP/IP technologies, and shows how the protocols operate in practice. The book contains a series of carefully designed and extensively tested laboratory experiments that span the various elements of protocol definition and behavior. Topics covered include bridges, routers, LANs, static and dynamic routing, multicast and realtime service, and network management and security. The experiments are described in a Linux environment, with parallel notes on Solaris implementation. The book includes many homework exercises, and supplementary material for instructors is available. The book is aimed at students of electrical and computer engineering or computer science who are taking courses in networking. It is also an ideal guide for engineers studying for networking certifications.

Contents: Preface; Note to instructor; Acknowledgements; General conventions; List of abbreviations; 0. TCP/IP overview; 1. Linux and TCP/IP networking; 2. A single segment network; 3. Bridges, LANs and the Cisco IOS; 4. Static and dynamics routing; 5. UDP and its applications; 6. TCP study; 7. Multicast and realtime service; 8. The Web, DHCP, NTP and NAT; 9. Network

management and security; References and further reading; Appendix A Instructor's guide; Appendix B Initial configuration of the routers; Appendix C Source code; Appendix D List of key requests for comments (RFC); Index.

ISBN: 9780521601245 284pp £ 38.99

High-Performance ASIC Design

Using Synthesizable Domino Logic in an ASIC Flow

Razak Hossain
STMicroelectronics, San Diego

Presenting a methodology for using domino logic in an ASIC design flow developed over several years in an industrial context, this text covers practical issues related to the use of domino logic in an automated framework, and brings together all the knowledge needed to apply these design techniques in practice. Beginning with a discussion of how to achieve high speed in ASIC designs, subsequent chapters detail the design and characterization of standard cell compatible domino logic libraries and an advanced domino logic synthesis flow. The results achieved by using automated domino logic design techniques, including silicon measurements, are used to validate the presented solution. With design examples including the implementation of the execution unit of a microprocessor and a Viterbi decoder, this text is ideal for graduate students and researchers in electrical and computer engineering and also for circuit designers in industry.

Contents: 1. An introduction to domino logic; 2. High speed digital design; 3. Domino logic library design; 4. Domino logic synthesis; 5. Circuits designed with domino logic in an ASIC flow; 6. Evolution of domino logic synthesis.

ISBN: 9780521873345 160pp £ 71.00

Advanced Model Order Reduction Techniques in VLSI Design

Sheldon Tan
University of California, Riverside

& Lei He
University of California, Los Angeles

Model order reduction (MOR) techniques reduce the complexity of VLSI designs, paving the way to higher operating speeds and smaller feature sizes. This book presents a systematic introduction to, and treatment of, the key MOR methods employed in general linear circuits, using real-world examples to illustrate the advantages and disadvantages of each algorithm. Following a review of traditional projection-based techniques, coverage progresses to advanced 'state-of-the-art' MOR methods for VLSI design, including HMOR, passive truncated balanced realization (TBR) methods, efficient inductance modeling via the VPEC model, and structure-preserving MOR techniques. Where possible, numerical methods are approached from the CAD engineer's perspective, avoiding complex mathematics and allowing the reader to take on real design problems and develop more effective tools. With practical examples and over 100 illustrations, this book is suitable for researchers and graduate students of electrical and computer engineering, as well as practitioners working in the VLSI design industry.

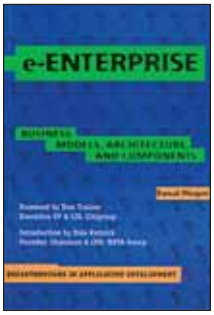
Contents: List of figures; List of tables; Preface; 1. Introduction; 2. Projection-based model order reduction algorithms; 3. Truncated balanced realization methods for model order reduction; 4. Passive balanced truncation of linear systems in descriptor form; 5. Passive hierarchical model order reduction; 6. Terminal reduction of linear dynamic circuits; 7. Vector potential equivalent circuit for inductance modeling; 8. Structure-preserving model order reduction; 9. Block structure-preserving reduction for RLCK circuits; 10. Model optimization and passivity enforcement; 11. General multi-port circuit realization; 12. Model order reduction for multi-terminal linear dynamic circuits; 13. Passive modeling by signal waveform shaping; References; Index.

ISBN: 9780521865814 258pp £ 95.00

e-Enterprise

Business Models, Architecture, and Components

Faisal Hoque



Any company that seeks to become one of the great e-Enterprises needs a clear blueprint for constructing a future where real-world and virtual-world assets will be inseparable. Your blueprint must include business and technology architectures, validated through an objective operating model and simulation to avoid costly mistakes. This book demystifies Net commerce and dissects the strategic challenges faced by companies that are embracing this new way of doing business. The author shows you how to create your blueprint, maximize return on your e-Investments, and continuously re-use your strategic and architectural assets to respond in real-time to changing customer demands.

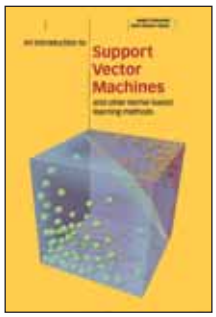
Contents: Foreword; Acknowledgments; Introduction; Part 1 The e-Enterprise: Chapter 1 From Net Commerce to e-Enterprise; Part 2 Business and Application Models: Chapter 2 e-Application Models; Chapter 3 B-to-C e-Application Models; Chapter 4 B-to-B e-Application Models; Part 3 e-Enterprise Methodology and Architecture: Chapter 5 Building e-Enterprises; Chapter 6 e-Enterprise Architecture; Part 4 Enabling Components: Chapter 7 e-Enterprise Business Components; Chapter 8 e-Enterprise Technology Components; Afterword Who Will Be the Great e-Enterprises?; References; Index.

ISBN: 9780521774871 304pp £ 45.00

An Introduction to Support Vector Machines and Other Kernel-Based Learning Methods

Nello Cristianini
University of Bristol

& John Shawe-Taylor
Royal Holloway, University of London



This book is the first comprehensive introduction to Support Vector Machines (SVMs), a new generation learning system based on recent advances in statistical learning theory. SVMs deliver state-of-the-art performance in real-world applications such as text categorisation, hand-written character recognition, image classification, biosequence analysis, etc.

Their first introduction in the early' 90s led to an explosion of applications and deepening theoretical analysis, that has now established Support Vector Machines as one of the standard tools for machine learning and data mining. Students will find the book both stimulating and accessible, while practitioners will be guided smoothly through the material required for a good grasp of the theory and application of these techniques. The concepts are introduced gradually in accessible and self-contained stages, while in each stage the presentation is rigorous and thorough. Pointers to relevant literature and web sites containing software ensure that it forms an ideal starting point for further study. Equally the book will equip the practitioner to apply the techniques and its associated web site will provide pointers to updated literature, new applications, and on-line software.

ISBN: 9780521780193 204pp £ 50.00

Memory as a Programming Concept in C and C++

Frantisek Franek
McMaster University, Ontario

The overwhelming majority of program bugs and computer crashes stem from problems of memory access, allocation, or deallocation. Such memory-related errors are also notoriously difficult to debug. Yet the role that memory plays in C and C++ programming is a subject often overlooked in courses and books because it requires specialized knowledge of operating systems, compilers, and computer architecture in addition to a familiarity with the languages themselves. Most professional programmers learn about memory entirely through experience of the trouble it causes.

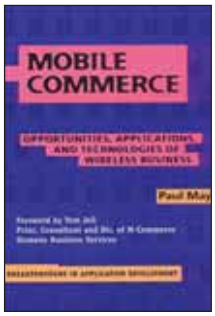
This book provides students and professional programmers with a concise yet comprehensive view of the role that memory plays in all aspects of programming and program behavior. Assuming only a basic familiarity with C or C++, the author describes the techniques, methods, and tools available to deal with the problems related to memory and its effective use.

ISBN: 9780521520430 272pp £ 29.99

Mobile Commerce

Opportunities, Applications, and Technologies of Wireless Business

Paul May
Verista Consulting



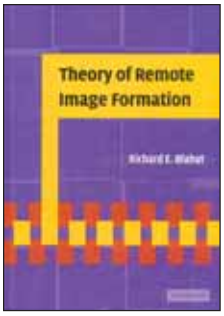
Mobile Commerce charts the business opportunities opened up by the new phase of development, exploring consumer and business services from intelligent tickets to realtime collaborative working. The author also explains the technologies that make mobile commerce work, covering everything from network types to smartcards in non-specialist language. Throughout, the emphasis is on getting mobile commerce to work for you and your business.

Mobile Commerce is the first comprehensive overview of wireless business strategies, providing a clear and detailed introduction to the technologies and architectures. This is the perfect guidebook for anyone who needs to get on top of the subject fast and gain the confidence to take action.

ISBN: 9780521797566 300pp £ 45.00

Theory of Remote Image Formation

Richard E. Blahut
University of Illinois, Urbana-Champaign



In many applications, sensor outputs, such as ultrasonic or X-ray signals, are recorded and then analyzed with digital or optical processors in order to extract information to form images. Such processing requires the development of algorithms of great precision and sophistication. This book presents a unified treatment of the mathematical methods that underpin the various algorithms used in remote image formation.

The author begins with a review of transform and filter theory. He then discusses two -and three-dimensional Fourier transform theory, the ambiguity function, image construction and reconstruction, tomography, baseband surveillance systems, and passive systems (where the signal source might be an earthquake or a galaxy). Information-theoretic methods for image formation in the presence of noise are also covered.

Throughout the book, practical applications illustrate theoretical concepts, and there are many homework problems. The book is aimed at graduate students of electrical engineering and computer science and practitioners in industry.

Contents: Preface; Acknowledgments; 1. Introduction; 2. Signals in one dimension; 3. Signals in two dimensions; 4. Optical Imaging Systems; 5. Antenna Systems; 6. The ambiguity function; 7. Radar imaging systems; 8. Diffraction imaging systems; 9. Construction and reconstruction of images; 10. Tomography; 11. Likelihood and entropy methods; 12. Radar search systems; 13. Passive and baseband surveillance systems; 14. Data combination and tracking; 15. Phase noise and phase distortion; References; Index.

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Model Driven Architecture with Executable UML

Chris Raistrick
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Paul Francis
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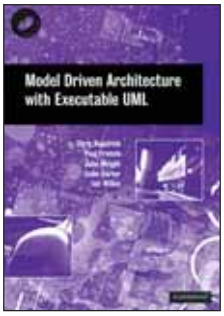
John Wright
Aurora Consulting Ltd.

Colin Carter
Aurora Consulting Ltd.

& Ian Wilkie
Kennedy Carter Ltd.



This book offers a unique insight into a revolution in software development that allows model specifications to be fully and efficiently translated into code. Using the most widely adopted industry standard software modelling language, Unified Modelling Language (UML), the reader will learn how to build robust specifications based on the Object Management Group™' s (OMG™) Model Driven Architecture™ (MDA™). From there, the authors describe the steps needed to translate the executable UML, (xUML) models to any platform-specific implementation. The benefits of this approach go well beyond simply reducing or eliminating the coding stage - it also ensures platform independence, avoids obsolescence (programming languages may change, the model doesn't) and allows full verification of the models by executing them in a test-and-debug xUML environment. This is an excellent reference for anyone embarking on what is surely the future of software development for medium and large scale projects.

The authors are all experienced practitioners of the techniques and processes described in the book. They know from first hand experience over several years that executable modelling and code generation works. They have also learnt how to make it work most effectively and where caution is required. The aim of this book is to back up the technical details with this practical experience.

Contents: The authors; Foreword; Acknowledgements; Glossary; List of abbreviations; 1. Introduction; 2. Executable model driven Architecture; 3. Using MDA in a typical project; 4. Use case modelling; 5. Platform-independent modelling with domains; 6. Class modelling in a domain; 7. Class behaviour and interactions; 8. Operation modelling; 9. Dynamic modelling; 10. Action specification; 11. Modelling patterns; 12. Integrating domains; 13. System generation; 14. Case study; CD installation procedure; References; Index.

ISBN: 9780521537711 412pp £ 65.00

Kernel Methods for Pattern Analysis

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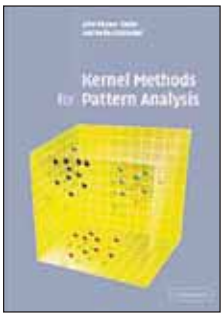
University of Southampton

& Nello Cristianini
University of Bristol



Kernel methods provide a powerful and unified framework for pattern discovery, motivating algorithms that can act on general types of data (e.g. strings, vectors or text) and look for general types of relations (e.g. rankings, classifications, regressions, clusters). The application areas range from neural networks and pattern recognition to machine learning and data mining. This book, developed from lectures and tutorials, fulfils two major roles: firstly it provides practitioners with a large toolkit of algorithms, kernels and solutions ready to use for standard pattern discovery problems in fields such as bioinformatics, text analysis, image analysis. Secondly it provides an easy introduction for students and researchers to the growing field of kernel-based pattern analysis, demonstrating with examples how to handcraft an algorithm or a kernel for a new specific application, and covering all the necessary conceptual and mathematical tools to do so.

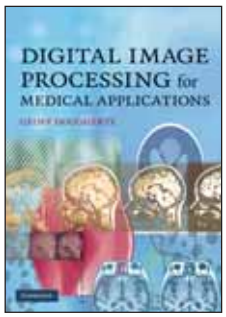
Contents: Preface; Part I Basic Concepts: 1. Pattern analysis; 2. Kernel methods: an overview; 3. Properties of Kernels; 4. Detecting stable patterns; Part II Pattern Analysis Algorithms: 5. Elementary algorithms in feature space; 6. Pattern analysis using eigen-decompositions; 7. Pattern analysis using convex optimisation; 8. Ranking, clustering and data visualisation; Part III Constructing Kernels: 9. Basic kernels and kernel types; 10. Kernels for text.; 11. Kernels for structured data: strings, trees, etc.; 12. Kernels from generative models; Part IV Appendices; Appendix A Proof omitted from the main text; Appendix B Notational conventions; Appendix C List of pattern analysis methods; Appendix D List of kernels; Bibliography; Index.

ISBN: 9780521813976 476pp £ 59.00

BIOTECHNOLOGY/ BIOINFORMATICS

Digital Image Processing for Medical Applications

Geoff Dougherty
California State University, Channel Islands



Companion Website available

Image processing is a hands-on discipline, and the best way to learn is by doing. This text takes its motivation from medical applications and uses real medical images and situations to illustrate and clarify concepts and to build intuition, insight and understanding. Designed for advanced undergraduates and graduate students who will become end-users of digital image processing, it covers the basics of the major clinical imaging modalities, explaining how the images are produced and acquired. It then presents the standard image processing operations, focusing on practical issues and problem solving. Crucially, the book explains when and why particular operations are done, and practical computer-based activities show how these operations affect real images. All images, links to the public-domain software ImageJ and custom plug-ins, and selected solutions are available from www.cambridge.org/books/dougherty.

Contents: Preface; 1. Introduction; 2. Imaging systems; 3. Medical images obtained with ionizing radiation; 4. Medical images obtained with non-ionizing radiation; 5. Fundamentals of digital image processing; 6. Image enhancement in the spatial domain; 7. Image enhancement in the frequency domain; 8. Image restoration; 9. Morphological image processing; 10. Image segmentation; 11. Feature recognition and classification; 12. Three-dimensional visualization; 13. Medical applications of imaging; 14. Frontiers of image processing in medicine; Appendix A. The Fourier Series and Fourier Transform; Appendix B. Set theory and probability; Appendix C. Shape and texture; Bibliography; Index.

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Biomechanics

Concepts and Computation

Cees Oomens
Technische Universiteit Eindhoven, Holland

Marcel Brekelmans
Technische Universiteit Eindhoven, Holland

& Frank Baaijens
Technische Universiteit Eindhoven, Holland

This quantitative approach integrates the classical concepts of mechanics and computational modelling techniques, in a logical progression through a wide range of fundamental biomechanics principles. Online MATLAB®-based software, along with examples and problems using biomedical applications, will motivate undergraduate biomedical engineering students to practise and test their skills. The book covers topics such as kinematics, equilibrium, stresses and strains, and also focuses on large deformations and rotations and non-linear constitutive equations, including visco-elastic behaviour and the behaviour of long slender fibre-like structures. This is the first textbook that integrates both general and specific topics, theoretical background and biomedical engineering applications, as well as analytical and numerical approaches. This is the definitive textbook for students.

Contents: Preface; 1. Vector calculus; 2. The concepts of force and moment; 3. Static equilibrium; 4. The mechanical behaviour of fibres; 5. Fibres: time dependent behaviour; 6. Analysis of a one-dimensional continuous medium; 7. Biological materials and continuum mechanics; 8. Stress in three-dimensional continuous media; 9. Motion: the time as an extra dimension; 10. Deformation and rotation, deformation rate and spin; 11. Local balance of mass, momentum and energy; 12. Constitutive modelling of solids and fluids; 13. Solution strategies for solid and fluid mechanics problems; 14. Numerical solution of one-dimensional diffusion equation; 15. The one-dimensional convection-diffusion equation; 16. The three-dimensional convection-diffusion equation; 17. Shape functions and numerical integration; 18. Infinitesimal strain elasticity problems; References; Index.

