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Contents

Analysis and Probability                     1
Discrete Mathematics and Foundations       2
Geometry and Topology                       3
Algebra and Number Theory                   6
Computational Science                      8
Dynamical Systems, Mechanics and Modelling  9
Mathematical Physics and Biology            11
Statistics, Applied Probability and
Optimization                                 13
Mathematical Finance                       16
Classics in Mathematical Finance            17
Computer Science                           18
SIAM Books                                 20
General and Recreational Maths              23

Author and Title Index                     25

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King’s College London

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Texas A & M University and Universidad de Extremadura

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Jean Bertoin
Université de Paris VI (Pierre et Marie Curie)

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Michael B. Marcus and Jay Rosen
City University of New York

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Kalyan B. Sinha
Indian Statistical Institute, New Delhi and Debashish Goswami
Indian Statistical Institute, Kolkata

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Suely Oliveira
University of Iowa
and David E. Stewart
University of Iowa

This manual of scientific computing style will prove to be an essential addition to the bookshelf and lab of everyone who writes numerical software. Scientists, engineers and computer scientists who follow its advice will learn how to write good software, and how to test it for bugs, accuracy and performance.

Cambridge University Press

An Introduction to Parallel and Vector Scientific Computation
Ronald W. Shonkwiler
Georgia Institute of Technology, Atlanta
and Lew Lefton
Georgia Institute of Technology, Atlanta

In this introductory text, the fundamental algorithms of numerical linear algebra are developed in a parallel context. Topics include direct

Dynamical Systems, Mechanics and Modelling

FEATURE TITLE

TEXTBOOK

Classical Mechanics

R. Douglas Gregory
University of Manchester

Gregory's Classical Mechanics 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 ample practice for understanding and technique.


Introduction to Homogenization Methods in Continuum Mechanics

William Parnell
University of Manchester

and Ian Abrahams
University of Manchester

An excellent guide to the modeling of composite materials, this text bridges the gap between undergraduate continuum mechanics and graduate studies in homogenization techniques. The book begins with the simplest methods for static problems and ends with effective properties regarding wave propagation in composites. Examples and exercises are offered throughout.

Numerical Methods for Chemical Engineering

Kenneth J. Beers
Massachusetts Institute of Technology

Suitable for a first year graduate course, this textbook unites applications of numerical mathematics and scientific computing to the practice of chemical engineering. The methods are developed at a level of mathematics suitable for graduate engineering. MATLAB is integrated within each chapter and numerous examples in chemical engineering are provided.


Visit our website at www.cambridge.org
Dynamic Modeling and Control of Engineering Systems
Third edition
Bohdan Kulakowski
Pennsylvania State University
John F. Gardner
Boise State University
and J. Lowen Shearer
Pennsylvania State University

This is a textbook for undergraduate courses in system dynamics and controls. It presents a comprehensive treatment of the analysis of lumped parameter physical systems. Beginning with a discussion of mathematical models and ODE's, the book covers input/output and state space models, computer simulation and modeling methods and techniques in mechanical, electrical, thermal and fluid domains.


Implicit Large Eddy Simulation
Computing Turbulent Fluid Dynamics
Edited by Fernando F. Grinstein
Naval Research Laboratory, Washington DC
Len G. Margolin
Los Alamos National Laboratory
and William J. Rider
Los Alamos National Laboratory

This book describes one approach to the numerical simulation of turbulent flows, Implicit Large Eddy Simulation (ILES). ILES is a relatively new approach that combines generality and computational efficiency with documented success in many areas of complex fluid flow. This book synthesizes the current understanding of the theoretical basis of the ILES methodology and reviews its accomplishments.

Contents: Part I. Motivation; Part II. Capturing Physics with Numerics; Part III. Verification and Validation; Part IV. Frontier Flows.
2007 253 x 177 mm 552pp 15 tables 978-0-521-86982-9 HB £65.00
Publication March 2007

Numerical Modeling of Ocean Circulation
Robert N. Miller
Oregon State University

This book describes the workings of ocean models, and examines the models critically. Numerical analysis is introduced as needed, and exercises are included to illustrate major points. This book is ideal for graduate students of oceanography, geophysics, climatology and atmospheric science, and researchers in oceanography and atmospheric science.

