

APPLIED MATHEMATICS 2010

∴ New

NANOSCIENCE AND TECHNOLOGY

A Collection of Reviews from Nature Journals

edited by **Peter Rodgers**
(Nature Publishing Group)

"... This is a useful volume of value to all involved in today's research in nano-science and nano-technology."

Leonard C Feldman, Rutgers University

"... Pulling these papers together in one volume helps put the remarkable advances in this still very new field in perspective and stimulates thinking about future directions in nanoscience and technology. It will be an important resource for the community."

Mark Lundstrom, Purdue University

"...The collection of all these papers in one place makes it a must-have for any student or researcher in nanoscience."

Mark Reed, Yale University

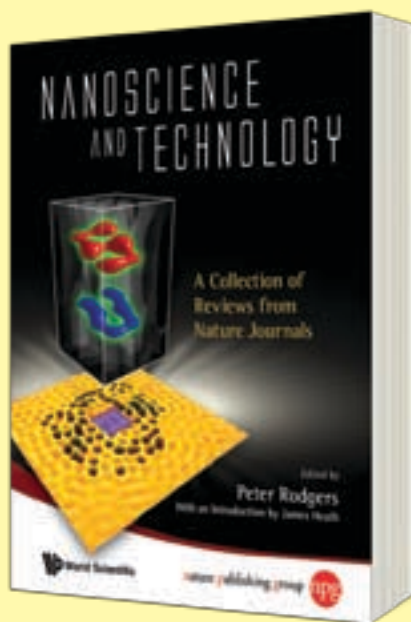
"There is a need for a book such as this that provides an introduction to the many areas of nanoscale science and technology."

**Professor Hongjie Dai
Stanford University**

"This is a remarkable collection, surveying many forefronts of contemporary nanoscience and nanotechnology."

**Professor Michael Roukes
California Institute of Technology**

This book contains 35 review articles on nanoscience and nanotechnology that were first published in *Nature Nanotechnology*, *Nature Materials* and a number of other Nature journals. The articles are all written



by leading authorities in their field and cover a wide range of areas in nanoscience and technology, from basic research (such as single-molecule devices and new materials) through to applications (in, for example, nanomedicine and data storage).

Readership: Chemists, physicists, material scientists, engineers, biomedical scientists and anyone interested in nanoscience and nanotechnology.

Key Features

- Broad range of topics
- Authors are all experts in their fields
- Articles have all been commissioned and edited to appeal to both specialists and non-specialists

300pp (approx.) **Aug 2009**
978-981-4282-68-0 **US\$168** **£126**

∴ Forthcoming

HOMOGENIZATION METHODS FOR MULTISCALE MECHANICS

by **Chiang C Mei** (Massachusetts Institute of Technology, USA) & **Bogdan Vernescu** (Worcester Polytechnic Institute, USA)

Key Features

- Primary emphasis on the derivation of approximate equations. Less effort is devoted to their solutions and the implied physical significance
- Limits the mathematics to the level commonly taught to graduate students of engineering and physical sciences
- Details are explained from ground zero
- Useful to a audience engaging in both theoretical and applied research of multiphase mechanics

Contents: Introductory Examples of Homogenization Method; Diffusion in a Composite; Seepage in Rigid Porous Media; Dispersion in Shear Flows; Deformable Porous Media; Wave Propagation in Inhomogeneous Media; Elastic Composites.

Readership: Graduate students and researchers in applied mathematics and engineering science.