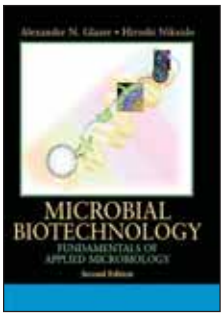
ISBN: 9780521875585 346pp ₹ 2400.00

Microbial Biotechnology

Fundamentals of Applied Microbiology
2nd Edition

Alexander N. Glazer
University of California, Berkeley

& Hiroshi Nikaido
University of California, Berkeley



Knowledge in microbiology is growing exponentially through the determination of genomic sequences of hundreds of microorganisms and the invention of new technologies such as genomics, transcriptomics, and proteomics, to deal with this avalanche of information. These genomic data are now exploited in thousands of applications, ranging from those in medicine, agriculture, organic chemistry, public health, biomass conversion, to biomining. *Microbial Biotechnology: Fundamentals of Applied Microbiology* focuses on uses of major societal importance, enabling an in-depth analysis of these critically important applications. Some, such as wastewater treatment, have changed only modestly over time, others, such as directed molecular evolution, or 'green' chemistry, are as current as today's headlines. This fully revised second edition provides an exciting interdisciplinary journey through the rapidly changing landscape of discovery in microbial biotechnology. An ideal text for courses in applied microbiology and biotechnology courses, this book will also serve as an invaluable overview of recent advances in this field for professional life scientists and for the diverse community of other professionals with interests in biotechnology.

Contents: Preamble; 1. Microbial diversity; 2. Microbial biotechnology, scope, techniques and examples; 3. Production of proteins in bacteria and yeast; 4. The world of 'omics' - genomics, transcriptomics, proteomics and metabolomics; 5. Recombinant and synthetic vaccines; 6. Plant-microbe interactions; 7. Microbial insecticides; 8. Microbial polysaccharides and polyesters; 9. Amino acids; 10. Antibiotics; 11. Biocatalysis in organic chemistry; 12. Biomass; 13. Ethanol; 14. Environmental applications.

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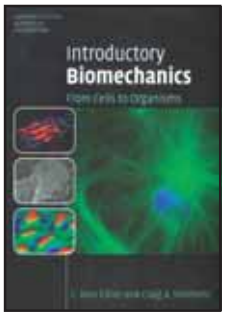
Introductory Biomechanics

C. Ross Ethier
University of Toronto

& Craig A. Simmons
University of Toronto



Introductory Biomechanics is a new, integrated text written specifically for engineering students. It provides a broad overview of this important branch of the rapidly growing field of bioengineering. A wide selection of topics is presented, ranging from the mechanics of single cells to the dynamics of human movement. No prior biological knowledge is assumed and in each chapter, the relevant anatomy and physiology are first described. The biological system is then analyzed from a mechanical viewpoint by reducing it to its essential elements, using the laws of mechanics and then tying mechanical insights back to biological function. This integrated approach provides students with a deeper understanding of both the mechanics and the biology than from qualitative study alone. The text is supported by a wealth of illustrations, tables and examples, a large selection of suitable problems and hundreds of current references, making it an essential textbook for any biomechanics course.

Contents: Preface; 1. Introduction; 2. Cellular biomechanics; 3. Hemodynamics; 4. The circulatory system; 5. The interstitium; 6. Ocular biomechanics; 7. The respiratory system; 8. Muscles and movement; 9. Skeletal biomechanics; 10. Terrestrial locomotion; Appendix A. The electrocardiogram; Index.

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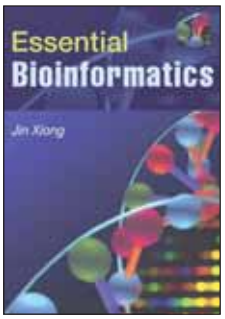
Essential Bioinformatics

Jin Xiong
Texas A & M University



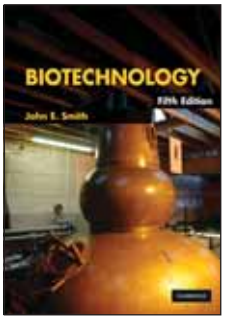
Essential Bioinformatics is a concise yet comprehensive textbook of bioinformatics that provides a broad introduction to the entire field. Written specifically for a life science audience, the basics of bioinformatics are explained; followed by discussions of the state-of-the-art computational tools available to solve biological research problems. All key areas of bioinformatics are covered including biological databases, sequence alignment, genes and promoter prediction, molecular phylogenetics, structural bioinformatics, genomics, and proteomics. The book emphasizes how computational methods work and compares the strengths and weaknesses of different methods. This balanced yet easily accessible text will be invaluable to students who do not have sophisticated computational backgrounds. Technical details of computational algorithms are explained with a minimum use of mathematical formulas; graphical illustrations are used in their place to aid understanding. The effective synthesis of existing literature as well as in-depth and up-to-date coverage of all key topics in bioinformatics make this an ideal textbook for all bioinformatics courses taken by life science students and for researchers wishing to develop their knowledge of bioinformatics to facilitate their own research.

Contents: Preface; Part I. Introduction and Biological Databases: 1. Introduction; 2. Introduction to biological databases; Part II. Sequence Alignment: 3. Pairwise sequence alignment; 4. Database similarity search; 5. Multiple sequence alignment; 6. Profiles and hidden Markov models; 7. Protein motifs and patterns; Part III. Gene and Promoter Prediction: 8. Gene prediction; 9. Promoter and regulatory element prediction; Part IV. Molecular Phylogenetics: 10. Phylogenetics basics; 11. Phylogenetic tree construction methods and programs; Part V. Protein Structure Basics: 12. Protein structure basics; 13. Protein structure visualization, comparison and classification; 14. Protein secondary structure prediction; 15. Protein tertiary structure prediction; 16. RNA structure prediction; Part VI. Genomics and Proteomics: 17. Genome mapping, assembly and comparison; 18. Functional genomics; 19. Proteomics; Practical exercises; Glossary.

ISBN: 9780521706100 339pp ₹ 445.00

Biotechnology

John E. Smith
University of Strathclyde



Biotechnology is the major technology of the 21st century, yet few people realise how much it impacts on many aspects of human society. The defining aim of this new fifth edition is to re-establish the correct understanding of the term biotechnology. Using the straightforward style that made the previous editions of his textbook so popular, John Smith once again helps students with the deciphering and use of biological knowledge. He explains the historical developments in biotechnology and the range of activities from brewing beer, the treatment of sewage and other wastes, and the creation of biofuels. He also discusses the innovations in molecular biology, genomics and proteomics, systems biology and their impact on new biotechnology. In this edition John Smith also re-examines the ethics and morality of aspects of biotechnology and puts new emphasis on stem cells and regenerative medicine and micro RNA.

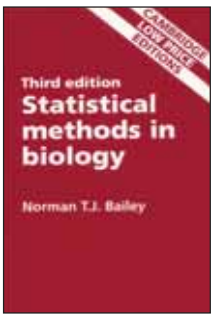
Contents: 1. The nature of biotechnology; 2. Biomass: a biotechnology substrate?; 3.Genetics and biotechnology; 4. Bioprocess/ fermentation technology; 5. Enzyme technology; 6. Biological fuel generation; 7. Environmental biotechnology; 8. Plant and forest biotechnology; 9. Animal and insect biotechnology; 10. Food and beverage biotechnology; 11. Biotechnology and medicine; 12. Stem cell biotechnology; 13. Protection of biotechnological inventions; 14. Safety in biotechnology; 15. Public perception of biotechnology: genetic engineering - safety, social, moral and ethical considerations; 16. Looking to the future.

ISBN: 9780521138796 280pp ₹ 345.00

Statistical methods in biology

3rd Edition
(CLPE)

Norman T.J. Bailey
Formerly Senior Lecturer in Physics, University of Liverpool



This is a very widely adopted textbook which presents the basic concepts of statistics lucidly and convincingly. It recognises that students must be aware of when to use the standard techniques and how to apply the results they obtain, and the reasoning behind the more important procedures is carefully explained. Since many biologists do not have a strong mathematical background, the arguments are gauged in terms which can be easily understood by those with only an elementary knowledge of algebra. Unlike many other introductory books, mathematical derivations are avoided and formulae are only used as a convenient shorthand. Although the subject is presented with great simplicity, the coverage is wide and will satisfy the needs of those working in many disciplines. The third edition includes a special chapter on problems associated with numerical calculation, electronic calculators and computers.

Contents: Preface; 1. Introduction; 2. Variability and frequency distributions; 3. Estimation, standard errors and confidence limits; 4. The basic idea of a significance test; 5. Simple significance tests based on the normal distribution; 6. The use of t-tests for small samples; 7. Contingency tables and X2; 8. X2-tests of goodness-of-fit and homogeneity; 9. The correlation of measurements; 10. Regression analysis; 11. Simple experimental design and the analysis of variance; 12. Introduction to factorial experiments; 13. Random samples and random numbers; 14. Partial correlation and multiple regression; 15. Non-parametric and distribution-free tests; 16. Notes on numerical calculation, calculators and computers; Appendix, Tables; Index

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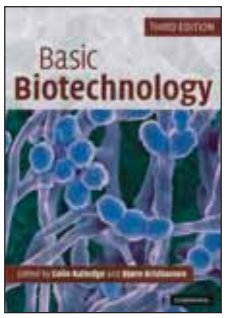
Basic Biotechnology

3rd Edition

Edited by
Colin Ratledge
University of Hull

& Bjorn Kristiansen
EU Biotech Consulting, Norway



Biotechnology is one of the major technologies of the twenty-first century. Its wide-ranging, multi-disciplinary activities include recombinant DNA techniques, cloning and the application of microbiology to the production of goods from bread to antibiotics. In this new edition of the textbook *Basic Biotechnology*, biology and bioprocessing topics are uniquely combined to provide a complete overview of biotechnology. The fundamental principles that underpin all biotechnology are explained and a full range of examples are discussed to show how these principles are applied; from starting substrate to final product. A distinctive feature of this text are the discussions of the public perception of biotechnology and the business of biotechnology, which set the science in a broader context. This comprehensive textbook is essential reading for all students of biotechnology and applied microbiology, and for researchers in biotechnology industries.

Contents: 1. Public perception of biotechnology; 2. Biochemistry and physiology of growth and metabolism; 3. Stoichiometry and kinetics of microbial growth from a thermodynamic perspective; 4. Genome management and analysis: prokaryotes; 5. Genetic engineering: yeasts and filamentous fungi; 6. Microbial process kinetics; 7. Bioreactor design; 8. Mass transfer; 9. Downstream processing; 10. Measurement, monitoring, modelling and control; 11. Process economics; 12. High throughput screening and process optimisation; 13. The business of biotechnology; 14. Amino acids; 15. Organic acids; 16. Microbial polysaccharides and single cell oils; 17. Environmental applications; 18. Production of antibiotics by fermentation; 19. Strategies of cultivation; 20. Enzyme biotechnology; 21. Recombinant proteins of high value; 22. Insect and mammalian cell culture; 23. Plant cell biotechnology; 24. Biotransformations; 25. Immunochemical applications

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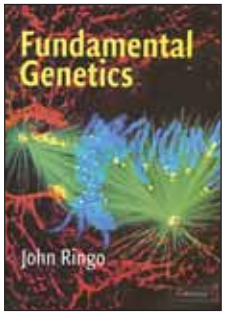
Fundamental Genetics

John Ringo
University of Maine, Orono



Fundamental Genetics is a concise, nontraditional textbook that explains major topics of modern genetics in 42 mini-chapters. It is designed as a textbook for an introductory general genetics course. *Fundamental Genetics* is also a useful reference or refresher on basic genetics for professionals and students in health sciences and biological sciences. It is organized for ease of learning, beginning with molecular structures and progressing through molecular processes to population genetics and evolution. Students will find the short, focused chapters approachable and more easily digested than the long, more complex chapters of traditional genetics textbooks. Each chapter concentrates on one topic, so that teachers and students can readily tailor the book to their needs by choosing a subset of chapters. The book is extensively illustrated throughout with clear and uncluttered diagrams that are simple enough to be re-drawn by students. This unique textbook provides a compact alternative for introductory genetics courses.

Contents: 1. Life forms and their origins; 2. Nucleic acids; 3. Proteins; 4. Simple chromosomes; 5. Chromosomes of eukarya; 6. Genome content; 7. RNA synthesis I: Transcription; 8. RNA synthesis II: Processing; 9. Abundance of RNAs in bacteria; 10. Abundance of RNAs in eukarya;11. Protein synthesis; 12. DNA replication; 13. Chromosome replication; 14. Molecular events of recombination; 15. Micromutations;16. Repair of altered DNA; 17. Reproduction of bacteria; 18. Horizontal gene transfer in bacteria; 19. Cell cycles of eukarya; 20. Meiosis; 21. Chromosomal abnormalities; 22. Life cycles of eukarya; 23. Reproduction of viruses; 24. Genetic processes in development; 25. Sex determination and dosage compensation; 26. Cancer; 27. Cutting, sorting, and copying DNA; 28. Genotyping by DNA analysis; 29. Genetically engineered organisms; 30. Genomics; 31. Behavior of genes and alleles; 32. Probability and statistics toolkit; 33. Genes, environment, and interactions; 34. Locating genes; 35. Finding and detecting mutations; 36. Cytoplasmic inheritance; 37. Genetic variation in populations; 38. Mutation, migration, and genetic drift; 39. Natural selection; 40. Quantitative genetics; 41. Speciation; 42. Molecular evolution and phylogeny; Glossary.

ISBN: 9780521613910 475pp ₹ 495.00

Mathematical Models in Biology

An Introduction

Elizabeth S. Allman
University of Southern Maine

& John A. Rhodes
Bates College, Maine

This introductory textbook on mathematical biology focuses on discrete models across a variety of biological subdisciplines. Biological topics treated include linear and nonlinear models of populations, Markov models of molecular evolution, phylogenetic tree construction, genetics, and infectious disease models. The coverage of models of molecular evolution and phylogenetic tree construction from DNA sequence data is unique among books at this level.

Computer investigations with MATLAB are incorporated throughout, in both exercises and more extensive projects, to give readers hands-on experience with the mathematical models developed. MATLAB programs accompany the text.

Contents: Preface; Note on MATLAB;1. Dynamic modeling with different equations; 2. Linear models of structured populations; 3. Non-linear models of interactions; 4. Modeling molecular evolution; 5. Constructing phylogenic trees; 6. Genetics; 7. Infectious disease modeling; 8. Curve fitting and biological modeling; Appendix A. Basic analysis of numerical data; Appendix B. For further reading.

ISBN: 9780521615556 370pp ₹ 445.00

Biological Sequence Analysis

Probabilistic Models of Proteins

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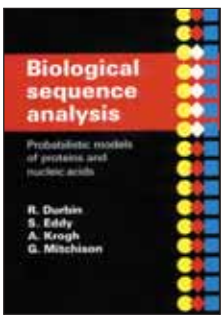
& G. Mitchinson
Medical Research Council's Laboratory for Molecular Biology, Cambridge



Probabilistic methods are assuming greater significance in the analysis of nucleotide sequence data. This book provides the first unified, up-to-date and self-contained account of such methods, and more generally of probabilistic methods of sequence analysis, presented in a Bayesian framework. Written by an interdisciplinary team of authors, it aims to be accessible to molecular biologists, computer scientists and mathematicians, with no formal knowledge of the other fields, and at the same time present the state-of-the-art in this new and highly important field.

Contents: 1. Introduction; 2. Pairwise sequence alignment; 3. Multiple alignments; 4. Hidden Markov models; 5. Hidden Markov models applied to biological sequences; 6. The Chomsky hierarchy of formal grammars; 7. RNA and stochastic context-free grammars; 8. Phylogenetic trees; 9. Phylogeny and alignment; Index.

ISBN: 9780521540797 370pp ₹ 545.00

Genomic Perl

From Bioinformatics Basics to Working Code

Rex A. Dwyer
The BioAlgorithmic Consultancy

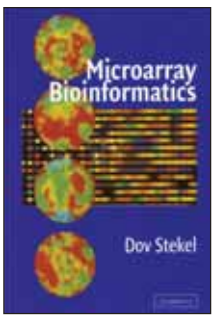
There are many basic computational problems in molecular biology and this text gives concise, working programs to solve them using Perl. With minimal prerequisites, the author explains the biological background for each problem, develops a model for the solution, then introduces the Perl concepts needed to implement the solution. Perl code is provided on the accompanying CD.