Contents: 1. Introduction; 2. Some basic results from numerical analysis; 3. Shallow-water models: the simplest ocean models; 4. Primitive equation models; 5. Quasigeostrophic models; 6. Models of the coastal ocean; 7. Models of the tropical ocean; References; Index.
2007 247 x 174 mm 252pp 20 line diagrams 65 half-tones 23 exercises 978-0-521-87406-9 HB £35.00
Publication June 2007

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2007 247 x 174 mm 252pp 20 line diagrams 65 half-tones 23 exercises 978-0-521-87406-9 HB £35.00
Publication June 2007

Recent Bestseller
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An Introduction to Partial Differential Equations
Yehuda Pinchover
Technion – Israel Institute of Technology, Haifa
and Jacob Rubinstein
Indiana University

A complete introduction to partial differential equations. A textbook aimed at students of mathematics, physics and engineering.

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Mathematical Reviews

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**TEXTBOOK**

**Mathematical Models in Biology**

Elizabeth S. Allman
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Linear and non-linear models of populations, molecular evolution, phylogenetic tree construction, genetics, and infectious diseases are presented with minimal prerequisites.

‘... many institutions, like mine, are looking into ways of adding a mathematical modeling component into the undergraduate curriculum for general biology students. This book will be a great asset to these institutions ... a very interesting and challenging book for undergraduate students with a strong interest in biology ...’

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978-0-521-53748-3 PB £27.99

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**TEXTBOOK**

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Quantitative Methods for Ecology and Evolutionary Biology

Marc Mangel
University of California, Santa Cruz

In this textbook, Marc Mangel provides a no-nonsense introduction to the skills needed to understand the principles of theoretical and mathematical biology. Suitable for advanced undergraduate courses in theoretical and mathematical biology, this book forms an essential resource for anyone wanting to gain an understanding of theoretical ecology and evolution.


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TEXTBOOK

K. F. Riley
University of Cambridge
and M. P. Hobson
University of Cambridge

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26 line diagrams 419 exercises
978-0-521-67973-2 PB £13.99

TEXTBOOK

Quantum Field Theory
Mark Srednicki
University of California, Santa Barbara

This textbook is an essential introduction to quantum field theory, covering all the key theories necessary to understand the standard model. It is ideal for graduate students studying quantum field theory and elementary particle theory. It contains extensive problems, with solutions available to lecturers at www.cambridge.org/9780521864497.
2006 247 x 174 mm 544pp
87 line diagrams 3 half-tones 250 exercises
978-0-521-86449-7 HB £35.00

Geometry of Quantum States
An Introduction to Quantum Entanglement
Ingemar Bengtsson
Stockholms Universitet
and Karol Zyczkowski
Jagiellonian University, Krakow

An introduction to the key concepts of quantum information processing. The authors cover basic quantum theory, the geometry of quantum state spaces and quantum entanglement, which has become a key resource for quantum computation. This richly-illustrated book is useful to graduates and researchers interested in quantum information theory.
2006 247 x 174 mm 418pp
100 line diagrams 15 half-tones 18 tables 84 exercises
978-0-521-81451-5 HB £50.00

Differential Geometry and Lie Groups for Physicists
Marián Fecko
Comenius University, Bratislava

Covering subjects including manifolds, tensor fields, spinors, and differential forms, this textbook introduces geometrical topics useful in modern theoretical physics and mathematics. It develops understanding through over 1000 short exercises, and is suitable for advanced undergraduate or graduate courses in physics, mathematics and engineering.
2006 247 x 174 mm 714pp
95 line diagrams 1100 exercises
978-0-521-84761-2 HB £70.00

Functional Integration
Action and Symmetries
Pierre Cartier
Institut des Hautes Études Scientifiques, France
and Cecile DeWitt-Morette
University of Texas, Austin

In this text, Cartier and DeWitt-Morette, using their complementary interests and expertise, successfully condense and apply the essentials of Functional Integration to a great variety of systems, showing this mathematically elusive technique to be a robust, user friendly and multipurpose tool.
Cambridge Monographs on Mathematical Physics
2006 247 x 174 mm 476pp
42 line diagrams 7 half-tones
978-0-521-86696-5 HB £80.00