350pp (approx.) **Feb 2010**
978-981-4282-44-4 **US\$80** **£60**

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ANALYSIS & DIFFERENTIAL EQUATIONS

:: Textbook

Atlantis Studies in Mathematics – Vol. 2

SELECTED TOPICS IN MEASURE THEORY

The Measure Extension Problem and Related Questions by **Alexander Kharazishvili** (*Razmadze Mathematical Institute, Republic of Georgia*)

Key Features

- An original treatment of the measure extension problem
- Highlights deep connections with set theory, general topology and group theory
- Some new approaches in the study of invariant and quasi-invariant measures
- Underlines the role of some pathological functions in various constructions of real analysis and measure theory
- A self-contained book that can be used as a textbook for set theory, real analysis, measure theory and general topology

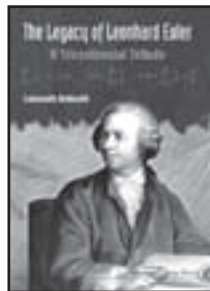
420pp (approx.) Sep 2009
978-90-78677-20-8 US\$125 £94

THE LEGACY OF LEONHARD EULER

A Tricentennial Tribute by **Lokenath Debnath** (*The University of Texas-Pan American, USA*)

Key Features

- Describes Leonhard Euler's biography, career and major contributions to mathematics and the physical sciences in detail
- Fourteen chapters detailing Euler's important works
- Covers a wide range of fields and emphasizes recent advances
- Undergraduate and graduate students of mathematics, mathematics education, physics, engineering and science. As well as professionals and prospective mathematical scientists



420pp (approx.) Oct 2009
978-1-84816-525-0 US\$121 £91

INNOVATION WAS NOT ENOUGH

A History of the Midwestern Universities Research Association (MURA)

by **Lawrence Jones** (*University of Michigan, USA*), **Frederick Mills** (*Fermi National Accelerator Laboratory, USA*), **Andrew Sessler** (*Lawrence Berkeley National Laboratory, USA*), **Keith Symon** (*University of Wisconsin-Madison, USA*) & **Donald Young** (*Fermi National Accelerator Laboratory, USA*),

This book presents a history of the Midwestern Universities Research Association (MURA) during its lifetime from the early 1950s to the late 1960s. MURA was responsible for a number of important contributions to the science of particle accelerators, including the invention of fixed field alternating gradient accelerators (FFAG), as well as contributions to accelerator orbit theory, radio frequency acceleration techniques, colliding beams technology, orbit instabilities, computation methods, and designs of accelerator magnets and linear accelerator cavities. This book is replete with never-before-published photos and a complete listing of all MURA reports.

260pp (approx.) Oct 2009
978-981-283-283-2 US\$38 £21

:: Textbook

CURIOUS CURVES

by **Richard B Darst** (*Colorado State University, USA*), **Judith A Palagallo** & **Thomas E Price** (*The University of Akron, USA*)

Curious Curves is self-contained and unified in presentation. This book is suitable for a topics course, capstone course, or senior seminar; it is also intended for independent study by students and others interested in mathematics.

Key Features

- Accessible to undergraduates with minimal background, the main prerequisite is a strong calculus course with some experience in reading and writing proofs
- Many examples and computer-generated illustrative figures accompany the discussion of curves
- Abundant exercises enhance the presented material and are a vital component of the book

200pp (approx.) Oct 2009
978-981-4291-28-6 US\$58 £44

:: Textbook

VISTAS OF SPECIAL FUNCTIONS II

by **Kalyan Chakraborty** (*Harish Chandra Research Institute, India*), **Shigeru Kanemitsu** & **Haruo Tsukada** (*Kinki University, Japan*)

This book (Vista II), is a sequel to *Vistas of Special Functions* (World Scientific, 2007). In Vista II, which maintains the spirit of the theory of special functions through zeta-functions, the authors base their theory on a theorem which gives some arithmetical Fourier series as intermediate modular relations — avatars of the functional equations. Vista II gives an organic and elucidating presentation of the situations where special functions can be effectively used. Vista II will provide the reader ample opportunity to find suitable formulas and the means to apply them to practical problems for actual research. It can even be used during tutorials for paper writing.

200pp (approx.) Nov 2009
978-981-4273-97-8 US\$70 £53

:: Bestselling Textbook

THE ANALYSIS OF HARMONIC MAPS AND THEIR HEAT FLOWS

by **Fanghua Lin** (*New York University, USA*) & **Changyou Wang** (*University of Kentucky, USA*)

This book provides a broad yet comprehensive introduction to the analysis of harmonic maps and their heat flows. The book can be used as a textbook for the topic course of advanced graduate students and for researchers who are interested in geometric partial differential equations and geometric analysis.