Contents: 1. The central dogma; 2. RNA secondary structure; 3. Comparing DNA sequences; 4. Statistical models; 5. Substitution matrices for amino acids; 6. Sequence databases; 7. Local alignment and the BLAST heuristic; 8. Statistics of BLAST database searches; 9. Multiple sequence alignment I;10. Multiple sequence alignment II;11. Phylogeny reconstruction; 12. Protein motifs and PROSITE; 13. Fragment assembly; 14. Coding sequence prediction with dicodon frequencies; 15. Satellite identification; 16. Restriction mapping; 17. Hybridization mapping; 18. Genome rearrangement: gates and hurdles; 19. Now what?; A. Drawing RNA cloverleaves; B. Space-saving strategies for alignment; C. A data structure for disjoint sets; D. A data structure for set operations.

PB + CD-ROM
ISBN: 9780521547185 352pp ₹ 545.00

Microarray Bioinformatics

Dov Stekel
University of Birmingham



This book is a comprehensive guide to all of the mathematics, statistics and computing you will need to successfully operate DNA microarray experiments. The book covers all aspects of microarray bioinformatics, giving you the tools to design arrays and experiments, to analyze your data, and to share your results with your organisation or with the international community. There are chapters covering sequence databases, oligonucleotide design, experimental design, image processing, normalisation, identifying differentially expressed genes, clustering, classification and data standards. The book is ideally suited for teaching the subject at postgraduate or professional level.

Contents: 1. Microarrays: making them and using them; 2. Sequence databases for microarrays; 3. Computer design of oligonucleotide probes; 4. Image processing; 5. Normalization; 6. Measuring and quantifying microarray variability; 7. Analysis of differentially expressed genes; 8. Analysis of relationships between genes, tissues or treatments; 9. Classification of tissues and samples; 10. Experimental design; 11. Data storage, standards and sharing; Appendix A. Glossary.

ISBN: 9780521670500 280pp ₹ 495.00

Biological Science

3rd Edition

D.J. Taylor
Strode's Sixth Form College, Egham

N.P.O. Green
St. George's College, Buenos Aires, Argentina

G. W. Stout
International School, Mafikeng, South Africa

& R.O. Soper
Formerly Vice-Principal and Head of Science, Collyers Sixth Form College, Horsham

This is the new edition of the highly successful textbook, *Biological Science,* a comprehensive and internationally established text for advanced students, including those following undergraduate courses. The text has been revised and updated, and provides comprehensive coverage in all the major areas of the biological sciences. New material has been added in the following fast-moving areas: human health and disease, microbiology and biotechnology, and the applications of genetics. Thought-provoking questions permeate the text to stimulate an enquiry based approach to the subject, with answers in a commentary at the end of the book. In addition a number of useful appendices are included covering biological chemistry, biological techniques and statistics. All the essential laboratory work required at this level is included in the form of selected and clearly presented practical investigations.

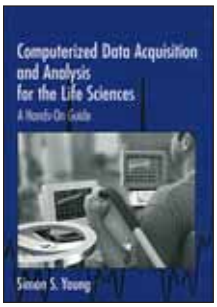
Contents: Preface to the third edition; Acknowledgements; Chapter 1 Introduction to the subject; Chapter 2 Variety of life; Chapter 3 Chemicals of life; Chapter 4 Enzymes; Chapter 5 Cells; Chapter 6 Histology; Chapter 7 Autotrophic nutrition; Chapter 8 Heterotrophic nutrition; Chapter 9 Energy utilisation; Chapter 10 Organism and the environment; Chapter 11 Quantitative ecology; Chapter 12 Microbiology and biotechnology; Answers and discussions; Chapter 13 Transport in plants; Chapter 14 Transport in animals; Chapter 15 Health and disease; Chapter 16 Coordination and control in plants; Chapter 17 Coordination and control in animals; Chapter 18. Movement and support in animals; Chapter 19. Homeostasis; Chapter 20. Excretion and osmoregulation;Chapter 21 Reproduction; Chapter 22. Growth and development; Chapter 23. Continuity of life; Chapter 24. Variation and genetics; Chapter 25. Applied genetics; Chapter 26. Evolution-history of life; Chapter 27 Mechanisms of speciation; Answers and discussion; Appendix 1 Biological chemistry; Appendix 2 Biological techniques; Appendix 3 Classification; Appendix 4 Nomenclature and units; Appendix 5 The geological time scale; Index.

ISBN: 9780521684170 928pp ₹ 595.00

Computerized Data Acquisition and Analysis for the Life Sciences

A Hands-On Guide

Simon S. Young
Schering-Plough Research Institute, Kenilworth, New Jersey



This book offers an excellent introduction to computer-based data acquisition and analysis and will be especially valuable to those with little or no engineering background. In an informal, easy-to-read style, it guides researchers through the basics of data acquisition systems, explains the important concepts underlying sampled data, and gives numerous examples of how to analyse the recorded information. While aimed at researchers in the life sciences, the topics covered are general and will be valuable to anyone interested in learning to use data acquisition systems.

A variety of high-quality hardware and software is now available to researchers, and computerized data acquisition systems are often the principal method of recording experimental results. Yet for the non-engineer, setting up these systems can be a difficult task. This book takes the reader through the process step by step, from the type of input to be used (single-ended or differential, unipolar or bipolar) through to the sampling rate and the size of the resultant data files. It explains how to set up preamplifiers to get the best results, and covers the main types of transducer encountered in life-science work. It then discusses how to obtain useful information from the large amounts of data recorded. The principles can be applied to the collection of data from respiratory apparatus, intracellular and extracellular electrodes, electrocardiograms, behavioural-science experiments, kinematics, and a host of other situations. Many illustrations and worked examples accompany the text, unfamiliar terms are explained, and the mathematics are kept as simple as possible. This book is an invaluable tool for the non-engineer who is collecting and analysing experimental data using data acquisition systems. Researchers, graduate students and technicians will find it an up-to-date and indispensable guide for setting up their equipment and getting the most out of their data.

Contents: Preface; 1. The Bare Essentials; 2. How a Data Acquisition System Works; 3. Important Concepts; 4. Connecting to the Real World with Transducers; 5. Data Manipulation; 6. Examples; Appendix Suppliers of Data Acquisition/Analysis Hardware and Software and Electronic Components; Notes; References; Index.

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General Microbiology

7th Edition
(CLPE)

Hans G. Schlegel

This revised, updated and expanded edition of Professor Schlegel's well-established textbook provides an excellent introduction to microbiology for a wide range of undergraduate students. In addition to being a first-rate general introduction to the subject for all students of microbiology, it is also suitable for life-science students whose courses include microbiology as a component. These include students of biochemistry, botany, zoology, medicine, pharmacy and agriculture as well as food science, biotechnology, ecology and environmental science. The text concentrates on the essential aspects of microbiology and thus provides the students with a broadly based overview of the subject. This new edition includes new species, new phylogenetic relationships and a greater emphasis on environmental and ecological matters, whilst retaining the traditional strengths of the previous edition.

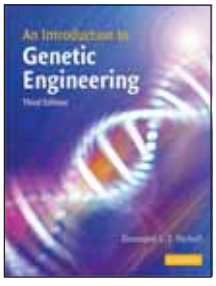
Contents: Preface to the seventh edition; Preface to the first edition; Translator's preface; Use of technical terms, conventions and nomenclature; Commonly used abbreviations; 1. The place of microorganisms in nature; 2. The cell and its structure; 3. The grouping of prokaryotes; 4. The viruses: distribution and structure; 5. The fungi (Mycota); 6. Growth of microorganisms; 7. Basic mechanisms of metabolism and energy conversion; 8. Special fermentations; 9. Electron transport under anaerobic conditions; 10. Incomplete oxidations and microbial biotechnology; 11. Inorganic hydrogen donors: aerobic chemolithotrophic bacteria; 12. Phototrophic bacteria and photosynthesis; 13. Fixation of molecular nitrogen; 14. Degradation of natural substances; 15. Constancy, change, recombination and transfer of genetic information; 16. Regulation of metabolism; 17. Microorganisms and the environment; Reading list; Vocabulary; Index.

ISBN: 9780521696210 682pp ₹ 495.00

An Introduction to Genetic Engineering

3rd Edition

Desmond S. T. Nicholl
University of Paisley



In this third edition of his popular undergraduate-level textbook, Des Nicholl recognises that a sound grasp of basic principles is vital in any introduction to genetic engineering. Therefore, the book retains its focus on the fundamental principles used in gene manipulation. It is divided into three sections: Part I provides an introduction to the relevant basic molecular biology; Part II, the methods used to manipulate genes; and Part III, applications of the technology. There is a new chapter devoted to the emerging importance of bioinformatics as a distinct discipline. Other additional features include text boxes, which highlight important aspects of topics discussed, and chapter summaries, which include aims and learning outcomes. These, along with key word listings, concept maps and a glossary, will enable students to tailor their study to suit their own learning styles and ultimately gain a firm grasp of a subject that students traditionally find difficult.

Contents: 1. Introduction; Part I. The Basis of Genetic Engineering: 2. Introducing molecular biology; 3. Working with nucleic acids; 4. The tools of the trade; Part II. The Methodology of Gene Manipulation: 5. Host cells and vectors; 6. Cloning strategies; 7. The polymerase chain reaction; 8. Selection, screening and analysis of recombinants; 9. Bioinformatics; Part III. Genetic Engineering in Action: 10. Understanding genes, genomes and 'otheromes'; 11. Genetic engineering and biotechnology; 12. Medical and forensic applications of gene manipulation; 13. Transgenic plants and animals; 14. The other sort of cloning; 15. Brave new world or genetic nightmare?

ISBN: 9780521188142 348pp ₹ 545.00

Introductory Microbiology

J. Heritage
University of Leeds

E. G. V. Evans
University of Leeds

& R. A. Killington
University of Leeds

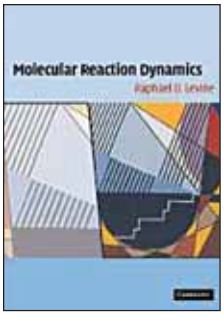
The authors present a basic and accessible introduction to the world of microbiology. In three chapters, this book provides both a foundation and overview of the subject. In the first chapter, 'Microbial Structure and Mode of Life', the structure and functioning of fungi, bacteria and viruses are discussed (with particular attention being paid to their description and discussion of their reproduction and nutrition). The second section, 'Handling microbes' introduces the methods used to culture, control and study these organisms in the laboratory. The final section covers the isolation, classification and identification of microbes'. This book is essential reading for anyone becoming interested in the subject, whether it be 6th form students, their teachers or undergraduates.

Contents: General preface to the series; Preface; 1. Microbial structure and mode of life; 2. Handling microbes; 3. Isolation, classification and identification of microbes; Further reading; Glossary; Index.

ISBN: 9788175961036 248pp ₹ 245.00

Molecular Reaction Dynamics

Raphael D. Levine
Hebrew University of Jerusalem



Molecular Reaction Dynamics is a brand new version of the text by Levine and Bernstein. The book delivers an updated treatment of this fundamental topic. The first half of the book describes experimental techniques for initiating and probing reaction dynamics and the essential insights gained. The second part explores key areas including photoselective chemistry, stereochemistry, chemical reactions in real time, and chemical reaction dynamics in solution and interfaces. Typical of the new challenges are molecular machines, enzyme action, and molecular control. With problem sets included, this book is aimed at advanced undergraduate and graduate students studying chemical reaction dynamics, as well as physical chemistry, biophysics, and materials science.

Contents: Preface; Acknowledgements; 1. Understanding chemical reactions at the molecular level; 2. Molecular collisions; 3. Introduction to reactive molecular collisions; 4. Scattering as a probe of collision dynamics; 5. Introduction to polyatomic dynamics;

6. Structural considerations in the calculation of reaction rates; 7. Photoselective chemistry: access to the transition state region; 8. Chemistry in real time; 9. State-changing collisions: molecular energy transfer; 10. Stereodynamics; 11. Dynamics in the condensed phase; 12. Dynamics of gas-surface interactions and reactions; Bibliography; Index.

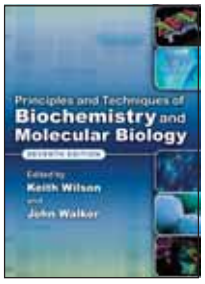
ISBN: 9780521140713 568pp ₹ 2750.00

Principles and Techniques of Biochemistry and Molecular Biology

7th Edition

Edited by Keith Wilson
University of Hertfordshire

& John Walker
University of Hertfordshire



This best-selling undergraduate textbook provides an introduction to key experimental techniques from across the biosciences. It uniquely integrates the theories and practices that drive the fields of biology and medicine, comprehensively covering both the methods students will encounter in lab classes and those that underpin recent advances and discoveries. Its problem-solving approach continues with worked examples that set a challenge and then show students how the challenge is met. New to this edition are case studies, for example, that illustrate the relevance of the principles and techniques to the diagnosis and treatment of individual patients. Coverage is expanded to include a section on stem cells, chapters on immunochemical techniques and spectroscopy techniques, and additional chapters on drug discovery and development, and clinical biochemistry. Experimental design and the statistical analysis of data are emphasised throughout to ensure students are equipped to successfully plan their own experiments and examine the results obtained.

Contents: 1. General principles; 2. Cell culture techniques; 3. Centrifugation 4. Microscopy; 5. Molecular biology, bioformatics and basic techniques; 6. Recombinant DNA and genetic analysis; 7. Immunological techniques; 8. Protein structure, purification, characterisation and functional analysis; 9. Mass spectrometric techniques; 10. Electrophoretic techniques; 11. Chromatographic techniques; 12. Spectroscopic techniques I; 13. Spectroscopic techniques II; 14. Radioisotope techniques; 15. Enzymes; 16. Principles of clinical biochemistry; 17. Cell membrane receptors; 18. Drug discovery and development.

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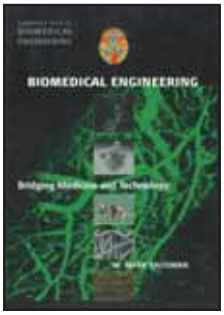
Biomedical Engineering

Bridging Medicine and Technology

W. Mark Saltzman
Yale University, Connecticut



This is an ideal text for an introduction to biomedical engineering. The book presents the basic science knowledge used by biomedical engineers at a level accessible to all students and illustrates the first steps in applying this knowledge to solve problems in human medicine. Biomedical engineering encompasses a range of fields of specialization including bioinstrumentation, bioimaging, biomechanics, biomaterials, and biomolecular engineering. This introduction to bioengineering assembles foundational resources from molecular and cellular biology and physiology and relates them to various sub-specialties of biomedical engineering. The first two parts of the book present basic information in molecular/cellular biology and human physiology; quantitative concepts are stressed in these sections. Comprehension of these basic life science principles provides the context in which biomedical engineers interact. The third part of the book introduces sub-specialties in biomedical engineering, and emphasizes - through examples and profiles of people in the field - the types of problems biomedical engineers solve.

Contents: 1. Introduction; Part I. Molecular and Cellular Principles: 2. Biomolecular principles; 3. Biomolecular principles: nucleic acids; 4. Biomolecular principles: proteins; 5. Cellular principles; Part II. Physiological Principles: 6. Communication systems in the body; 7. Engineering balances: respiration and digestion; 8. Circulation; 9. Removal of molecules from the body; 10. Biomechanics; 11. Bioinstrumentation; 12. Bioimaging; 13. Biomolecular engineering and biotechnology; 14. Biomolecular engineering II: engineering of immunity; 15. Biomaterials and artificial organs; 16. Biomedical engineering and cancer.

ISBN: 9780521840996 656pp $ 111.00

Primer of Genetic Analysis

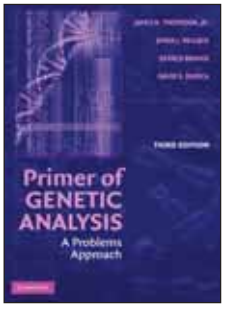
A Problems Approach

James N. Thompson Jr.
University of Oklahoma

Jenna J. Hellack
University of Oklahoma

Gerald Braver
University of Oklahoma

& David S. Durica
University of Oklahoma



An invaluable student-tested study aid, this primer provides guided instruction for the analysis and interpretation of genetic principles and practice in problem solving. Each section is introduced with a summary of useful hints for problem solving and an overview of the topic with key terms. A series of problems, generally progressing from simple to more complex, then allows students to test their understanding of the material. Each question and answer is accompanied by detailed explanation. This new edition includes additional problems in basic areas that often challenge students, extended coverage in molecular biology and development, an expanded glossary of terms, and updated historical landmarks. Students at all levels, from beginning biologists and premedical students to graduates seeking a review of basic genetics, will find this book a valuable aid. It will complement the formal presentation in any genetics textbook or stand alone as a self-paced review manual.