Path Integrals and Anomalies in Curved Space
Fiorenzo Bastianelli
Università degli Studi, Bologna, Italy
and Peter van Nieuwenhuizen
State University of New York

This book introduces path integrals, a powerful method for describing quantum phenomena, and then uses them to compute anomalies in quantum field theories. An advanced text for researchers and graduate students of quantum field theory and string theory, it also provides a stand-alone introduction to path integrals in quantum mechanics.
Cambridge Monographs on Mathematical Physics
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58 line diagrams
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Astrophysical Flows
James E. Pringle
University of Cambridge
and Andrew King
University of Leicester

Developed from a course in astrophysical fluid dynamics, this new graduate textbook provides a basic understanding of the fluid dynamical processes relevant to astrophysics. Covering topics including wave propagation, shocks, spherical flows and stellar oscillations, this book is suitable for graduate students in astrophysics, physics and applied mathematics.


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16 line diagrams 1 half-tone 40 exercises
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Publication April 2007

FEATURE TITLE

Principles of Statistical Inference
D. R. Cox
Nuffield College, Oxford

No one is better placed than D. R. Cox to give the comprehensive, balanced account of the theory of statistical inference, its main ideas and controversies, that is now needed. This book is for every serious user or student of statistics — for anyone serious about the scientific understanding of uncertainty.

'A deep and beautifully elegant overview of statistical inference, from one of the towering figures who created modern statistics. This book should be essential reading for all who call themselves 'statistician'.'

David Hand, Imperial College London


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978-0-521-68567-2 PB £19.99
Publication August 2007

FEATURE TITLE

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Peter Whittle
University of Cambridge

Foundational book on optimization of network structure, not just function, deriving comprehensible and realistic design principles. Connections are made with optimal mechanical structures, formation of bone structure, and neural, processing and communication networks, including the Internet and the Web. A masterful unification of theory from disparate fields and lessons from nature.


Cambridge Series in Statistical and Probabilistic Mathematics, 21
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Publication March 2007
be read as much for enjoyment as for edification.


2006 253 x 177 mm 1150pp
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David Cox
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Queen's University, Ontario

Sir David Cox’s most important papers, each the subject of a new commentary by Professor Cox.

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The Cambridge Dictionary of Statistics

Third edition
B. S. Everitt
King’s College London

If you use statistics and need easy access to simple, reliable definitions and explanations of modern statistical and statistics-related concepts, then look no further than this dictionary. Over 3600 terms are defined, covering medical, survey, theoretical, and applied statistics, including computational aspects. Entries are provided for standard and specialised statistical software. In addition, short biographies of over 100 important statisticians are given. Definitions provide enough mathematical detail to clarify concepts and give standard formulae when these are helpful. The majority of definitions then give a reference to a book or article where the user can seek further or more specialised information, and many are accompanied by graphical material to aid understanding.

Earlier edition: ‘This is already the most useful book on my shelf … excellent value and it is highly recommended as a reference text for anyone who is even mildly interested in statistics.’

The Statistician

2006 247 x 174 mm 442pp   134 figures
978-0-521-69027-0   PB   £17.99

Data Analysis and Graphics Using R

An Example-based Approach

Second edition
John Maindonald
Australian National University, Canberra

and John Braun
University of Western Ontario

Emphasising hands-on analysis, graphical display and interpretation of data, this is a guide to the practical tools that the R system provides. A website provides computer code and data sets, allowing readers to reproduce all analyses. For research scientists, final-year undergraduate or graduate students of applied statistics, and practising statisticians.

From reviews of previous edition: ‘I would strongly recommend the book to scientists who have already had a regression or a linear models course and who wish to learn to use R … an easy-to-read and an understandable reference on the use of R for practical data analysis.’