280pp May 2008
978-981-277-952-6 US\$73 £43

TITLES OF YOUR INTEREST

<p>MEAN FIELD THEORIES AND DUAL VARIATION: A MATHEMATICAL PROFILE EMERGED IN THE NONLINEAR HIERARCHY by Takashi Suzuki (<i>Osaka University, Japan</i>) - 9789078677147</p>
<p>USING COUNTER-EXAMPLES IN CALCULUS by John Mason (<i>Open University in Milton Keynes, UK</i>) et al. - 9781848163591 (hbk) / 9781848163607 (pbk)</p>
<p>RELATIVE INDEX THEORY, DETERMINANTS AND TORSION FOR OPEN MANIFOLDS by Jürgen Eichhorn (<i>Universität Greifswald, Germany</i>) - 9789812771445</p>
<p>NONLINEAR CONSERVATION LAWS, FLUID SYSTEMS AND RELATED TOPICS edited by Gui-Qiang Chen (<i>Northwestern University, USA</i>) et al. - 9789814273275</p>

ANALYSIS & DIFFERENTIAL EQUATIONS

:: Forthcoming

Advanced Series in Nonlinear Dynamics – Vol. 26

GEOMETRY OF NONHOLONOMICALLY
CONSTRAINED SYSTEMS

by **Richard H Cushman**, **Jędrzej Śniatycki** (*University of Calgary, Canada*) & **Hans Duistermaat** (*University of Utrecht, The Netherlands*)

This book gives a modern differential geometric treatment of linearly nonholonomically constrained systems. It discusses in detail what is meant by symmetry of such a system and gives a general theory of how to reduce such a symmetry using the concept of a differential space and the almost Poisson bracket structure of its algebra of smooth functions. The geometric techniques described in this book for symmetry reduction have not appeared in any book before. Nor has the detailed description of the motion of the rolling disk. In this respect, the authors are trail-blazers in their respective fields.

Readership: Graduate students in mathematics and mechanical engineering and researchers in dynamical systems.

420pp (approx.) Dec 2009
978-981-4289-48-1 US\$98 £74

:: Forthcoming

NORM DERIVATIVES AND CHARACTERIZATIONS OF
INNER PRODUCT SPACES

by **Claudi Alsina** (*Universitat Politècnica de Catalunya, Spain*), **Justyna Sikorska** (*Silesian University, Poland*) & **M Santos Tomas** (*Universitat Politècnica de Catalunya, Spain*)

Key Features

- An original book by three experts who have been actively involved in the field of functional equations and their applications
- A detailed presentation of many mathematical techniques for solving functional equations and inequalities in normed spaces
- A valuable resource for researchers who wish to deal with characterizations of inner products and new insights on geometry in normed spaces

Readership: Advanced undergraduates, graduate students, mathematicians and scientists interested in Banach and Hilbert spaces, functional equations and their applications, inequalities and geometry in normed spaces and inner product spaces.

190pp (approx.) Dec 2009
978-981-4287-26-5 US\$65 £49

:: Forthcoming Textbook

CLASSICAL COMPLEX ANALYSIS

A Geometric Approach
(Volume 1)

by **I-Hsiung Lin** (*National Taiwan Normal University, Taiwan*)

Key Features

- Balance between theory and examples
- Careful Treatment of Multiple-valued Functions (lots of descriptive and nonrigorous Riemann surfaces or their line complexes of multiple-valued functions)
- Emphasis on the difference between real and complex analysis

Contents: Complex Numbers; Complex-Valued Functions of a Complex Variable; Fundamental Theory: Differentiation, Integration and Analytic Functions; Fundamental Theory: Integration (Continued).

Readership: Undergraduates in mathematics, physics and engineering.