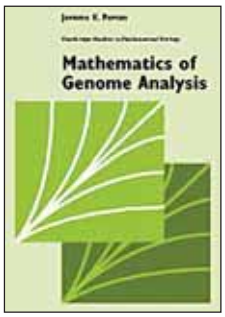
Contents: 1. Overview of genetic organization and scale; 2. Mitosis and meiosis; 3. Nucleic acids: DNA and RNA; 4. Basic mendelian genetics; 5. Probability and chi-square; 6. Sex-

linkage and gene interactions; 7. Pedigree analysis; 8. Overview of basic statistical testing; 9. Quantitative inheritance; 10. Overview of genetic mapping; 11. Assessing chromosome linkage relationships; 12. Linkage and mapping in diploids; 13. Mapping in bacteria and viruses; 14. Overview of types of genetic change; 15. Gene mutation; 16. Changes in chromosome number and structure; 17. Protein synthesis and the genetic code; 18. Gene regulation and development; 19. Overview of molecular biology techniques; 20. DNA mapping and human genome analysis; 21. Basic population genetics; 22. Selection and evolution; 23. Practice tests; 24. Answers to practice tests and crossword puzzles; 25. Landmarks in the history of genetics; Glossary; Reference tables.

ISBN: 9780521603652 328pp $ 55.00

Mathematics of Genome Analysis

Jerome K. Percus
New York University



The massive research effort known as the Human Genome Project is an attempt to record the sequence of the three trillion nucleotides that make up the human genome and to identify individual genes within this sequence. While the basic effort is of course a biological one, the description and classification of sequences also lend themselves naturally to mathematical and statistical modeling. This short textbook on the mathematics of genome analysis presents a brief description of several ways in which mathematics and statistics are being used in genome analysis and sequencing. It will be of interest not only to students but also to professional mathematicians curious about the subject.

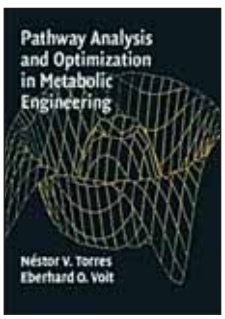
Contents: Preface; 1. Decomposing DNA; 2. Recomposing DNA; 3. Sequence statistics; 4. Sequence comparison; 5. Spatial structure and dynamics of DNA; Bibliography; Index.

ISBN: 9780521585262 150pp $ 33.99

Pathway Analysis and Optimization in Metabolic Engineering

Nestor V. Torres
Universidad de Laguna, Tenerife

& Eberhard O. Voit
Medical University of South Carolina



Facility in the targeted manipulation of the genetic and metabolic composition of organisms, combined with unprecedented computational power, is forging a niche for a new subspecialty of biotechnology called metabolic engineering. This book introduces researchers and advanced students in biology and engineering to methods of optimizing biochemical systems of biotechnological relevance. It examines the development of strategies for manipulating metabolic pathways, demonstrates the need for effective systems models, and discusses their design and analysis, while placing special emphasis on optimization. The authors propose power-law models of biochemical systems theory toward these ends. All concepts are derived from first principles, and the text is richly illustrated with numerous graphs and examples throughout. Special features include:

- both nontechnical and technical introductions to models of biochemical systems
- a review of basic methods of model design and analysis
- concepts of optimization
- detailed case studies

Biotechnologists will find this introductory book a highly valuable reference, as will other scientists and engineers interested in biological systems.

Contents: Preface; 1. Target: a useful model; 2. Methods of biochemical systems theory; 3. A model of citric acid production in the mold Aspergillus niger; 4. Optimization methods; 5. Optimization of biochemical systems; 6. Optimization of citric acid production in Aspergillus niger; 7. Maximization of ethanol and carbohydrate production in Saccharomyces cerevisiae; 8. Conclusions; Author index; Subject index.

ISBN: 9780521800389 320pp $ 182.00

Commercialising Successful Biomedical Technologies

Basic Principles for the Development of Drugs, Diagnostics and Devices

***Shreefal S. Mehta*,**
Cytopia

Successful product design and development requires the ability to take a concept and translate the technology into useful, patentable, commercial products. This book guides the reader through the practical aspects of the commercialization process of drug, diagnostic and device biomedical technology including market analysis, product development, intellectual property and regulatory constraints. Key issues are highlighted at each stage in the process, and case studies are used to provide practical examples. The book will provide a sound road map for those involved in the biotechnology industry to effectively plan the commercialization of profitable regulated medical products. It will also be suitable for a capstone design course in engineering and biotechnology, providing the student with the business acumen skills involved in product development.

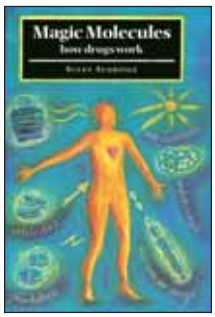
Contents: Foreword; Glossary; 1. Biomedical device and drug design industry and markets; 2. Markets of interest and market research steps; 3. Intellectual property and licensing; 4. Product development; 5. Regulatory pathway; 6. Manufacturing; 7. Reimbursement and distribution; Appendices: A. General sources of information (websites, associations); B. Alphabet soup of regulatory bodies, regulations and standards; Index.

ISBN: 9780521870986 360pp £ 54.00

Magic Molecules

How Drugs Work

Susan Aldridge
Focus Magazine



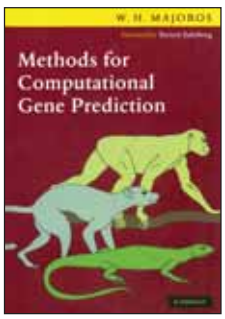
All of us are drug users, in the broadest sense of the word. Drugs can be medicines, they can be used for pleasure, and they can also be used to protect our long-term health. It is important that we are well informed about the drugs we use - how they work, their benefits, and their risks. This book is a unique guide for the general science reader to the drugs of everyday life - from the main types of medicine through to recreational drugs and food supplements. It looks at how drugs interact with their targets in the body, where they come from, how they are developed and what drugs to expect in the future. All the major pharmaceutical medicines are reviewed - painkillers, antibiotics, anti-cancer drugs, anti-depressants, heart drugs, tranquillisers and hormones. However this book is much more than a consumer handbook - it also conveys the fascinating science of drug discovery in an easily accessible way.

Contents: List of illustrations; Acknowledgements; Introduction; 1. How drugs work; 2. From penicillin to Prozac: introducing pharmaceutical drugs; 3. Fighting infection; 4. The hormonal revolution; 5. Cardiovascular drugs: protecting the heart and brain; 6. The problem of pain; 7. The cancer challenge; 8. Drugs for the mind; 9. Drugs of recreation and addiction; 10. Natural alternative: vitamins, minerals and herbs; 11. In the pipeline: gene-based medicine; Bibliography; Index.

ISBN: 9780521044158 284pp £ 21.99

Methods for Computational Gene Prediction

William H. Majoros
Duke University,
North Carolina



Inferring the precise locations and splicing patterns of genes in DNA is a difficult but important task, with broad applications to biomedicine. The mathematical and statistical techniques that have been applied to this problem are surveyed and organized into a logical framework based on the theory of parsing. Both established approaches and methods at the forefront of current research are discussed. Numerous case studies of existing software systems are provided, in addition to detailed examples that work through the actual implementation of effective gene-predictors using hidden Markov models and other machine-learning techniques. Background material on probability theory, discrete mathematics, computer science, and molecular biology is provided, making the book accessible to students and researchers from across the life and computational sciences. This book is ideal for use in a first course in bioinformatics at graduate or advanced undergraduate level, and for anyone wanting to keep pace with this rapidly-advancing field.

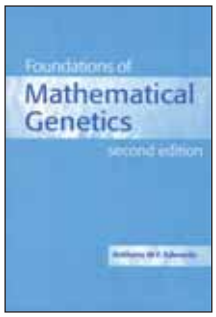
Contents: Foreword; 1. Introduction; 2. Mathematical preliminaries; 3. Overview of gene prediction; 4. Gene finder evaluation; 5. A toy Exon finder; 6. Hidden Markov models; 7. Signal and content sensors; 8. Generalized hidden Markov models; 9. Comparative gene finding; 10. Machine Learning methods; 11. Tips and tricks; 12. Advanced topics; Appendix - online resources; References; Index.

ISBN: 9780521706940 448pp £ 34.99

Foundations of Mathematical Genetics

2nd Edition

Anthony W.F. Edwards
Gonville and Caius
College, Cambridge



In this second edition of the classic work *Foundations of Mathematical Genetics* a definitive account is given of the basic models of population genetics, together with the historical origins of developments since 1908. Existing texts in mathematical population genetics have revealed the need for a careful study of the foundations of the field which have tended to be neglected in the past. This book satisfies that need, treating the simple deterministic models for random-mating diploid populations in depth, though without sacrificing clarity of expression. In the new edition, coverage has been extended with the provision of an extra chapter on the Fundamental Theorem of Natural Selection. This book is written for those interested in the mathematical aspects of genetics, ecology and biology.

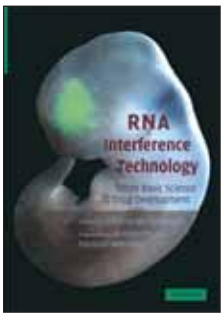
Contents: Preface to the second edition; Preface to the first edition; 1. The genetic model; 2. Two alleles at a single locus; 3. Two alleles using homogeneous coordinates; 4. Many alleles at a single locus; 5. The special case of three alleles; 6. An X-linked locus; 7. Miscellaneous single-locus models; 8. Two diallelic loci; 9. Fisher's fundamental theorem; References; Index.

ISBN: 9780521775441 133pp £ 21.99

RNA Interference Technology

From Basic Science to Drug Development

Krishnarao Appasani
Gene-Expression
Systems, Inc,
Massachusetts



RNA Interference (RNAi) technology has rapidly become one of the key methods used in functional genomics. RNAi is used to block the expression of genes and create phenotypes that can potentially yield clues about the function of these genes. In the postgenomic era, the elucidation of the physiological function of genes has become the rate-limiting step in the quest to develop "gene-based drugs" and RNAi could potentially play a pivotal role in the validation of such novel drugs. In this cutting-edge overview, the basic concepts of RNAi biology are discussed, as well as the current and potential applications. Leading experts from both academia and industry have contributed to this invaluable reference for graduate students, post-docs, and researchers from academia wanting to initiate RNAi research in their own labs, as well as for those working in research and development in biotech and pharmaceutical companies who need to understand this emerging technology.

Contents: Part I Basic RNAi, siRNA and Gene Silencing Mechanisms: 1. RNAi beginnings: overview of the pathway in C. elegans; 2. Dicer in RNAi: its roles in vivo and utility in vitro; 3. Genes required for RNAi; 4. MicroRNAs: a small contribution from worms; 5. miRNAs in the brain and the application of RNAi to neurons; Part II Design and Synthesis of siRNAs: 6. Design and synthesis of small interfering RNA (siRNA); 7. Automated design and high throughout synthesis of siRNAS; 8. Rational design of siRNAs with the Sfold software; 9. Enzymatic production of siRNAS; Part III Vector Development and In Vivo, In Vitro and In Ovo Delivery Methods: 10. Six methods of inducing RNAi in mammalian cells; 11. Viral delivery of siRNA;12. siRNA delivery by lentiviral vectors: design and

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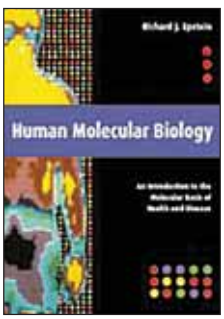
ISBN: 9780521836777 544pp £ 149.00

Human Molecular Biology

An Introduction to the Molecular Basis of Health and Disease

Richard J. Epstein
University of Singapore



Human Molecular Biology is an introduction to the molecular basis of health and disease for the new generation of life scientists and medical students. By integrating cutting-edge molecular genetics and biochemistry with the latest clinical information, the book weaves a pattern which unifies biology with syndromes, genetic pathways with developmental phenotypes, and protein function with drug action. From the origins of life to the present day, a narrative is traced through the workings of genomes, cells and organ systems, culminating in linking of laboratory technologies to future research horizons. Lavishly illustrated throughout with two-colour diagrams and full colour clinical pictures, this text brings the complexities and breadth of human molecular biology clearly to life. This seamless account breaks through the boundaries between molecular biology and medicine, and leads the reader on to a new dimension where the biological basis of health and disease is inescapably molecular.

Contents: 1. Introduction - a disease for every gene?; Part I From Molecular Biology to Human Genetics: 2. Biomolecular evolution; 3. Chromatin and chromosomes; 4. Gene expression; 5. RNA processing and translation; 6. Protein structure and function; Part II From Molecular Genetics to Human Biochemistry: 7. Nutrition and energy; 8. Membranes and channels; 9. Cell surface receptors; 10. Adhesion molecules and the extracellular matrix; 11. Cytoskeletal and motor proteins; Part III From Molecular Biochemistry to Human Cell Biology: 12. Signal transduction; 13. Inflammatory cytokines;14. Hormones and growth factors; 15. Hemopoietins, angiogenins and vasoactive mediators; 16. Cell cycle control, apoptosis and ageing; Part IV. From Molecular Cell Biology to Human Physiology: 17. Development; 18. Metabolism; 19. Blood; 20. Immunity; 21. Neurobiology; Part V From Molecular Physiology to Human Molecular Biology: 22. Genetic test systems; 23. Gene and protein analysis; 24. Genetic engineering, gene mapping and gene testing; 25. Gene knockouts, transgenics, and cloned animals; 26. Gene therapy and recombinant DNA technology; Index.

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Information Theory, Evolution and the Origin of Life

Hubert P. Yockey
Former Director, Pulsed Radiation Facility, U.S. Army's Aberdeen Proving Ground, Maryland

Information Theory, Evolution, and the Origin of Life presents a timely introduction to the use of information theory and coding theory in molecular biology. The genetical information system, because it is linear and digital, resembles the algorithmic language of computers. George Gamow pointed out that the application of Shannon's information theory breaks genetics and molecular biology out of the descriptive mode into the quantitative mode, and Dr. Yockey develops this theme, discussing how information theory and coding theory can be applied to molecular biology. He discusses how these tools for measuring the information in the sequences of the genome and the proteome are essential for our complete understanding of the nature and origin of life. The author writes for the computer competent reader who is interested in evolution and the origins of life.

Contents: Preface; 1. The genetic information system; 2. James Watson, Francis Crick, George Gamow, and the genetic code; 3. The Central Dogma of molecular biology; 4. The measure of the information content in the genetic message; 5. Communication of information from the genome to the proteome; 6. The information content or complexity of protein families; 7. Evolution of the genetic code and its modern characteristics; 8. Haeckel's *Urschleim* and the role of the Central Dogma in the origin of life; 9. Philosophical approaches to the origin of life; 10. Error catastrophe and the hypercycles of Eigen and Schuster,11. Randomness, complexity, the unknowable, and the impossible; 12. Does evolution need an intelligent designer?; 13 Epilogue; Mathematical appendix; Glossary; References; Index.

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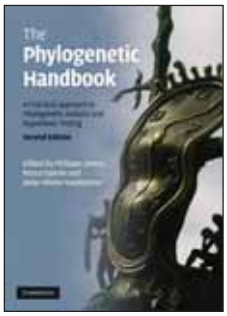
The Phylogenetic Handbook

A Practical Approach to Phylogenetic Analysis and Hypothesis Testing
2nd Edition

Philippe Lerney
University of Oxford

Marco Salemi
University of California, Irvine

& Anne-Mieke Vandamme
Katholieke Universiteir Leuven, Belgium



The Phylogenetic Handbook is a broad, hands on guide to theory and practice of nucleotide and protein phylogenetic analysis. This second edition includes six new chapters, covering topics such as Bayesian inference, tree topology testing and the impact of recombination on phylogenies, as well as a detailed section on molecular adaptation. The book has a stronger focus on hypothesis testing than the previous edition, with more extensive discussions on recombination analysis, detecting molecular adaptation and genealogy-based population genetics. Many chapters include elaborate practical sections, which have been updated to introduce the reader to the most recent versions of sequence analysis and phylogeny software, including BLAST, FastA, Clustal, T-coffee, Muscle, DAMBE, Tree-puzzle, Phylip, MEGA, PAUP*, IQPNNI, CONSEL, ModelTest, Prottest, PAML, HYPHY, MrBayes, BEAST, LAMARC, SplitsTree, and RDP. Many analysis tools are described by their original authors, resulting in clear explanations that constitute an ideal teaching guide for advanced-level undergraduate and graduate students.