R News


Cambridge Series in Statistical and Probabilistic Mathematics, 10

2007 247 x 174 mm 528pp 12 colour plates
50 tables 150 exercises 150 figures
978-0-521-86116-8   HB   £43.00

TEXTBOOK

Data Analysis Using Regression and Multilevel/Hierarchical Models

Andrew Gelman
Columbia University

and Jennifer Hill
Columbia University

Data Analysis Using Regression and Multilevel/Hierarchical Models is a comprehensive manual for the applied researcher who wants to perform data analysis using linear and nonlinear regression and multilevel models. The book introduces and demonstrates a wide variety of models and instructs the reader in how to fit these models using freely available software packages.

‘Data Analysis Using Regression and Multilevel/Hierarchical Models ... careful yet mathematically accessible style is generously illustrated with examples and graphical displays, making it ideal for either classroom use or self-study. It appears destined
Mathematical Finance

FEATURE TITLE

Optimization Methods in Finance

Gerard Cornuejols
Carnegie Mellon University, Pennsylvania

and Reha Tutuncu
Quantitative Resources Group, Goldman Sachs

Asset Management, New York

Discusses optimization problems encountered in financial models, describes the relevant theory and efficient solution methods, and shows how to apply them to practical problems in mathematical finance. Based on a successful course at CMU, the text is class-tested and meets the need for a textbook aimed at financial applications.


Mathematics, Finance and Risk, 5
2006 247 x 174 mm 358pp
43 line diagrams 44 tables 177 exercises
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Mark S. Joshi
Royal Bank of Scotland

Professional text/reference on mathematical finance.

‘...an excellent starting point for a numerate person in the field of mathematical finance.’

Risk Magazine


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C++ Design Patterns and Derivatives Pricing

Mark S. Joshi
Royal Bank of Scotland

Shows how to combine mathematical finance and object-oriented programming to practical effect.

‘This is a short book, but an elegant one. It would serve as an excellent course text for a course on the practical aspects of mathematical finance.’

International Statistical Institute

Contents: Preface; 1. Introduction; 2. Portfolio; 3. Trees; 4. Solvers, templates and implied vols; 3. The Ito formula; 11. Design patterns revisited; Appendix A. Black-Scholes formulas; Appendix B. Distribution functions; Appendix C. A simple array class; Appendix D. The code; Bibliography.

Mathematics, Finance and Risk, 2
2004 247 x 174 mm 314pp
38 exercises
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FEATURE TITLE

Market-Valuation Methods in Life and Pension Insurance

Thomas Möller
PFA Pension, Copenhagen

and Mogens Steffensen
University of Copenhagen

Students and practitioners needing a guide to life insurance accounting and product development will welcome this book. New developments in life insurance mathematics are described, together with more traditional methods, with various chapters addressing specific aspects of market-based valuation.

Contents: Preface; 1. Introduction and life insurance practice; 2. Technical reserves and market value; 3. Interest rate theory in insurance; 4. Bonus, binomial and Black-Scholes; 5. Integrated actuarial and financial valuation; 6. Surplus-linked life insurance; 7. Interest rate derivatives in insurance; Appendix A.

International Series on Actuarial Science
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David C. M. Dickson
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Journal of Applied Statistics


International Series on Actuarial Science
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16 Mathematical Finance

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Methods and Modelling
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London School of Economics and Political Science
and Norman Biggs
London School of Economics and Political Science

‘Throughout, the stress is firmly on how the mathematics relates to economics, and this is illustrated with copious examples and exercises that will foster depth of understanding.’
L’Enseignement Mathématique


L’Enseignement Mathématique
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978-0-521-55113-7 HB £50.00

TEXTBOOK
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A Student Introduction
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Imperial College of Science, Technology and Medicine, London
Sam Howison
University of Oxford
and Jeff Dewynne
University of Southampton

‘The layout is good and clear, so is the style of notation … overall this is an excellent tool for both mathematicians interested in the world of finance as well as finance practitioners keen to rebuild the foundations of their knowledge.’
Rudi Bogli, Times Higher Education

Contents: Part I. Basic Option Theory; Part II. Numerical Methods; Part III. Further Option Theory; Part IV. Interest Rate Derivative Products.
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47 line diagrams 143 exercises
143 music examples
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978-0-521-49699-5 HB £40.00

TEXTBOOK
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Options and other Topics
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Sheldon M. Ross
University of California, Berkeley