900pp (approx.) Feb 2010
978-981-4261-22-7 US\$118 £89
978-981-4261-23-4 (pbk) US\$78 £59

BIOMATHEMATICS

Series in Mathematical Biology and Medicine
– Vol. 9

HANDBOOK OF CANCER
MODELS WITH APPLICATIONS

edited by **Wai-Yuan Tan** (*University of Memphis, USA*) & **Leonid Hanin** (*Idaho State University, USA*)

“This is a well-written book that provides an accessible up-to-date overview of a variety of mathematical methods, of which some have been recently developed. It provides both systematic reviews and novel theoretical developments, and contains many examples of successful applications of mathematical modeling to cancer research.”

Olivier Hyrien
University of Rochester Medical Center, USA

Composed of contributions from an international team of leading researchers, this book pulls together the most recent research results in the field of cancer modeling to provide readers with the most advanced mathematical models of cancer and their applications.

592pp Jun 2008
978-981-277-947-2 US\$210 £123

LINEAR REGRESSION ANALYSIS

Theory and Computing

by **Xin Yan** (*University of Missouri–Kansas City, USA*) & **Xiao Gang Su** (*University of Central Florida, USA*)

This volume presents in detail the fundamental theories of linear regression analysis and diagnosis, as well as the relevant statistical computing techniques so that readers are able to actually model the data using the methods and techniques described in the book. It covers the fundamental theories in linear regression analysis and is extremely useful for future research in this area. The examples of regression analysis using the Statistical Application System (SAS) are also included. This book is suitable for graduate students who are either majoring in statistics/biostatistics or using linear regression analysis substantially in their subject fields.

348pp Jun 2009
978-981-283-410-2 US\$85 £46

TITLES OF YOUR INTEREST

NEW DEVELOPMENTS IN BIOSTATISTICS AND BIOINFORMATICS
edited by **Jianqing Fan** (*Princeton University, USA*)
et al. - 9789812837431

MODELING AND DYNAMICS OF INFECTIOUS DISEASES
edited by **Zhien Ma, Yicang Zhou** (*Xi'an Jiaotong University, China*) et al.
- 9789814261258

BIOMATHEMATICS

:: Forthcoming

STATISTICAL AND EVOLUTIONARY ANALYSIS OF BIOLOGICAL NETWORKS

edited by **Michael P H Stumpf** (*Imperial College London, UK*) & **Carsten Wiuf** (*Aarhus University, Denmark*)

This book reviews and explores statistical, mathematical and evolutionary theory and tools in the understanding of biological networks. The book is divided into comprehensive and self-contained chapters, each of which focuses on an important biological network type, explains concepts and theory and illustrates how these can be used to obtain insight into biologically relevant processes and questions. There are chapters covering metabolic, transcriptomic, protein interaction and epidemiological networks as well as chapters that deal with theoretical and conceptual material. The authors, who contribute to the book, are active, highly regarded and well-known in the network community.

Readership: Academics, researchers, postgraduates and advanced undergraduates in bioinformatics. Biologists, mathematicians/statisticians, physicists and computer scientists.

200pp (approx.) Dec 2009
978-1-84816-433-8 US\$72 £54

:: Forthcoming

DIFFUSION, PROPAGATION AND GROWTH IN BIOMEDICAL SYSTEMS

by **Livio Triolo** (*Università di Roma Tor Vergata, Italy*)

This book takes an in-depth look into the great interdisciplinary mainstream of mathematical modeling in the life sciences. The various topics reflect the author's experience in statistical mechanics and in multiscale biomathematical analysis. One of the main issues is the multiscale aspect — the microscopic, subcellular level is linked, through the growth process, to the emerging macroscopic organization. Detailed attention is paid to the interplay between different descriptions — deterministic and stochastic, spatial and non-spatial. The exposition is not formal, details are referred to the Bibliography and some topics are critically reviewed.

Readership: Applied mathematicians, biophysicists, and theoretical biologists with medical interests.