Contents: Part I. Introduction: 1. Basic concepts of molecular evolution; Part II. Data Preparation: 2. Sequence databases and database searching; 3. Multiple sequence alignment; Part III. Phylogenetic Inference: 4. Nucleotide substitution models; 5. Phylogenetic inference based on distance methods; 6. Phylogenetic inference using maximum likelihood methods; 7. Bayesian phylogenetic analysis using MRBAYES; 8. Phylogeny inference based on parsimony and other methods using PAUP*; 9. Phylogenetic analysis using protein sequences; Part IV. Testing Models and Trees: 10. Selecting models of evolution; 11. Molecular clock analysis; 12. Testing tree topologies ; Part V. Molecular Adaptation: 13. Natural selection and adaptation of molecular sequences; 14. Estimating selection pressures on alignments of coding sequences; Part VI. Recombination: 15. Introduction to recombination detection; 16. Detecting and characterizing individual recombination events; Part VII. Population Genetics: 17. The coalescent: population genetic inference using genealogies; 18. Bayesian evolutionary analysis by sampling trees; 19. LAMARC: estimating population genetic parameters from molecular data; Part VIII. Additional Topics: 20. Assessing substitution saturation with DAMBE; 21. Split networks: a tool for exploring complex evolutionary relationships in molecular data

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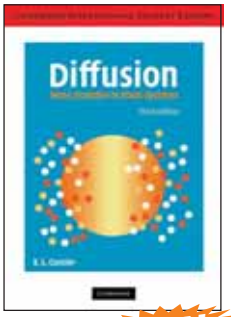
MECHANICAL ENGINEERING

Diffusion

Mass Transfer in Fluid Systems

3rd Edition

E. L. Cussler
University of Minnesota



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Contents: Preface; 1. Models for diffusion; Part I. Fundamentals of Diffusion: 2. Diffusion in dilute solutions; 3. Diffusion in concentrated solutions; 4. Dispersion; Part II. Diffusion Coefficients: 5. Values of diffusion coefficients; 6. Diffusion of interacting species; 7. Multicomponent diffusion; Part III. Mass Transfer: 8. Fundamentals of mass transfer; 9. Theories of mass transfer; 10. Absorption; 11. Absorption in biology and medicine; 12. Differential distillation; 13. Staged distillation; 14. Extraction; 15. Absorption; Part IV. Diffusion Coupled with other Processes: 16. General questions and heterogeneous chemical reactions; 17. Homogeneous chemical reactions; 18. Membranes; 19. Controlled release and related phenomena; 20. Heat transfer; 21. Simultaneous heat and mass transfer; Problems; Subject index; Materials index.

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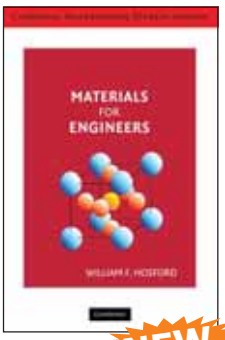
Materials for Engineers

William F. Hosford
University of Michigan



This text is intended for a first undergraduate course in materials science and engineering with an emphasis on mechanical and electrical properties. The text features numerous useful examples and exercises. It differs from other available texts in that it covers topics of greatest interest in most undergraduate programs, leaving more specialized and advanced coverage for later course books. The text begins with phases and phase diagrams. This is followed by a chapter on diffusion, which treats diffusion in multiphase as well as single-phase systems. The next several chapters on mechanical behaviour and failure should be of particular interest to mechanical engineers. There are chapters on iron and steel and on nonferrous alloys, followed by chapters on specific types of materials. There is an emphasis on manufacturing, including recycling, casting and welding, powder processing, solid forming, and more modern techniques, including photolithography, vapor disposition, and the use of lasers.

Contents: 1. Introduction; 2. Phases; 3. Diffusion; 4. Mechanical behavior; 5. Mechanical failure; 6. Annealing; 7. Iron and steel; 8. Non-ferrous metals; 9. Casting and welding; 10. Solid shaping; 11. Polymers; 12. Polymer processing; 13. Glasses; 14. Crystalline ceramics; 15. Powder processing; 16. Pottery and concrete; 17. Composites; 18. Carbon; 19. Fibers, foams and porous materials; 20. Electrical properties; 21. Optical and thermal properties; 22. Magnetic materials; 23. Corrosion; 24. Modern manufacturing techniques and surface treatments and recycling; Appendix I: Wood; Appendix II: Miller indices for planes and directions; Appendix III: Xray diffraction; Appendix IV: Surfaces; Appendix V: Dislocations; Appendix VI: Avrami kinetics; Appendix VII: Organic chemistry; Appendix VIII: Average molecular weight; Appendix IX: Bond geometry in compounds; Appendix X: Weibull analysis.

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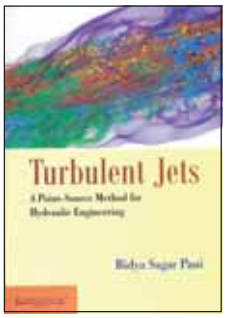
Turbulent Jets

A Point-Source Method for Hydraulic Engineering

Bidya Sagar Pani
Indian Institute of Technology, Bombay



The point-source concept is a versatile technique that can be applied to a host of problems in civil, mechanical, chemical and aerospace engineering. *Turbulent Jets: A Point-Source Method for Hydraulic Engineering* is based on a momentum transport model applied to point-source. The method enunciated in the book helps to predict mean velocity, temperature and concentration field downstream of three-dimensional outlets, both in stagnant and co-flowing ambient fluid. The task of synthesizing the vast available literature, involving varied notations and normalization scales, has also been done to unify the underlying principles.

The book contains various examples to enable application of the concepts and to explain the essence of methodology. Derivations, where necessary, have been included. It will serve as a textbook for graduate students of Hydraulic and Environmental Engineering. Graduate students of Civil, Mechanical, Chemical and Aerospace engineering and researchers taking courses in Environmental Hydraulics or Turbulent Mixing will also find this book useful.

Key features
- Elucidates the basic principles of turbulent jets
- Discusses theoretical expressions for velocity and temperature decay of three-dimensional jets based on point-source concept
- Explains multiple jets in co-flowing streams
- Provides a unified approach to analyze the near-field and the far-field flow
- Includes solved examples to demonstrate the method of superposition

Contents: List of Figures; List of Tables; Preface; Chapter 1: Jets in Hydraulic Engineering; Chapter 2: Boundary Layer Approach; Chapter 3: Free Jets; Chapter 4: Reichardt's Momentum Transport Theory; Chapter 5: Three-dimensional Free Jet: Single Outlet; Chapter 6: Coflowing Jets; Chapter 7: Multiple Free Jets; Chapter 8: Potential Core and Virtual Origin; Chapter 9: Energy Loss at Sewer Junction Boxes; Chapter 10: Jet Flocculator; Chapter 11: Wall Jets; Chapter 12: Comparison with CFD Analysis; References; Index

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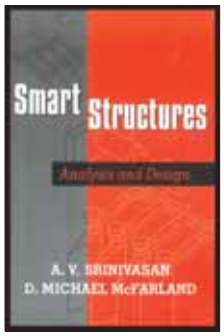
Smart Structures

Analysis and Design

A. V. Srinivasan
Strategic Technologies, Inc.

& D. Michael McFarland
University of Illinois, Urbana-Champaign



Smart structures and structural components have unusual abilities: they can sense a change in temperature, pressure, or strain; diagnose a problem; and initiate an appropriate action in order to preserve structural integrity and continue to perform their intended functions. Smart structures can also store processes in memory and learn to repeat the actions taken. Among the many applications are aircraft sensors that warn of impending cracks and medical devices that monitor blood sugar and deliver insulin. This text provides the basic information needed to analyze and design smart devices and structures. Among topics covered are piezoelectric crystals, shape memory alloys, electrorheological fluids, vibration absorbers, fiber optics, and mistuning. A final chapter offers an intriguing view of biomimetics and design strategies that can be incorporated at the microstructural level deriving inspiration from biological structures. The design of smart structures is at the cutting edge of engineering research and development, and there is a great need for an introductory book on the subject. This book will be welcomed by both students and practising engineers.

Contents: Preface; 1. Introduction; 2. Piezoelectric materials and induced-strain actuation; 3. Shape memory alloys; 4. Electrorheological and magnetorheological fluids; 5. Vibration absorbers; 6. Mistuning; 7. Fiber optics; 8. Control of structures; 9. Biomimetics.

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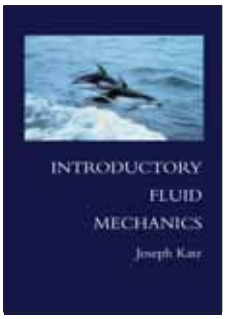
Introductory Fluid Mechanics

Joseph Katz
San Diego State University



The objective of this introductory text is to familiarise students with the basic elements of fluid mechanics so that they will be familiar with the jargon of the discipline and the expected results. At the same time, this book serves as a long-term reference text, contrary to the oversimplified approach occasionally used for such introductory courses. The second objective is to provide a comprehensive foundation for more advanced courses in fluid mechanics (within disciplines such as mechanical or aerospace engineering). In order to avoid confusing the students, the governing equations are introduced early, and the assumptions leading to the various models are clearly presented. This provides a logical hierarchy and explains the interconnectivity between the various models. Supporting examples demonstrate the principles and provide engineering analysis tools for many engineering calculations.

Contents: 1. Basic concepts and fluid properties; 2. The fluid dynamic equation; 3. Fluid statics; 4. Introduction to fluid in motion - one-dimensional (frictionless) flow; 5. Viscous incompressible flow: 'exact solutions'; 6. Dimension analysis, and high Reynolds number flows; 7. The laminar boundary layer; 8. High Reynolds number flow over bodies (incompressible); 9. Introduction to computational fluid mechanics (CFD); 10. Elements of inviscid compressible flow; 11. Fluid machinery.

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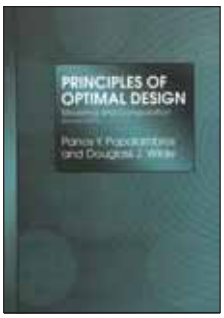
Principles of Optimal Design

Modeling and Computation
2nd Edition

Panos Y. Papalambros
University of Michigan, Ann Arbor

& Douglass J. Wilde
Stanford University, California



Principles of Optimal Design puts the concept of optimal design on a rigorous foundation and demonstrates the intimate relationship between the mathematical model that describes a design and the solution methods that optimize it. Since the first edition was published, computers have become ever more powerful, design engineers are tackling more complex systems, and the term optimization is now routinely used to denote a design process with increased speed and quality. This second edition takes account of these developments and brings the original text thoroughly up to date. The book now includes a discussion of trust region and convex approximation algorithms. A new chapter focuses on how to construct optimal design models. Three new case studies illustrate the creation of optimization models. The final chapter on optimization practice has been expanded to include computation of derivatives, interpretation of algorithmic results, and selection of algorithms and software. Both students and practising engineers will find this book a valuable resource for design project work.

Contents: Preface; Notation; List of symbols; 1. Optimization models; 2. Model construction; 3. Model boundedness; 4. Interior optima; 5. Boundary optima; 6. Parametric and discrete optima; 7. Local computation; 8. Principles and practice; References; Author index; Subject index.

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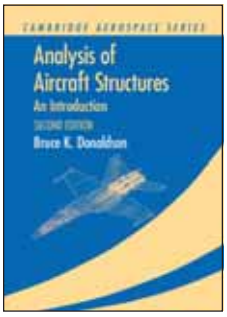
Analysis of Aircraft Structures

An Introduction
2nd Edition

Bruce K. Donaldson
University of Maryland, College Park



As with the first edition, this textbook provides a clear introduction to the fundamental theory of structural analysis as applied to vehicular structures such as aircraft, spacecraft, automobiles and ships. The emphasis is on the application of fundamental concepts of structural analysis that are employed in everyday engineering practice. All approximations are accompanied by a full explanation of their validity. In this new edition, more topics, figures, examples and exercises have been added. There is also a greater emphasis on the finite element method of analysis. Clarity remains the hallmark of this text and it employs three strategies to achieve clarity of presentation: essential introductory topics are covered, all approximations are fully explained and many important concepts are repeated.

Contents: Introduction to the second edition; Introduction to the first edition; Part I. The Fundamentals of Structural Analysis: 1. Stress in structures; 2. Stresses and coordinate axis rotations; 3. Displacements and strains; 4. Strains in rotated coordinate systems; 5. The mechanical behavior of engineering materials; 6. Linearly elastic materials; Part II. Introduction to the Theory of Elasticity: 7. The theory of elasticity; 8. Plane stress theory of elasticity solutions; Part I and Part II review questions; Part III. The Engineering Theory for Straight, Long Beams: 9. Bending and extensional stresses in beams; 10. Beam bending and extensional deflections; 11. Additional beam

bending topics; 12. Uniform torsion of beams; 13. Beam torsion approximate solutions; Beam bending and torsion review questions; 14. Beam shearing stresses due to shearing forces; Part IV. Work and Energy Principles: 15. Work and potential energy principles; Part V. Energy Based Numerical Solutions: 16. Precursor numerical analyses; 17. Introduction to the finite element method; 18. Finite element truss problems; 19. Basic aspects of multidimensional finite elements; 20. The unit load method for determinate structures; 21. The unit load method for indeterminate structures; Parts IV and V review; Part VI. Extensions to Plate Theory and Finite Element Applications: 22. Thin plate theory; 23. Elastic and aeroelastic instabilities; Selected answers to Part I exercises; Selected answers to Part II exercises; Selected answers to Part III exercises; Selected answers to Part IV and Part V exercises; Selected answers to Part VI exercises; References.

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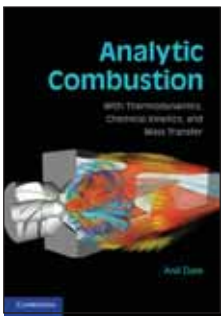
Analytic Combustion

With Thermodynamics, Chemical Kinetics and Mass Transfer

Anil W. Date
Indian Institute of Technology, Bombay



Combustion involves change in the chemical state of a substance from a fuel-state to a product-state via chemical reaction accompanied by release of heat energy. Design or performance evaluation of equipment also requires knowledge of the rate of change of state. This rate is governed by the laws of thermodynamics and by the empirical sciences of heat and mass transfer, chemical kinetics and fluid dynamics. *Analytic Combustion* is written for advanced undergraduates, graduate students and professionals in mechanical, aeronautical and chemical engineering. Topics were carefully selected and presented to facilitate learning with emphasis on effective mathematical formulations and solution strategies. The book features over 60 solved numerical problems and analytical derivations and nearly 145 end-of-chapter exercise problems. The presentation is gradual, starting from thermodynamics of pure and mixture substances, and chemical equilibrium, building to a uniquely strong chapter on application case studies.

Contents: 1. Introduction; 2. Thermodynamics of a pure substance; 3. Thermodynamics of gaseous mixtures; 4. Chemical equilibrium; 5. Chemical kinetics; 6. Derivation of transport equations; 7. Thermochemical reactors; 8. Premixed flames; 9. Diffusion flames; 10. Combustion of particles and droplets; 11. Combustion applications.

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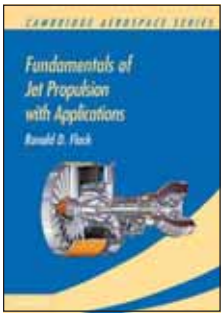
Fundamentals of Jet Propulsion with Applications

Ronald D. Flack,
University of Virginia



This introductory text on air-breathing jet propulsion focuses on the basic operating principles of jet engines and gas turbines. Previous coursework in fluid mechanics and thermodynamics is elucidated and applied to help the student understand and predict the characteristics of engine components and various types of engines and power gas turbines. Numerous examples help the reader appreciate the methods and differing, representative physical parameters. A capstone chapter integrates the text material into a portion of the book devoted to system matching and analysis so that engine performance can be predicted for both on- and off-design conditions. The book is designed for advanced undergraduate and first-year graduate students in aerospace and mechanical engineering. A basic understanding of fluid dynamics and thermodynamics is presumed. Although aircraft propulsion is the focus, the material can also be used to study ground- and marine-based gas turbines and turbomachinery and some advanced topics in compressors and turbines.

Contents: Part I. Cycle Analysis: 1. Introduction; 2. Ideal cycle analysis; 3. Non-ideal cycle analysis; Part II. Component Analysis: 4. Diffusers; 5. Nozzles; 6. Axial flow compressors and fans; 7. Centrifugal compressors; 8. Axial flow turbines; 9. Combustors and afterburners; 10. Ducts and mixers; Part III. System Matching and Analysis: 11. Matching of gas turbine components; Appendix A. Standard atmosphere table; Appendix B. Isentropic flow tables; Appendix C. Fanno line flow tables; Appendix D. Rayleigh line flow tables; Appendix E. Normal shock tables; Appendix F. Common conversions; Appendix G. Notes on iteration methods; Appendix H. One dimensional compressible flow; Appendix I. Turbomachinery fundamentals; References; Answers to selected problems; Key words.

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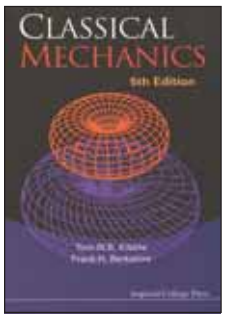
Classical Mechanics

5th Edition

Tom W.B. Kibble
Imperial College
London, UK

& Frank H. Berkshire
Imperial College
London, UK

(World Scientific)



This is the fifth edition of a well-established textbook. It is intended to provide a thorough coverage of the fundamental principles and techniques of classical mechanics, an old subject that is at the base of all of physics, but in which there has also in recent years been rapid development. The book is aimed at undergraduate students of physics and applied mathematics. It emphasizes the basic principles, and aims to progress rapidly to the point of being able to handle physically and mathematically interesting problems, without getting bogged down in excessive formalism. Lagrangian methods are introduced at a relatively early stage, to get students to appreciate their use in simple contexts. Later chapters use Lagrangian and Hamiltonian methods extensively, but in a way that aims to be accessible to undergraduates, while including modern developments at the appropriate level of detail. The subject has been developed considerably recently while retaining a truly central role for all students of physics and applied mathematics.