Reviews of the first edition:
‘… an excellent introduction to the subject … the book is ideally suited for self-study and provides a very accessible entry point to this fascinating field.’
P. P. Boyle, ISI Short Book Reviews

2003 228 x 152 mm 270pp
19 line diagrams 9 tables 150 exercises
978-0-521-81429-4 HB £30.00

Computer Science

FEATURE TITLE
Statistical Machine Translation
Philipp Koehn
University of Edinburgh

This classroom-tested text gives background in NLP and statistics, then develops the basics through to current research. By the end readers can build their own translation systems. For advanced undergraduates in computer science, graduate students in computer science and computational linguistics, and researchers in NLP, for instruction or self-study.

2007 247 x 174 mm 300pp 70 exercises
978-0-521-87415-1 HB c. £35.00
Publication August 2007

Introduction to Clustering Large and High-Dimensional Data
Jacob Kogan
University of Maryland, Baltimore

This book focuses on a few of the most important clustering algorithms, providing a detailed account of these major models in an information retrieval context. The beginning chapters introduce the classic algorithms in detail, while the later chapters describe clustering through diversifications and show recent research for more advanced audiences.
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978-0-521-61793-2 PB £17.99
Publication February 2007

Algorithms on Strings
Maxime Crochemore
Christophe Hancart
and Thierry Lecroq
Université de Rouen

This text and reference on string processes and pattern matching presents examples related to the automatic processing of natural language, to the analysis of molecular sequences and to the management of textual databases. Algorithms are described in a C-like language, with correctness proofs and complexity analysis, to make them ready to implement.
2007 228 x 152 mm 375pp 6 tables 142 exercises
978-0-521-84899-2 HB c. £35.00
Publication June 2007

TEXTBOOK
Protecting Information
From Classical Error Correction to Quantum Cryptography
Susan Loepp
Williams College, Massachusetts
and William K. Wootters
Williams College, Massachusetts

In the transmission of information storage, preventing noise and/or eavesdropping is essential. This undergraduate introduction to quantum computing focuses on error correction and cryptography, providing a context in which ideas about mathematics, computer science and physics meet together, and students can understand the current thinking in quantum information theory.

‘The authors have combined the two ‘hot’ subjects of cryptography and coding, looking at each with regard to both classical and quantum models of computing and communication. These exciting topics are unified through the steady, consistent development of algebraic structures and techniques. Students who read this book will walk away with a broad exposure to both the theory and the concrete application of groups, finite fields, and vector spaces.’
Ben Lotto, Vassar College
**Constraint Logic Programming using Eclipse**

**Krzysztof R. Apt**
Stichting Centrum voor Wiskunde en Informatica (CWI), Amsterdam

**and Mark Wallace**
Monash University, Melbourne

Aimed at one-semester courses and programmers wishing to master practical aspects of constraint programming, the book teaches understanding and how to write constraint programs that solve complex problems. It also systematically introduces the Eclipse system through carefully-chosen examples, guiding readers through the language and illustrating its power, versatility and utility.


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Stanford University, California

**Daniela Nardi**
Università degli Studi di Roma “La Sapienza”, Italy

**and Peter F. Patel-Schneider**
AT&T Bell Laboratories, New Jersey

*The Description Logic Handbook* is the definitive reference and study guide for researchers in the field of knowledge representation. As well as general revision throughout the book, this new edition presents a new chapter on ontology languages for the semantic web.

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**Boolean Functions**

Volume 1: Theory and Algorithms

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**Encyclopedia of Mathematics and its Applications**

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**Learning Theory**

**An Approximation Theory Viewpoint**

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City University of Hong Kong

**and Ding Xuan Zhou**
City University of Hong Kong

The goal of learning theory is to approximate a function from sample values. This is a general overview of the theoretical foundations, and is the first book to emphasize the approximation theory viewpoint. This emphasis provides a balanced approach, and will attract mathematicians to the problems raised.


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*Algorithms with Mathematical Analysis*
Tamal K. Dey
Ohio State University

After developing the basics of a sampling theory and its connections to various geometric and topological properties, the author describes a suite of algorithms that have been designed for the reconstruction problem, including algorithms for surface reconstruction from dense samples, from samples that are not adequately dense and from noisy samples.