250pp (approx.) Mar 2010
978-1-84816-341-6 US\$79 £59

:: Bestselling Textbook

A FIRST COURSE IN INTEGRAL EQUATIONS

by **A M Wazwaz** (*Saint Xavier Univ., USA*)

This book presents the subject of integral equations in an accessible manner for a variety of applications. Emphasis is placed on understanding the subject while avoiding the abstract and compact theorems. A distinctive feature of the book is that it introduces the recent powerful and reliable developments in this field, which are not covered in traditional texts. The newly developed decomposition method, the series solution method and the direct computation method are thoroughly implemented, which allows the topic to be far more accessible. The book also includes some of the traditional techniques for comparison.

Readership: Applied mathematicians and graduate students in mathematics.

220pp Dec 1997
978-981-02-3101-9 US\$36 £26

ENGINEERING MATHEMATICS

World Scientific Series on Nonlinear Science, Series A – Vol. 68

A NONLINEAR DYNAMICS PERSPECTIVE OF WOLFRAM'S NEW KIND OF SCIENCE

(Volume III)

Leon O Chua (*University of California at Berkeley, USA*)

Volume III continues the author's quest for developing a pedagogical, self-contained, yet rigorous analytical theory of 1-D cellular automata via a nonlinear dynamics perspective. Using carefully conceived and illuminating color graphics, the global dynamical behaviors of the 50 (out of 256) local rules that have not yet been covered in Volumes I and II are exposed via their stunningly revealing basin tree diagrams. The Bernoulli σ -shift dynamics discovered in Volume II is generalized to hold for all 50 (or 18 globally equivalent) local rules via complex and hyper Bernoulli wave dynamics. Explicit global state transition formulas derived for rules 60, 90, 105, and 150 reveal a new scale-free phenomenon. The most surprising new result unveiled in this volume is the "Isle of Eden" found hidden in most (almost 90%) of the 256 local rules. Readers are challenged to hunt for long-period, isolated Isles of Eden. These are rare gems waiting to be discovered.

360pp Aug 2009
978-981-283-793-6 US\$115 £86

:: Textbook

Series on Advances in Statistical Mechanics – Vol. 17

CHAOS

From Simple Models to Complex Systems

by **Massimo Cencini**, **Fabio Cecconi** (*INFN-CNR, Italy*) & **Angelo Vulpiani** (*University of Rome "Sapienza", Italy*)

Key Features

- Provides a unified presentation of fundamental and advanced research topics in nonlinear physics
- Accessible to graduate students and of interest to researchers in physics, engineering, biology and mathematics
- Emphasizes the importance of probabilistic and scale-dependent descriptions of chaotic phenomena

Readership: Students and researchers in science (physics, chemistry, mathematics, biology) and engineering.

480pp Sep 2009
978-981-4277-65-5 US\$88 £66

TITLES OF YOUR INTEREST

ANALYSIS AND CONTROL OF NONLINEAR SYSTEMS WITH STATIONARY SETS: TIME-DOMAIN AND FREQUENCY-DOMAIN METHODS

by **Jinzhong Wang, Zhisheng Duan, Ying Yang & Lin Huang** (*Peking University, China*) - 9789812814692

DIFFERENTIAL GEOMETRY APPLIED TO DYNAMICAL SYSTEMS (WITH CD-ROM)

by **Jean-Marc Ginoux** (*Université du Sud, France*) - 9789814277143

MIND FORCE: ON HUMAN ATTRACTIONS

by **Franco Orsucci** (*University College London, UK & University of Siena & Institute for Complexity Studies, Italy*) - 9789812771216

DUAL SETS OF ENVELOPES AND CHARACTERISTIC REGIONS OF QUASI-POLYNOMIALS

by **Sui Sun Cheng** (*National Tsing Hua University, R O China*) et al. - 9789814277273

DETERMINING THRESHOLDS OF COMPLETE SYNCHRONIZATION, AND APPLICATION

by **Andrzej Stefański** (*Technical University of Łódź, Poland*) - 9789812837660

FOUNDATIONS IN APPLIED NUCLEAR ENGINEERING ANALYSIS

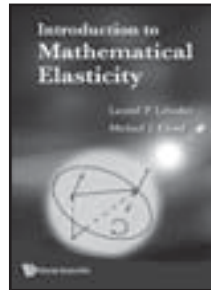
by **Glenn E Sjoeden** (*University of Florida, USA*) - 9789812837752 (hbk) / 9789812837769 (pbk)