This edition retains all the main features of the fourth edition, including the two chapters on geometry of dynamical systems and on order and chaos, and the new appendices on concise and on dynamical systems near a critical point. The material has been somewhat expanded, in particular to contrast continuous and discrete behaviours. A further appendix has been added on routes to chaos (period-doubling) and related discrete maps. The new edition has also been revised to give more emphasis to specific examples worked out in detail.

Key features of the new edition include:

- Further development of the chapters on dynamical systems and their geometry, and on order and chaos, introduced in the fourth edition.
- Examples with solutions in the text, supplementing the wide range of problems with answers.
- Appendices on vectors, on conic sections, on dynamical systems near a critical point and, new in this edition, on routes to chaos and related discrete maps.
- Emphasis on basic principles of wide applicability.
- End of chapter summaries.
- A comprehensive index and list of sysmbols.

Contents: Preface; Useful Constants and Units; List of Symbols; 1 Introduction; 2 Linear Motion; 3 Energy and Angular Momentum; 4 Central Conservative Forces; 5 Rotating Frames; 6 Potential Theory; 7 The Two-Body Problem; 8 Many-Body Systems; 9 Rigid Bodies; 10 Lagrangian Mechanics; 11 Small Oscillations and Normal Modes; 12 Hamiltonian Mechanics; 13 Dynamical Systems and Their Geometry; 14 Order and Chaos in Hamiltonian Systems; Appendix A Vectors, Appendix B Conics, Appendix C Phase Plane Analysis Near Critical Points, Appendix D Discrete Dynamical Systems — Maps; Answers to Problems; Bibliography; Index

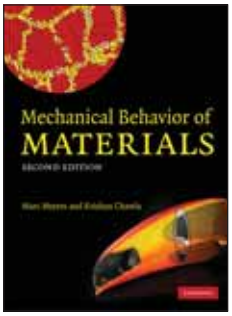
ISBN: 9788175967205 498pp ₹ 395.00

Mechanical Behavior of Materials

2nd Edition

Marc André Meyers
University of California,
San Diego

& Krishan Kumar Chawla
University of Alabama at
Birmingham



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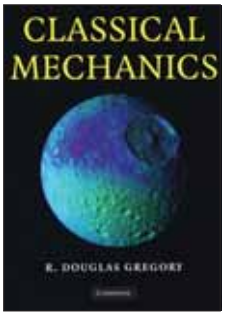
A balanced mechanics-materials approach and coverage of the latest developments in biomaterials and electronic materials, the new edition of this popular text is the most thorough and modern book available for upper-level undergraduate courses on the mechanical behavior of materials. To ensure that the student gains a thorough understanding the authors present the fundamental mechanisms that operate at micro- and nano-meter level across a wide-range of materials, in a way that is mathematically simple and requires no extensive knowledge of materials. This integrated approach provides a conceptual presentation that shows how the microstructure of a material controls its mechanical behavior, and this is reinforced through extensive use of micrographs and illustrations. New worked examples and exercises help the student test their understanding. Further resources for this title, including lecture slides of select illustrations and solutions for exercises, are available online at www.cambridge.org/9780521866758.

Contents: Preface to the first edition; Preface to the second edition; 1. Materials: structure, properties and performance; 2. Elasticity and viscoelasticity; 3. Plasticity; 4. Imperfections: point and line defects; 5. Imperfections: interfacial and volumetric defects; 6. Geometry of deformation and work-hardening; 7. Fracture: macroscopic aspects; 8. Fracture: microscopic aspects; 9. Fracture testing; 10. Solid solution, precipitation and dispersion strengthening; 11. Martensitic transformation; 12. Speciality materials: intermetallics and foams; 13. Creep and superplasticity; 14. Fatigue; 15. Composite materials; 16. Environmental effects.

ISBN: 9780521186209 880pp ₹ 1325.00

Classical Mechanics

R. Douglas Gregory
University of Manchester



Gregory's *Classical Mechanics* is a major new textbook for undergraduates in mathematics and physics. It is a thorough, self-contained and highly readable account of a subject many students find difficult. The author's clear and systematic style promotes a good understanding of the subject: each concept is motivated and illustrated by worked examples, while problem sets provide plenty of practice for understanding and technique. Computer assisted problems, some suitable for projects, are also included. The book is structured to make learning the subject easy; there is a natural progression from core topics to more advanced ones and hard topics are treated with particular care. A theme of the book is the importance of conservation principles. These appear first in vectorial mechanics where they are proved and applied to problem solving. They reappear in analytical mechanics, where they are shown to be related to symmetries of the Lagrangian, culminating in Noether's theorem.

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An Introduction to Composite Materials

2nd Edition

D. Hull
University of Liverpool

& T. W. Clyne
University of Cambridge

This edition has been greatly enlarged and updated to provide both scientists and engineers with a clear and comprehensive understanding of composite materials. In describing both theoretical and practical aspects of their production, properties and usage, the book crosses the borders of many disciplines. Topics covered include: fibres, matrices, laminates and interfaces; elastic deformation, stress and strain, strength, fatigue crack propagation and creep resistance; toughness and thermal properties; fatigue and deterioration under environmental conditions; fabrication and applications. Coverage has been increased to include polymeric, metallic and ceramic matrices and reinforcement in the form of long fibres, short fibres and particles. Designed primarily as a teaching text for final-year undergraduates in materials science and engineering, this book will also interest undergraduates and postgraduates in chemistry, physics, and mechanical engineering. In addition, it will be an excellent source book for academic and technological researchers on materials.

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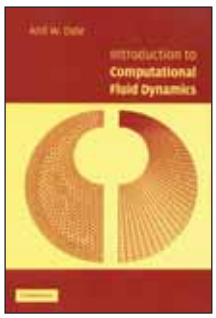
Introduction to Computational Fluid Dynamics

Anil W. Date
Indian Institute of Technology, Bombay



Introduction to Computational Fluid Dynamics is a textbook for advanced undergraduate and first year graduate students in mechanical, aerospace and chemical engineering. The book emphasizes understanding CFD through physical principles and examples. The author follows a consistent philosophy of control volume formulation of the fundamental laws of fluid motion and energy transfer, and introduces a novel notion of 'smoothing pressure correction' for solution of flow equations on collocated grids within the framework of the well-known SIMPLE algorithm. The subject matter is developed by considering pure conduction/diffusion discretization of equations for transport of mass, momentum and energy on Cartesian, structured curvilinear and unstructured meshes, solution of discretised equations, numerical grid generation and convergence enhancement.

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Turbulence

The Legacy of A.N. Kolmogorov

Uriel Frisch
Observatoire de la Cote d' Azur

This textbook presents a modern account of turbulence, one of the greatest challenges in physics. The state-of-the-art is put into historical perspective five centuries after the first studies of Leonardo and half a century after the first attempt by A. N. Kolmogorov to predict the properties of flow at very high Reynolds numbers. Such "fully developed turbulence" is ubiquitous in both cosmical and natural environments, in engineering applications and in everyday life.

First, a qualitative introduction is given to bring out the need for a probabilistic description of what is in essence a deterministic system. Kolmogorov's 1941 theory is presented in a novel fashion with emphasis on symmetries (including scaling transformations) which are broken by the mechanisms producing the turbulence and restored by the chaotic character of the cascade to small scales. Considerable material is devoted to intermittency, the clumpiness of small-scale activity, which has led to the development of fractal and multifractal models. Such models, pioneered by B. Mandelbrot, have applications in numerous fields besides turbulence (diffusion limited aggregation, solid-earth geophysics, attractors of dynamical systems, etc). The final chapter contains an introduction to analytic theories of the sort pioneered by R. Kraichnan, to the modern theory of eddy transport and renormalization and to recent developments in the statistical theory of two-dimensional turbulence. The book concludes with a guide to further reading.

Elementary presentations of dynamical systems ideas, of probabilistic methods (including the theory of large deviations) and of fractal geometry make this a self-contained textbook.

Contents: Preface; Chapter 1 Introduction; Chapter 2 Symmetries and conservation laws; Chapter 3 Why a probabilistic description of turbulence?; Chapter 4 Probabilistic tools: a survey; Chapter 5 Two experimental laws of fully developed turbulence; Chapter 6 The Kolmogorov 1941 theory; Chapter 7 Kolmogorov and Landau: The lack of universality; Chapter 8 Phenomenology of turbulence in the sense of Kolmogorov 1941; Chapter 9 Intermittency; Chapter 10 Further reading: a guided tour; References; Author index; Subject index.

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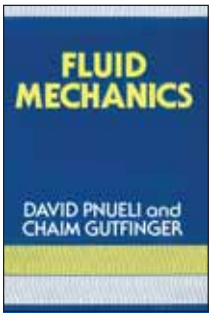
Fluid Mechanics

David Pnueli
Technion-Israel Institute of Technology, Haifa, Israel

& Chaim Gutfinger
Technion-Israel Institute of Technology, Haifa, Israel



This text is intended for the study of fluid mechanics at an intermediate level. However, the presentation starts with basic ideas in order to form a sound conceptual structure that can support engineering applications and encourage further learning. Subjects treated include hydrostatics, viscous flow, similitude and order of magnitude, creeping flow, potential flow, boundary layer flow, turbulent flow, compressible flow, and non-Newtonian fluids.

Contents: Preface; 1. Introduction; 2. Stress in a Fluid; 3. Fluid Statics; 4 Fluids in Motion – Integral Analysis; 5 Fluids in Motion – Differential Analysis; 6. Exact Solutions of the Navier–Stokes Equations; 7. Energy Equations; 8. Similitude and Order of Magnitude; 9. Flows with Negligible Acceleration; 10. High Reynolds Number Flows – Regions Far From Solid Boundaries; 11. High Reynolds Number Flows – The Boundary Layer 12. Turbulent Flow; 13. Compressible Flow; 14. Non-Newtonian Fluids; Appendixes; Index

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Metal Forming

Mechanics and Metallurgy 4th Edition

William F. Hosford
University of Michigan, Ann Arbor

& Robert M. Caddell
University of Michigan, Ann Arbor

This book helps the engineer understand the principles of metal forming and analyze forming problems - both the mechanics of forming processes and how the properties of metals interact with the processes. In this third edition, an entire chapter has been devoted to forming limit diagrams and various aspects of stamping and another on other sheet forming operations. Sheet testing is covered in a separate chapter. Coverage of sheet metal properties has been expanded. Interesting end-of-chapter notes have been added throughout, as well as references. More than 200 end-of-chapter problems are also included.

Contents: 1. Stress and strain; 2. Plasticity; 3. Strain hardening; 4. Plastic instability; 5. Temperature and strain-rate dependence; 6. Work balance; 7. Slab analysis and friction; 8. Friction and lubrication; 9. Upper-bound analysis; 10. Slip-line field analysis; 11. Deformation zone geometry; 12. Formability; 13. Bending; 14. Plastic anisotropy; 15. Cupping, redrawing and ironing; 16. Forming limit diagrams; 17. Stamping; 18. Hydroforming; 19. Other sheet forming operations; 20. Formability tests; 21. Sheet metal properties

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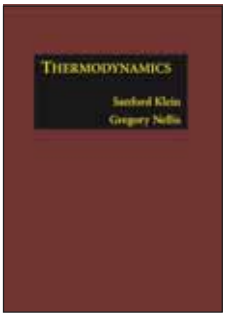
Thermodynamics

Sanford Klein
University of Wisconsin, Madison

& Gregory Nellis
University of Wisconsin, Madison



Companion Website available

This book differs from other thermodynamics texts in its objective which is to provide engineers with the concepts, tools, and experience needed to solve practical real-world energy problems. The presentation integrates computer tools (e.g., EES) with thermodynamic concepts to allow engineering students and practising engineers to solve problems they would otherwise not be able to solve. The use of examples, solved and explained in detail, and supported with property diagrams that are drawn to scale, is ubiquitous in this textbook. The examples are not trivial, drill problems, but rather complex and timely real world problems that are of interest by themselves. As with the presentation, the solutions to these examples are complete and do not skip steps. Similarly the book includes numerous end of chapter problems, both typeset and online. Most of these problems are more detailed than those found in other thermodynamics textbooks. The supplements include complete solutions to all exercises, software downloads, and additional content on selected topics. These are available at the book web site www.cambridge.org/KleinandNellis.

Contents: 1. Basic concepts; 2. Thermodynamic properties; 3. Energy and energy transport; 4. General application of the first law; 5. The second law of thermodynamics; 6. Entropy; 7. Exergy; 8. Power cycles; 9. Refrigeration and heat pump cycles; 10. Property relations for pure fluids; 11. Mixtures and multi-component phase equilibrium; 12. Psychometrics; 13. Combustion; 14. Chemical equilibrium; 15. Statistical thermodynamics; 16. Compressible flow.

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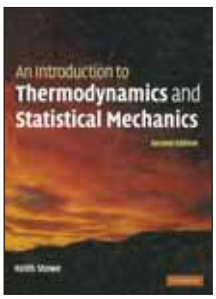
An Introduction to Thermodynamics and Statistical Mechanics

2nd Edition

Keith Stowe
California State Polytechnic University, Pomona



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This introductory textbook for standard undergraduate courses in thermodynamics has been completely rewritten. Starting with an overview of important quantum behaviours, the book teaches students how to calculate probabilities, in order to provide a firm foundation for later chapters. It introduces the ideas of classical thermodynamics and explores them both in general and as they are applied to specific processes and interactions. The remainder of the book deals with statistical mechanics - the study of small systems interacting with huge reservoirs. The changes to this second edition have been made after more than 10 years classroom testing and student feedback. Each topic ends with a boxed summary of ideas and results, and every chapter contains numerous homework problems, covering a broad range of difficulties. Answers are given to odd numbered problems, and solutions to even problems are available to instructors at www.cambridge.org/9780521865579.

Contents: Preface; Part I. Introduction: 1. Introduction; Part II. Small Systems: 2. Statistics for small systems; 3. Systems with many elements; Part III. Energy and the First Law. 4. Internal energy; 5. Interactions between systems; Part IV. States and the Second Law: 6. Internal energy and the number of accessible states; 7. Entropy and the second law; 8. Entropy and thermal interactions; Part V. Constraints: 9. Natural constraints; 10. Models; 11. Choice of variables; 12. Special processes; 13. Engines; 14. Diffusive interactions; Part VI. Classical Statistics: 15. Probabilities and microscopic behaviours; 16. Kinetic theory and transport processes in gases; 17. Magnetic properties of materials; 18. The partition function; Part VII. Quantum Statistics: 19. Introduction to quantum statistics; 20. Quantum gases; 21. Blackbody radiation; 22. The thermal properties of solids; 23. The electrical properties of materials; 24. Low temperatures and degenerate systems; Appendices; Further reading; Problem solutions; Index.

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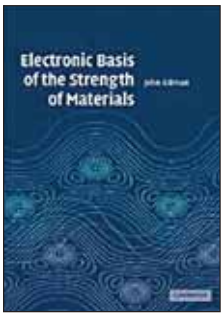
Electronic Basis of the Strength of Materials

John G. Gilman
University of California, Los Angeles



This book is the first to relate the complete set of strength characteristics of constituent atoms to their electronic structures. These relationships require knowledge of both the chemistry and physics of materials. The book uses both classical and quantum mechanics, since both are needed to describe these properties, and begins with short reviews of each. Following these reviews, the three major branches of the strength of materials are given their own sections. They are: the elastic stiffnesses; the plastic responses; and the nature of fracture. This work will be of great value to academic and industrial research workers in the sciences of metallurgy, ceramics, microelectronics, and polymers. It will also serve well as a supplementary text for the teaching of solid mechanics.

Contents: Part I Introduction; Part II Elements of Solid Mechanics: 1. Nature of elastic stiffness; 2. Generalized stress; 3. Generalized strain; 4. Elastic coefficients; Part III Elements of Electron Mechanics: 5. Properties of electrons; 6. Quantum states; 7. Periodic patterns of electrons; 8. Heisenberg's Principle; Part IV Elastic Stiffness: 9. Cohesion of atoms; 10. Intramolecular cohesion;11. Intermolecular cohesion; 12. Bulk modulus; 13. Shear moduli; 14. Entropic elasticity (polymers); 15. Universality and unification; Part V Plastic Strength: 16. Macroscopic plastic deformation; 17. Microscopic plastic deformation; 18. Dislocation mobility; Part VI Fracture Resistance: 19. Mechanics of cracks; 20. Surface and interfacial energies; 21. Fracturing rates.