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978-0-521-86370-4 HB £40.00
Publication February 2007

**TEXTBOOK**

**Continuous and Discrete Time Signals and Systems**
Mrinal Mandal
University of Alberta
and Amir Asif
York University, Toronto

Introductory textbook on the fundamental concepts of continuous-time and discrete-time signals and systems, self-contained for independent or combined teaching approaches. Includes a CD-ROM containing MATLAB code and various signals. Contains worked examples, homework problems (solutions for instructors online) and extensive illustrations. Suitable for undergraduates in electrical and computer engineering.

*Contents*
1. Introduction to signals; 2. Introduction to systems; 

A. Mathematical tables; B. Introduction to complex numbers; C. Linear constant coefficient differential equations; D. Partial fraction expansion; E. Introduction to MATLAB; F. About the CD-ROM.

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Publication May 2007

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Subir Ghosh
Tata Institute of Fundamental Research, Mumbai

Computations of visible portions of objects from a viewpoint involving thousands of objects is a time consuming task even for high speed computers. To solve such visibility problems, efficient algorithms have been designed and this book presents some of these visibility algorithms in two dimensions.

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Publication March 2007

**Combinatorics and Probability**
Edited by Graham Brightwell
London School of Economics and Political Science
Imre Leader
University of Cambridge
Alex Scott
University of Oxford
and Andrew Thomason
University of Cambridge

In a highly distinguished career Béla Bollobás has made, and continues to make, many significant contributions to combinatorics. This volume provides a wealth of insight to the current state of the art in the wide range of topics on which his work has had a major influence.

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31 line diagrams 4 tables 6 exercises
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Publication February 2007

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**TEXTBOOK**

**MATLAB Guide**
Second edition
Desmond J. Higham
University of Strathclyde
and Nicholas J. Higham
University of Manchester

This second edition remains a lively, concise introduction to the important features of MATLAB 7 and the Symbolic Math Toolbox.

I ‘use the Higham brothers’ MATLAB Guide as a reference for myself and my students in all my applied mathematics and computational science courses. The clarity and usefulness of their writing are major attractions for using their books. Consequently, I look forward to the very much improved second edition, as if that were possible for a much admired book. In particular, the new chapter on case studies looks quite interesting with its useful applications. In addition, new treatments of new functions and features like nested functions, ODE as well as DDE functions will be of great interest.’

Floyd B. Hanson, Ph.D., Professor of Mathematics, Department of Mathematics, Statistics, and Computer Science, University of Illinois at Chicago

**Contents**

2005 228 x 152 mm 406pp
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second edition

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university of manchester

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barbara a. simmons, technical communication

learning latex

david f. griffiths
university of dundee

and desmond j. higham
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24
99 Points of Intersection .......................... 24

A
Abrahams, Ian ........................................ 9
Accuracy and Stability of Numerical Algorithms ... 22
Adams, James ........................................... 1
Adams, James ........................................... 1
Adem, Alejandro ....................................... 5
ahai! A two volume collection ..................... 24
Algebra and Geometry ................................ 6
Algebraic Cycles and Motives ...................... 5
Algorithmic Game Theory .......................... 3
Algorithms on Strings ................................ 18
Allman, Elizabeth S. ................................ 11
Ambrosiello, Antonio .............................. 1
Angelen Hügel, Lidia .............................. 7
Anthony, Martin ...................................... 17
Ants, Bikes, and Clocks ............................ 21
Applebaum, David ................................... 17
Applied Asymptotics .................................. 15
Apt, Krzysztof ........................................ 9
Armitage, J. V. ....................................... 4
Art of Mathematics, The ............................ 23
Asl, Amir .................................................. 6
Assessing Mathematical Proficiency ............. 24
Astrophysical Flows .................................. 12
Automorphic Forms and L-Functions for the Group GL(n,R) ................................ 7