**ENGINEERING
MATHEMATICS**

**INTRODUCTION TO
MATHEMATICAL ELASTICITY**

by **Leonid P Lebedev** (*National University of Colombia*) & **Michael J Cloud** (*Lawrence Technological University, USA*)

This book provides the general reader with an introduction to mathematical elasticity, by means of general concepts in classic mechanics, and models for elastic springs, strings, rods, beams and membranes. Introduction to Mathematical Elasticity will also be of essential reference to engineers specializing in elasticity, and to mathematicians working on abstract formulations of the related boundary value problems.



316pp **Sept 2009**
978-981-4273-72-5 **US\$85** **£64**

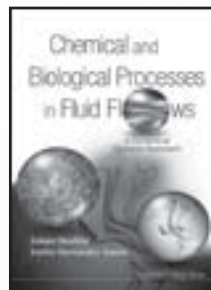
**CHEMICAL AND BIOLOGICAL
PROCESSES IN FLUID FLOWS**

A Dynamical Systems Approach

by **Zoltán Neufeld** (*University College Dublin, Ireland*) & **Emilio Hernández-García** (*Spanish Higher Research Council CSIC & University of the Balearic Islands, Spain*)

Key Features

- Covers the latest developments in the field of chemical and biological activity in fluid flows with emphasis on the dynamical systems representation
- Concisely introduces the basic concepts of fluid dynamics, turbulence and nonlinear dynamics
- Gives a cross-disciplinary view of the subject with applications in various fields including geophysical flows, marine ecology, nonlinear chemistry and combustion



300pp (approx.) **Sep 2009**
978-1-86094-699-8 **US\$77** **£58**

:: Forthcoming Textbook

**LINEAR MATHEMATICAL MODELS
IN CHEMICAL ENGINEERING**

by **Martin A Hjortso** & **Peter Wolenski** (*Louisiana State University, USA*)

Key Features

- Bridges the gap between the mathematical needs of undergraduate and graduate chemical engineering students
- Targeted exclusively to chemical engineering students, and therefore differs from most engineering math books that attempt to embrace all engineering disciplines
- Serves as a convenient reference to fundamental mathematical concepts

600pp (approx.) **Dec 2009**
978-981-279-415-4 **US\$98** **£55**

:: Forthcoming

**OPTIMIZATION AND ANTI-OPTIMIZATION OF
STRUCTURES UNDER UNCERTAINTY**

by **Isaac Elishakoff** (*Florida Atlantic University, USA*) & **Makoto Ohsaki** (*Kyoto University, Japan*)

Key Features

- This is the first book on optimization and anti-optimization
- Tackles two of the most important facets of engineering — safety and optimality — in a unified manner; the book may prove to be a turning point in both optimization and uncertainty studies by the suggested hybrid treatment
- Basic concepts are first demonstrated through illustrative examples
- Applications are presented for broad areas of engineering

400pp (approx.) **Dec 2009**
978-1-84816-477-2 **US\$99** **£74**

:: Forthcoming Textbook

Series in Algebra – Vol. 10

**MATRIX PARTIAL ORDERS, SHORTED OPERATORS
AND APPLICATIONS**

by **Sujit Kumar Mitra*** (*Indian Statistical Institute, India*), **P Bhimasankaram** (*University of Hyderabad, India*) & **Saroj B Malik** (*Hindu College, University of Delhi, India*)

Key Features

- The approach to matrix partial orders through matrix decompositions gives nice motivation and leads to an intuitive understanding of the concepts and results
- The monograph contains several new results as well as new and intuitive proofs of a number of existing results. The entire chapter on the partial orders of modified matrices is new
- This should prove to be of great use to graduate students, with a wealth of exercises and complements at the end of each chapter
- The first author * (deceased) was one of the principal contributors in this field