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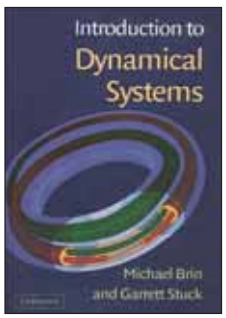
Introduction to Dynamical Systems

Michael Brin
University of Maryland, College Park

& Garrett Stuck
University of Maryland, College Park



This book provides a broad introduction to the subject of dynamical systems, suitable for a one- or two-semester graduate course. In the first chapter, the authors introduce over a dozen examples, and then use these examples throughout the book to motivate and clarify the development of the theory. Topics include topological dynamics, symbolic dynamics, ergodic theory, hyperbolic dynamics, one-dimensional dynamics, complex dynamics, the measure-theoretic entropy. The authors top off the presentation with some beautiful and remarkable applications of dynamical systems to such areas as number theory, data storage, and Internet search engines.

This book grew out of lecture notes from the graduate dynamical systems course at the University of Maryland, College Park, and reflects not only the tastes of the authors, but also to some extent the collective opinion of the Dynamics Group at the University of Maryland, which includes experts in virtually every major area of dynamical systems.

Contents: Introduction; 1. Examples and Basic Concepts; 2. Topological Dynamics; 3. Symbolic Dynamics; 4. Ergodic Theory; 5. Hyperbolic Dynamics; 6 Ergodicity of Anosov Diffeomorphisms; 7. Low-Dimensional Dynamics; 8. Complex Dynamics; 9. Measure-Theoretic Entropy; Bibliography; Index.

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Perspectives in Fluid Dynamics

A Collective Introduction to Current Research

G. K. Batchelor
University of Cambridge

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University of Cambridge

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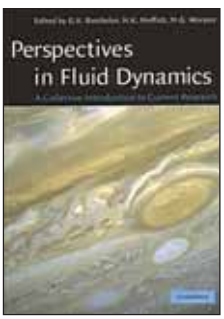

Fluid mechanics is a rich and fascinating subject, with applications ranging from modelling the environment, to automotive design, to physiology, to astrophysics. At the same time, basic physical phenomena such as turbulence still present fundamental challenges. Conventional textbooks cannot hope to give graduate students more than an inkling of what topics are currently being researched, or how to make a choice between them. This book aims to rectify matters, at least in part. It consists of eleven chapters that each introduces a different branch of the subject. Though not exhaustive, the coverage is broad: thin-film flows, Saffman-Taylor fingering, flows in arteries and veins, convective and absolute instabilities, turbulence, natural convection, magnetohydrodynamics, solidification, geological fluid mechanics, oceanography and atmospheric dynamics are all introduced and reviewed by established authorities. Thus the book will not only be suitable for graduate-level courses but also for specialists seeking introductions to other areas.

Contents: Preface; 1. Interfacial Fluid Dynamics; 2. Viscous Fingering as an Archetype for Growth Patterns; 3. Blood Flow in Arteries and Veins; 4. Open Shear Flow Instabilities; 5. Turbulence; 6. Convection in the Environment; 7. Reflections on Magnetohydrodynamics; 8. Solidification of Fluids; 9. Geological Fluid Mechanics; 10. The Dynamic Ocean; 11. On Global-Scale Atmospheric and Oceanic Circulations; Index.

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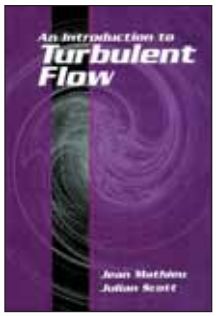
An Introduction to Turbulent Flow

Jean Mathieu
Ecole Centrale de Lyon

& Julian Scott
Ecole Centrale de Lyon



An Introduction to Turbulent Flow offers a solid grounding in the subject of turbulence, developing both physical insight and the mathematical framework needed to express the theory. It begins with a review of the physical nature of turbulence, statistical tools, and space and time scales of turbulence. Basic theory is presented next, illustrated by examples of simple turbulent flows and developed through classical models of jets, wakes, and boundary layers. A deeper understanding of turbulence dynamics is provided by spectral analysis and its applications. The final chapter introduces the numerical simulation of turbulent flows. This well-balanced text will interest graduate students in engineering, applied mathematics and physical sciences. It is also a useful reference for practising engineers and scientists.

Contents: Preface and Roadmap; General References; 1. An Introduction to Turbulence; 2. Statistical Tools; 3. Space and Time Scales of Turbulence; 4. Basic Theory and Illustrative Examples; 5. Classical Models of Jets, Wakes, and Boundary Layers; 6. Spectral Analysis of Homogeneous Turbulence; 7. Kolmogorov's and Other Theories Based on Spectral Analysis; 8. Numerical Simulation of Turbulent Flows; Index.

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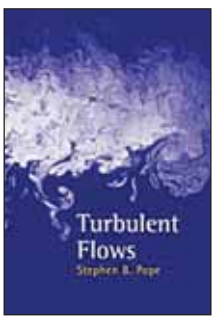
Turbulent Flows

Stephen B. Pope
Cornell University, New York



This is a graduate text on turbulent flows, an important topic in fluid dynamics. It is up to date, comprehensive, and designed for teaching, it is based on a course taught by the author at Cornell University for a number of years.

The book consists of two parts followed by a number of appendices. Part I provides a general introduction to turbulent flows, how they behave, how they can be described quantitatively, and the fundamental physical processes involved. The topics covered include: the Navier-Stokes equations; the statistical representation of turbulent fields; mean-flow equations; the energy cascade; turbulence spectra; and the Kolmogorov hypotheses. Part II is concerned with various approaches for modelling or simulating turbulent flows. The approaches described are: direct numerical simulation (DNS); turbulent viscosity models (e.g., the K-e model); Reynolds-stress models; probability-density-function (PDF) methods; and large-eddy simulation (LES). There are numerous appendices in which the necessary mathematical techniques are presented. This book is primarily intended as a graduate level text in turbulent flows for engineering students. It is also valuable to students in applied mathematics, physics, oceanography, atmospheric sciences, as well as researchers and practising engineers.

Contents: List of tables; Preface; Nomenclature; Part I Fundamentals: 1. Introduction; 2. The equations of fluid motion; 3. The statistical description of turbulent flows; 4. Mean-flow

equations; 5. Free shear flows; 6. The scales of turbulent motion; 7. Wall flows; Part II Modelling and Simulation: 8. An introduction to modelling and simulation; 9. Direct numerical simulation; 10. Turbulent-viscosity models; 11. Reynolds-stress and related models; 12. PDF methods; 13. Large-eddy simulation; Part III Appendices: Appendix A Cartesian tensors; Appendix B Properties of second-order tensors; Appendix C Dirac delta functions; Appendix D Fourier transforms; Appendix E Spectral representation of stationary random processes; Appendix F The discrete Fourier transform; Appendix G Power-law spectra; Appendix H Derivation of Eulerian PDF equations; Appendix I Characteristic functions; Appendix J Diffusion processes; Bibliography; Author Index; Subject index.

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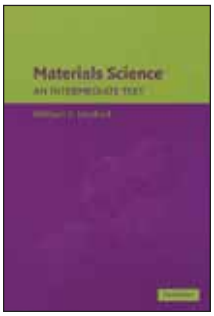
Materials Science

An Intermediate Text

William F. Hosford
Univesity of Michigan, Ann Arbor



This exciting new textbook on the structure, property and applications of materials, is written for advanced undergraduate courses on the principles of Materials Science. It covers the main topics commonly encountered by students in materials science and engineering but explores them in greater depth than standard introductory textbooks, making it ideal for use on a second-level course and upwards. Major topics covered include crystallography, symmetry and bonding-related properties, phase diagrams and transformations, ordering, diffusion, solidification, and dedicated chapters on amorphous, liquid crystal, magnetic and novel materials, including shape memory. Each chapter contains numerous illustrative examples, problem sets, references and notes of interest to aid student understanding, with a chapter of hints on engineering calculations to ensure mathematical competency.

Contents: 1. Microstructural analysis; 2. Symmetry; 3. Miller-Bravais system; 4. Stereographic projection; 5. Crystal defects 6. Phase diagrams; 7. Free energy basis for phase diagrams; 8. Ordering of solid solutions; 9. Diffusion; 10. Freezing; 11. Phase transformations; 12. Surfaces; 13. Bonding; 14. Sintering; 15. Amorphous materials; 16. Liquid crystals; 17. Molecular morphology; 18. Magnetic materials; 19. Porous and novel materials 20. Shape memory and super-elasticity; 21. Calculations.

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APPLIED MATHEMATICS

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For Engineering and the Physical Sciences

Sudhakar Nair
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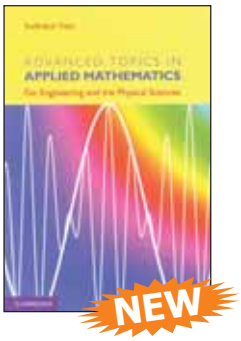

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This book is ideal for engineering, physical science, and applied mathematics students and professionals who want to enhance their mathematical knowledge. *Advanced Topics in Applied Mathematics* covers four essential applied mathematics topics: Green's functions, integral equations, Fourier transforms, and Laplace transforms. Also included is a useful discussion of topics such as the Wiener-Hopf method, finite Hilbert transforms, Cagniard-De Hoop method, and the proper orthogonal decomposition. This book reflects Sudhakar Nair's long classroom experience from engineering and physics to illustrate the solution procedures. The text includes exercise sets at the end of each chapter and a solutions manual, which is available for instructors.

Contents: Preface; Green's Functions; Integral Equations; Fourier Transforms; Laplace Transforms; Author Index; Subject Index

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Introduction to Lattices and Order

2nd Edition

B. A. Davey
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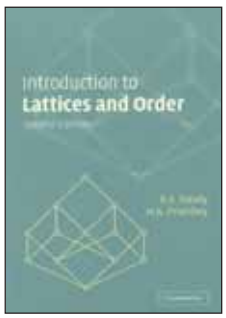
& H. A. Priestley
University of Oxford



This new edition of *Introduction to Lattices and Order* presents a radical reorganization and updating, though its primary aim is unchanged. The explosive development of theoretical computer science in recent years has, in particular, influenced the book's evolution: a fresh treatment of fixpoints testifies to this and Galois connections now feature prominently. An early presentation of concept analysis gives both a concrete foundation for the subsequent theory of complete lattices and a glimpse of a methodology for data analysis that is of commercial value in social science. Classroom experience has led to numerous pedagogical improvements and many new exercises have been added. As before, exposure to elementary abstract algebra and the notation of set theory are the only prerequisites, making the book suitable for advanced undergraduates and beginning graduate students. It will also be a valuable resource for anyone who meets ordered structures.

Contents: Preface; Preface to the first edition; 1. Ordered sets; 2. Lattices and complete lattices; 3. Formal concept analysis; 4. Modular, distributive and Boolean lattices; 5. Representation theory: the finite case; 6. Congruences; 7. Complete lattices and Galois connections; 8. CPOs and fixpoint theorems; 9. Domains and information systems; 10. Maximality principles; 11. Representation: the general case; Appendix A. A topological toolkit; Appendix B. Further reading; Notation index; Index.

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Differential Equations

A. C. King
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J. Billingham
University of Birmingham

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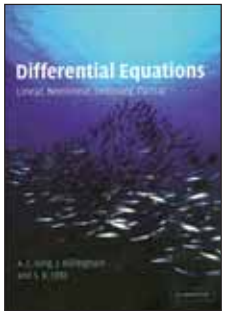

Finding and interpreting the solutions of differential equations is a central and essential part of applied mathematics. This book aims to enable the reader to develop the required skills needed for a thorough understanding of the subject. The authors focus on the business of constructing solutions analytically, and interpreting their meaning, using rigorous analysis where needed. MATLAB is used extensively to illustrate the material. There are many worked examples based on interesting and unusual real world problems. A large selection of exercises is provided, including several lengthier projects, some of which involve the use of MATLAB. The coverage is broad, ranging from basic second-order ODES and PDEs, through to techniques for nonlinear differential equations, chaos, asymptotics and control theory.

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Modern Mathematical Methods for Physicists and Engineers

C.D. Cantrell
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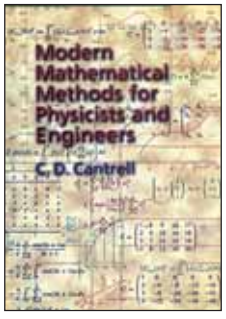

Modern Mathematical Methods for Physicists and Engineers provides an up-to-date mathematical and computational education for students, researchers, and practising engineers. The author begins with a review of computation, and then deals with a range of key concepts including sets, fields, matrix theory, and vector spaces. He then goes on to cover more advanced subjects such as linear mappings, group theory, and special functions. In this way, he concentrates exclusively on the most important topics for the working physical scientist or engineer with the aim of helping them to make intelligent use of the latest computational and analytical methods. The book contains well over 400 homework problems and covers many topics not dealt with in other textbooks. It will be ideal for senior undergraduate and graduate students in the physical sciences and engineering, as well as a valuable reference for working engineers.

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Mathematical Methods for Physics and Engineering

3rd Edition

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University of Cambridge

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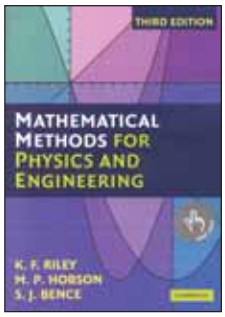

Instructor's Solutions available

The third edition of this highly acclaimed undergraduate textbook is suitable for teaching all the mathematics ever likely to be needed for an undergraduate course in any of the physical sciences. As well as lucid descriptions of all the topics covered and many worked examples, it contains more than 800 exercises. A number of additional topics have been included and the text has undergone significant reorganisation in some areas. New stand-alone chapters:

- give a systematic account of the 'special functions' of physical science
- cover an extended range of practical applications of complex variables including WKB methods and saddle-point integration techniques
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Further tabulations, of relevance in statistics and numerical integration, have been added. In this edition, all 400 odd-numbered exercises are provided with complete worked solutions in a separate manual, available to both students and their teachers; these are in addition to the hints and outline answers given in the main text. The even-numbered exercises have no hints, answers or worked solutions and can be used for unaided homework; full solutions to them are available to instructors on a password-protected website.

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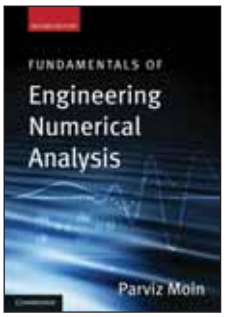
Fundamentals of Engineering Numerical Analysis

2nd Edition

Parviz Moin
Standford University, California



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Since the original publication of this book, available computer power has increased greatly. Today, scientific computing is playing an ever more prominent role as a tool in scientific discovery and engineering analysis. In this second edition, the key addition is an introduction to the finite element method. This is a widely used technique for solving partial differential equations (PDEs) in complex domains. This text introduces numerical methods and shows how to develop, analyse, and use them. Complete MATLAB programs for all the worked examples are now available at www.cambridge.org/Moin, and more than 30 exercises have been added. This thorough and practical book is intended as a first course in numerical analysis, primarily for new graduate students in engineering and physical science. Along with mastering the fundamentals of numerical methods, students will learn to write their own computer programs using standard numerical methods.

Contents: 1. Interpolation; 2. Numerical differentiation - finite differences; 3. Numerical integration; 4. Numerical solution of ordinary differential equations; 5. Numerical solution of partial differential equations; 6. Discrete transform methods; Appendix. A review of linear algebra.

ISBN: 9780521269674 256pp ₹ 495.00

A Course in Combinatorics

2nd Edition

J.H. Van Lint
Technische Universiteit Eindhoven, Holland

& R.M. Wilson
California Institute of Technology

This is the second edition of a popular book on combinatorics, a subject dealing with ways of arranging and distributing objects, and which involves ideas from geometry, algebra and analysis. The breadth of the theory is matched by that of its applications, which include topics as diverse as codes, circuit design and algorithm complexity. It has thus become essential for workers in many scientific fields to have some familiarity with the subject. The authors have tried to be as comprehensive as possible, dealing in a unified manner with, for example, graph theory, extremal problems, designs, colorings and codes. The depth and breadth of the coverage make the book a unique guide to the whole of the subject.

Contents: Preface; 1. Graphs; 2. Trees; 3. Colorings of graphs and Ramsey's theorem; 4. Turen's theorem and extremal graphs; 5. Systems of distinct representatives; 6. Dilworth's theorem and extremal set theory; 7. Rows in networks; 8. De Bruijn sequences; 9. The addressing problem for graphs; 10. The principle of inclusion and exclusion; inversion formulae; 11. Permanents; 12. The Van der Waerden conjecture; 13. Elementary counting; Stirling numbers; 14. Recursions and generating functions; 15. Partitions; 16. (0,1)-matrices; 17. Latin squares; 18. Hadamard matrices, Reed-Muller codes; 19. Designs; 20. Codes and designs; 21. Strongly regular graphs and partial geometries; 22. Orthogonal Latin squares; 23. Projective and combinatorial geometries; 24. Gaussian numbers and q-analogues; 25. Lattices and Mobius inversion; 26. Combinatorial designs and projective geometries; 27. Difference sets and automorphisms; 28. Difference sets and the group ring; 29. Codes and symmetric designs; 30. Association schemes; 31. Algebraic graph theory: eigenvalue techniques; 32. Graphs: planarity and duality; 33. Graphs: colorings and embeddings; 34. Electrical networks and squared squares; 35. Polya theory of counting; 36. Baranyai's theorem; Appendices; Name index; Subject index.