B
Baader, Franz ......................................... 19
Barnsley, Michael Fielding ....................... 3
Bastianelli, Fiorenzo ............................... 7
Bau, III, David ......................................... 12
Baxter, Martin W. .................................... 17
Beardon, Alan F ...................................... 17
Beers, Kenneth J. ..................................... 9
Bence, S. J. .................................................. 1
Bengtsson, Ingemar .................................. 12
Benson, Dave ......................................... 23
Bertoin, Jean ............................................ 1
Biggs, Norman ........................................ 17
Bimore, Ken ............................................ 2
Bollbás, Bela .......................................... 2, 23
Boolean Functions .................................... 19
Boyd, Stephen ......................................... 15
Braess, Dietrich ....................................... 8
Branman, David Alexander ....................... 1
Braun, John ............................................. 14
Brazale, A. R. .......................................... 15
Briggs, William ....................................... 21, 22
Brightwell, Graham .................................. 20
Butler, Ronald W. .................................. 15

C
C++ Design Patterns and Derivatives             Pricing .................................................. 16
Calculus .................................................. 1
Calculus: Concepts and Methods ................. 2
Calvanese, Diego .................................... 19
Campbell, C. M. ..................................... 7
Cartier, Pierre ....................................... 12
Castillo, Jesus M. F. .................................. 1
Central Simple Algebras and Galois Cohomology .............................................. 4
Chan, Tony ............................................. 22
Chung, T. I. ............................................ 10
Classical Fields, The ................................ 7
Classical Mechanics .................................. 9
Combinatorics and Probability ................... 20
Computational Methods for Multiphase Flow ................................................. 8
Computational Methods for Option Pricing ..................................................... 22
Concepts and Practice of Mathematical Finance, The .................................. 16
Conrey, J. B. ........................................... 6
Constraint Logic Programming using Eclipse .................................................. 19
Contact Geometry and Nonlinear Differential Equations .................................. 9
Continuous and Discrete Time Signals and Systems ........................................ 20
Convex Optimization .................................. 15
Coordinate-Free Approach to Linear Models, The ........................................ 15
Cornuejols, Gerard .................................. 16
Course in Financial Calculus, A ................... 17
Cox, D. R. .............................................. 13
Cox, David ............................................. 13, 14
Cramer, Yves .......................................... 19
Cristiani, Nello ........................................ 11
Crochemore, Maxime .................................. 18
Cucker, Felipe ......................................... 19
Curtis, Robert T. ...................................... 6
Curve and Surface Reconstruction ................. 20

D
Data Analysis and Graphics Using R .............. 14
Data Analysis Using Regression and Multilevel/Hierarchical Models ................. 14
Davies, E. Brian ....................................... 1
Davies, Joan ............................................ 2
Davison, A. C. .......................................... 15
Demaine, Erik D. ..................................... 4
Dependence Logic ....................................... 3
Description Logic Handbook, The ............... 19
DeWitt-Morette, Cecile ............................. 12
Dewynne, Jeff ......................................... 18
Dey, Tamal K. .......................................... 20
Dickson, David C. M. ............................... 16
Differential Geometry and Lie Groups for Physicists .................................. 12
Distributed Pi-Calculus, A .......................... 19
Dunham, William ..................................... 23
Durrett, Rick .......................................... 15
Dynamic Modeling and Control of Engineering Systems .................................. 10
Dynamics, Ergodic Theory and Geometry ..... 5

E
Early Mathematics of Leonhard Euler, The ...................................... 23
Eberlaim, W. F. ....................................... 4
Eccles, Peter J. .......................................... 3
Edelstein-Keshet, Leah .............................. 22
Edge of the Universe, The .......................... 24
Elementary Introduction to Mathematical Finance, An .................................. 18
Elements of Automata Theory ..................... 2
Elliptic Cohomology ................................... 4
Elliptic Functions ...................................... 4
Etheridge, Alison ..................................... 17
Everitt, B. S. .......................................... 14
Farmer, D. W. .......................................... 6
Fecko, Marián ......................................... 12
Financial Calculus .................................... 17
Finite Elements ........................................ 8
First Course in Mathematical Analysis, A .... 1
Functional Integration ................................ 12
Gardner, John F. ...................................... 10
Gardner, Martin ....................................... 24
Gardner, Richard J. .................................. 4
Gelman, Andrew ...................................... 14
General Continuum Mechanics .................... 10
Genius of Euler, The .................................. 10
Geometric Folding Algorithms ..................... 4
Geometric Spanner Networks ....................... 5
Geometric Tomography ................................ 4
Geometry of Quantum States ...................... 12
Ghost, Subir ............................................ 20
Gille, Philippe .......................................... 4
Gockenbach, Mark S. ................................ 23
Goldfeld, Dorian ....................................... 7
Goswami, Debashish .................................. 2
Gottlieb, David ........................................ 8
Gottlieb, Sigal ........................................... 8
Gregory, R. Douglas ................................. 9
Griffiths, David F. ..................................... 21
Grinstein, Fernando F. ............................... 10
Groups St Andrews 2005 ........................... 7
Grundhöfer, T. ........................................ 7
Hähl, H. .................................................. 11
Hahn, Matthew W. ................................... 17
Hamm, Peter L. ........................................ 19
Hancart, Christophe ................................... 18
Hand, D. J. ............................................. 13, 14
Handbook of Tilting Theory ............................. 7
Handbook of Writing for the Mathematical Sciences .................................. 21
Happel, Dieter .......................................... 7
Harkleroad, Leon ..................................... 23
Hasselblatt, Boris ....................................... 5
Hassett, Brendan ....................................... 3
Haunsperger, Deanna ................................. 24
Hennessy, Matthew ................................... 19
Henson, Van Emden .................................. 22
Herberg, A. M. ......................................... 13, 14
Hesthaven, Jan ......................................... 8
Higham, Desmond .................................... 17
Higham, Desmond J. ................................ 20, 21
Higham, Nicholas .................................... 21
Higham, Nicholas J. ................................ 20, 22
Hilbert’s Tenth Problem ................................ 4

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Selected Statistical Papers of Sir David Cox .............................................. 13, 14
Shearer, J. Lowen ................................... 10
Shen, Jianhong .................................... 22
Shlapentokh, Alexandra ........................... 4
Shonkwiler, Ronald W. ............................... 8
Sinha, Kalyan B. ...................................... 2
Smid, Michiel ........................................ 5
Smith, G. C. ......................................... 7
Snaith, N. C. ........................................ 6
Spectral Methods for Time-Dependent Problems ........................................... 8
Spivak, Michael ...................................... 1
Spline Functions on Triangulations .......... 9
Srednicki, Mark ..................................... 12
Statistical Machine Translation ............... 18
Steffensen, Mogens ................................ 16
Stewart, David E. ..................................... 8
Street, Ross ......................................... 6
SuperFractals ......................................... 3
Surveys in Geometry and Number Theory .5
Swanson, Irena ..................................... 7
Symmetric Generation of Groups ............ 6
Szamuely, Tamás ................................... 4
Tao, Terence ........................................... 2
Tardos, Eva .......................................... 3
Theoretical Biologist’s Toolbox, The ........ 11
Theory of Finite Simple Groups .............. 6
Thomason, Andrew ................................. 20
Tibar Mihai ........................................... 5
Tijms, Henk ......................................... 13
Topping, Peter ....................................... 4
Trefethen, Lloyd N. ................................. 22
Tryggvason, Gretar ................................. 8
Tutuncu, Reha ....................................... 16
U
Understanding Probability ..................... 13
V
Väänänen, Jouko ...................................... 3
van Nieuwenhuizen, Peter .................... 12
Vandenbergh, Lieven ............................... 15
Vaughan, Robert C. ................................. 6
Vazirani, Vijay ___________________________ 3
Visibility Algorithms in the Plane .......... 20
Vu, Van H. ........................................... 2
W
Wagner, Claus ....................................... 12
Wallace, Mark ....................................... 19
Walser, Hans ....................................... 24
Whittle, Peter ....................................... 13
Wichura, Michael J. ............................... 15
Willett, Paul ........................................ 18
Wootters, William K. ............................. 18
Writing Scientific Software .................... 8
Y
Young, Nicholas ................................. 5
Z
Zhou, Ding Xuan ................................ 19
Zyczkowski, Karol ................................. 12
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