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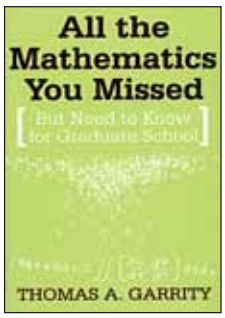
All the Mathematics You Missed

But Need to Know for Graduate School

Thomas A. Garrity
Williams College, Massachusetts



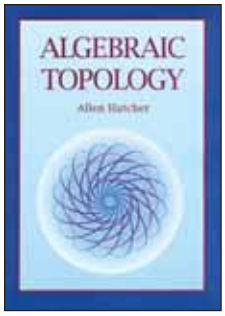
This book will help students to see the broad outline of mathematics and to fill in the gaps in their knowledge. The author explains the basic points and a few key results of all the most important undergraduate topics in mathematics, emphasizing the intuitions behind the subject. The topics include linear algebra, vector calculus, differential geometry, real analysis, point-set topology, probability, complex analysis, abstract algebra, and more. An annotated bibliography then offers a guide to further reading and to more rigorous foundations. The book will be an essential resource for advanced undergraduate and beginning graduate students in mathematics, the physical sciences, engineering, computer science, statistics and economics who need to quickly learn some serious mathematics.

Contents: 1. Linear algebra; 2. e and d real analysis; 3. Calculus for vector-valued functions; 4. Point set topology; 5. Classical Stokes' theorems; 6. Differential forms and Stokes' theorem; 7. Curvature for curves and surfaces; 8. Geometry; 9. Complex analysis; 10. Countability and the axiom of choice; 11. Algebra; 12. Lebesgue integration; 13. Fourier analysis; 14. Differential equations; 15. Combinatorics and probability theory; 16. Algorithms; A. Equivalence relations.

ISBN: 9780521670340 374pp ₹ 445.00

Algebraic Topology

Allen Hatcher
Cornell University, New York



This introductory textbook is suitable for use in a first-year graduate course or for self-study, featuring broad coverage of the subject and a readable exposition, with many examples and exercises. Along with the basic material on fundamental group and covering spaces, homology and cohomology, higher homotopy groups, and homotopy theory, the book includes many optional topics for which elementary expositions are hard to find.

Contents: Part I. Some Underlying Geometric Notions: 1. Homotopy and homotopy type; 2. Deformation retractions; 3. Homotopy of maps; 4. Homotopy equivalent spaces; 5. Contractible spaces; 6. Cell complexes definitions and examples; 7. Subcomplexes; 8. Some basic

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GENERAL BOOKS

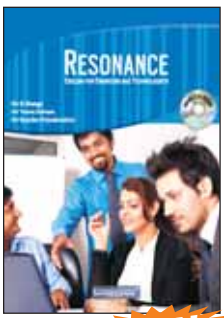
Resonance

English for Engineers and Technologists

Dr K Elango
Anna University, Chennai

Dr Veena Selvam
Anna University, Chennai

& Dr P R Sujatha Priyadarshini
Anna University, Chennai



English has been introduced as a subject of study for students of engineering and technology because it is a major link language in today's world. Universities and colleges have recognised that adequate proficiency in using the language has become a prerequisite for better career prospects. *Resonance: English for Engineers and Technologists* hopes to cater to the language needs of the students in the academic, professional and social contexts. The book covers all the four language skills through interactive and creative tasks.

Key Features

- A variety of thematic reading passages that will interest students of science.
- All teaching is followed by tasks that challenge the learners' comprehension of the topics.
- An accompanying CD contains audio-visual material to aid the learning process.
- A combination of individual and group tasks to help classroom learning.
- Flexible content and tasks to suit mixed-ability classrooms.

Contents: Syllabus • Preface; Unit 1 • Going Places: Travel; Unit 2 • Reaching Out: Mass Media; Unit 3 • Ushering in a New Era: Networking; Unit 4 • Exploring the Final Frontier: Space; Unit 5 • Inspiring Minds: Successful People; Unit 6 • Futuristic Technology: Looking at Tomorrow; Unit 7 • Morphed Universe: Technology as a Double-edged Sword; Unit 8 • The Indomitable Human Spirit: Facing Disasters; Unit 9 • Getting Job Ready: Interview Skills; Unit 10 • The World of Work: The Corporate Experience • Audio Script • Acknowledgement

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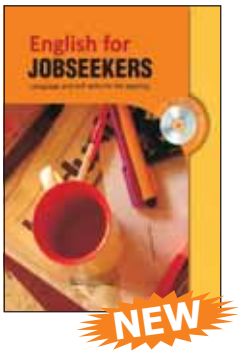
English for Jobseekers

Language and Soft Skills for the Aspiring

Lina Mukhopadhyay, Muthukumar Maganti, Geetha Rajeevan, Priyadarshi Patnaik, B Sai Lakshmi, Nandini Nayar, Mohanan, C L N Prakash



English is a must for getting a job, communicating at the workplace and understanding business globally. It is also important to know English to face an interview, a group discussion or take a test which evaluates reading or writing skills. In a globalized world with escalating competition, it is essential that English courses at the undergraduate level are well supplemented with material that addresses skills gaps.

English for Jobseekers aims to equip Indian students with the communication tools which will ready them for the job they are looking for. The book is designed as worksheets built around capsules of practical ideas about how best to communicate when in need of a job. It can be used for smart self-learning as well as for teacher-led communication skills courses which focus on employability.

Worksheets and a video CD with simulations of interviews and group discussions, and accompanying video-based exercises make *English for Jobseekers* an intensive package that assures success.

Contents: *Introduction • Guide to using English for Jobseekers;* Preparing for Written assessment • Module I: Grammar • Module II: Reading comprehension • Module III: Writing paragraphs and essays; Preparing for oral assessment • Module IV: Group Discussion • Module V: Interview skills; In the workplace • Module VI: workplace awareness • *Appendix 1: Audio scripts* • *Appendix 2: Video-based exercises*

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Group Discussion and Interview Skills

Priyadarshi Patnaik
Indian Institute of Technology, Kharagpur

Today's world of globalization and international commerce demands a high level of communicative competence, interpersonal skills and team skills. Group discussions and personal interviews are two hiring tools commonly used by many organizations in their process of recruitment. *Group Discussion and Interview Skills* aims to equip candidates with the requisite skills for performing well at group discussions and interviews. The book and the companion video CD, though highly suitable for self-learning, can also be used for classroom teaching.

Key Features
- Visuals to illustrate proper use of body language, postures and gestures
- Effective and extensive video samples with in-depth analysis
- Activities at the end of each chapter help to reinforce the learning
- Instructions for learners to do self-assessment tests, mock GDs and interviews

Contents: Introduction; Overview; Acknowledgements; 1. Taking Stock of Things; 2. Write Perfectly to Get the Right Job; 3. Know Your Basics; 4. Hone Your Interaction Strategies; 5. Orienting Yourself for Group Discussion; 6. Group Discussion; 7. Preparing for the Job Interview; 8. The First Interview; 9. Stress and Behavioural Interviews; Appendices; Model Answers

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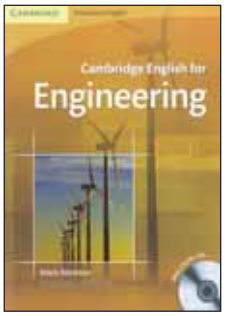
Cambridge English for Engineering

Mark Ibbotson



Companion Website available

Cambridge English for Engineering is for intermediate to upper-intermediate level (B1-B2) learners of English who need to use English in an engineering environment. The course is particularly suitable for civil, mechanical and electrical engineers and can be used in the classroom or for self-study.

Cambridge English for Engineering is designed to improve the communication skills and specialist language knowledge of engineers, enabling them to communicate more confidently and effectively. With an emphasis on listening and speaking, the ten standalone units cover topics common to all fields of engineering such as monitoring and control; procedures and precautions; and engineering design. Authentic activities based on everyday engineering situations - from describing technical problems and solutions to working with drawings - make the course relevant and motivating.

In addition, a set of case studies available online provide problem-solving in authentic engineering scenarios.

The online Teacher's Book has extensive background information for the non-specialist teacher, useful web links and extra printable activities.

The course comprises:
- Student's Book with 2 Audio CDs
- Engineering case studies online
- Teacher's Book online

For more information visit:
www.cambridge.org/elt/englishforengineering

Contents: Unit 1 Technology in use; Unit 2 Materials technology; Unit 3 Components and assemblies; Unit 4 Engineering design; Unit 5 Breaking point; Unit 6 Technical development; Unit 7 Procedures and precautions; Unit 8 Monitoring and control; Unit 9 Theory and practice; Unit 10 Pushing the boundaries; Audioscript; Answer Key; Glossary; Acknowledgements

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A Handbook for English Language Laboratories

E. Suresh Kumar
University College of Engineering, Osmania University, Hyderabad

& P. Sreehari
University College of Engineering, Osmania University, Hyderabad

With increased awareness among students and teachers about the importance of developing English language skills and communication skills, language laboratories have become an integral part of the paraphernalia for teaching the language in all educational institutions. *A Handbook for English Language Laboratories* aims to develop students' ability to use the language accurately, appropriately and fluently for one-to-one and one-to-many communication in a variety of contexts. It also briefly introduces them to Computer Assisted Language Learning (CALL).

Key topics discussed:

- The sound system of English
- Accent, rhythm and intonation
- Presentation skills
- Preparing résumés and facing interviews
- Group discussions, debates, role play and public speaking

This book is accompanied by an audio CD to offer excellent models of the use of English through a variety of listening exercises.

Contents: Foreword; Preface; **Part I:** Computer Assisted Language Learning; 1. Computer Assisted Language Learning (CALL); **Part II:** The Sound System of English; 2. Introduction to the Sounds of English; 3. Description of Vowels and Consonants; 4. Accent, Rhythm and Intonation; **Part III:** Communication Skills; 5. Presentation Skills; 6. Interviews and Resume Writing; 7. Group Discussions; 8. Debates; 9. Public Speaking; 10. Role play; *List of Audio Tracks*

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Malcolm Goodale
United Nations, Geneva

Professional Presentations is a short and flexible video-based course for students and professionals.

At the core of the course are two sections: Preparing the Presentation and Performing the Presentation. These provide a thorough, step-by-step programme. Preparing the Presentation covers Why, Who, What, How and Where & When. Performing the Presentation deals with Beginning Language, Visual Aids and Body Language, Voice, Ending and Question.

Contents: Teacher's Guide; 1. Preparing the Presentation; 2. Performing the Presentation; 3. A Bad Dream; 4. The New Product Line; 5. An Interview about Presentations.

Video**:** Performing the Presentation; A Bad Dream; The New Product Line; An Interview About Presentations.

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Speaking Effectively

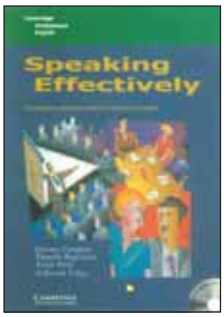
Developing Speaking Skills for Business English

Jeremy Comfort
York Associates

Pamela Rogerson
Hong Kong City Polytechnic

Trish Stott
York Associates

& Derek Utley
York Associates



Speaking Effectively is a resource for learners who want to improve their speaking skills in a general English context. It can be used as supplementary material or as the basis for a course. It contains 14 short units, which cover a range of topics from Chairing a meeting to Socializing, and 3 case studies which provide an opportunity to consolidate what has been presented in the previous units.

Speaking Elfecfively is accompanied by an Audio CD which provides listening comprehension and pronunciation tasks.

Contents: Introduction to the learner; Introduction to the teacher, Summary of unit contents; Unit 1 Presenting information; Unit 2 Greeting friends and strangers; Unit 3 Explaining ideas and visual information; Unit 4 Phoning; Case study 1: Unit 5 Giving and getting product information; Unit 6 Small talk; Unit 7 Dealing with visitors; Unit 8 Offering help and invitations; Case study 2: Unit 9 Meetings between colleagues; Unit 10 Arranging to meet; Unit 11 Informal negotiations; Unit 12 Developing a conversation; Unit 13 Chairing a meeting; Unit 14 Talking about people and place; Case study 3: Resource Section; Key.

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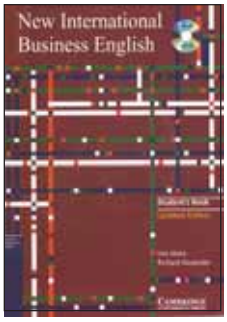
New International Business English

Leo Jones &
Richard Alexander



New International Business English is a flexible course at the upper-intermediate level for people who need or will soon need to use English in their day-to-day work.

All four skills - listening, speaking, reading, writing - are developed through a wide range of tasks which closely reflect the world of work.

Key features of the Student's Book are:

- learner-centred approach
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- thorough vocabulary development
- frequent opportunities for discussion

The Student's Book has been redesigned with many new illustrations and photos to make it more attractive and easier to use.

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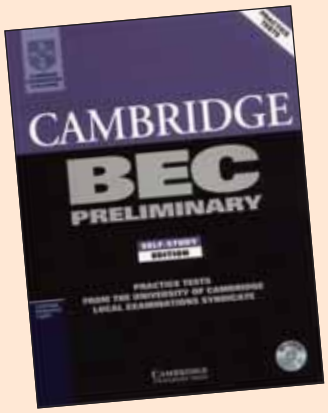
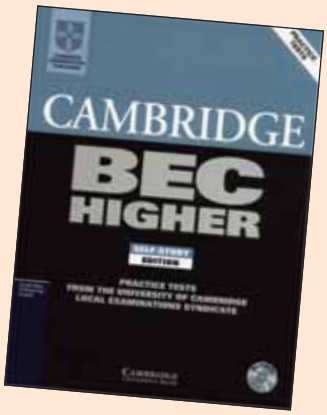
BEC Preliminary, Vantage and Higher





Cambridge BEC contains four complete practice tests for each level of the UCLES Business English Certificate — Preliminary, Vantage and Higher.

The books contain an answer key, audio transcripts, and guidance on the exam. This makes it usable either in class or for self-study.

The accompanying Audio CD contains the recorded material for the Listening papers.

Contents: Thanks and acknowledgements; Introduction; **Test 1:** Reading; Writing; Listening; Speaking; **Test 2:** Reading; Writing; Listening; Speaking; **Test 3:** Reading; Writing; Listening; Speaking; **Test 4:** Reading; Writing; Listening; Speaking; **Key (including tapescripts):** Test 1; Test 2; Test 3; Test 4; Speaking Test Interlocutor Frames; Sample OMR Answer Sheets.

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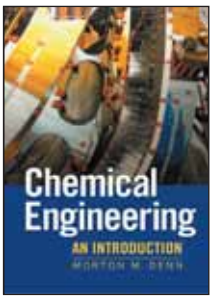

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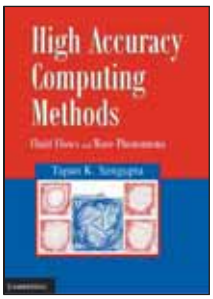

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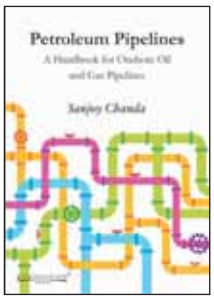

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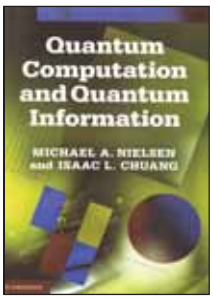

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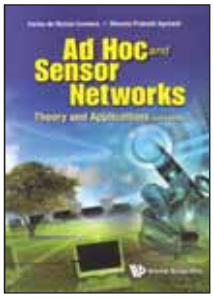

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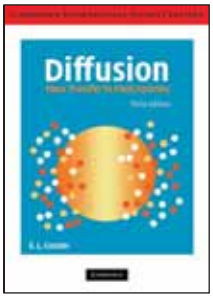

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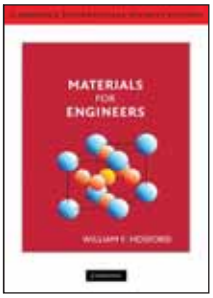

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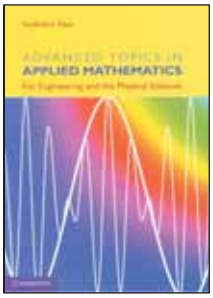

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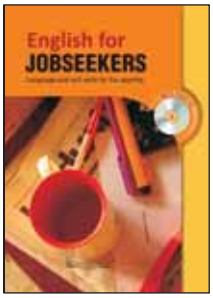

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