450pp (approx.) **Feb 2010**
978-981-283-844-5 **US\$88** **£66**

:: Bestselling Textbook

Series on Stability, Vibration and Control of Systems, Series A – Vol. 18

**MULTIPHYSICS MODELING WITH FINITE ELEMENT
METHODS**

by **William B J Zimmerman** (*University of Sheffield, UK*)

Key Features

- The only textbook for modeling with finite elements that is fully compatible with Comsol Multiphysics
- A unique exposition of chemical engineering modeling for network analysis and heterogeneous systems
- Suitable for both novice and advanced modelers

432pp **Oct 2006**
978-981-256-843-4 **US\$84** **£52**

:: Textbook

Series on Advances in Mathematics for Applied Sciences – Vol. 80

INELASTICITY OF MATERIALS

An Engineering Approach and a Practical Guide

by **Arun R Srinivasa** (*Texas A&M University, USA*) & **Sivakumar M Srinivasan** (*Indian Institute of Technology, Madras, India*)

Key Features

- Follows a new, task- or scenario-based approach to teaching and learning inelasticity
- Develops inelasticity from a completely thermodynamical point of view from an early stage
- Makes extensive use of MATLAB to implement many inelasticity models, also for finite deformations and provides step-by-step procedures for formulations and calculations

72pp **Jul 2009**
978-981-283-749-3 **US\$85** **£64**

FLUID MECHANICS

:: Textbook

THE MICROFLOW CYTOMETER

edited by **Jason S Kim & Frances S Ligler** (*Naval Research Laboratory, USA*)

This book will describe the continuing development of inexpensive, portable flow cytometers through incorporation of microfluidic technologies and small optical components. The underlying microfluidic theories essential for microflow cytometry will be discussed in detail, as well as advances that are representative of the current state-of-the-art. Design and fabrication strategies for these innovative component technologies will be subsequently presented by numerous research groups leading the field. Integration of the components into functional prototype devices for analysis and manipulation of particles and cells will be reviewed. Multiple currently available commercial systems will be examined to highlight both strengths and areas for improvement.

400pp (approx.) Oct 2009
978-981-4267-41-0 US\$169 £127

Series on Advances in Mathematics for Applied Sciences – Vol. 81

STABILITY CRITERIA FOR FLUID FLOWS

by **Adelina Georgescu** (*Academy of Romanian Scientists, Romania*) & **Lidia Palese** (*University of Bari, Italy*)

This is a comprehensive and self-contained introduction to the mathematical problems of thermal convection. The book delineates the main ideas leading to the authors' variant of the energy method. These can be also applied to other variants of the energy method. The importance of the book lies in its focussing on the best concrete results known in the domain of fluid flows stability and in the systematic treatment of mathematical instruments used in order to reach them.

Readership: Researchers in applied mathematics and condensed matter physics (thermodynamics).

420pp (approx.) Nov 2009
978-981-4289-56-6 US\$120 £90

:: Forthcoming

MONTE CARLO METHODS IN MECHANICS OF FLUID AND GAS

by **Oleg M Belotserkovskii** (*Russian Academy of Sciences, Russia*) & **Yury Iv Khlopkov** (*Russian Academy of Natural Sciences, Russia*)

This book is devoted to analysis of Monte Carlo methods developed in rarefied gas dynamics. Presented is the short history of the development of such methods, described are their main properties, their advantages and deficiencies. It is shown that the contemporary stage in the progress of computational methods cannot be regarded without a complex approach to the preparation of algorithms taking into account all the peculiarities of the problem under consideration, that is, of the physical nature of a process, the mathematical model and the theoretical aspects of computational mathematics and stochastic processes.

350pp (approx.) Feb 2010
978-981-4282-35-2 US\$95 £71

TITLES OF YOUR INTEREST

CONSTRUCTIVE MODELING OF STRUCTURAL TURBULENCE AND HYDRODYNAMIC INSTABILITIES

by **O M Belotserkovskii** (*Russian Academy of Sciences, Russia*)
- 9789812833013

VORTEX DYNAMICS, STATISTICAL MECHANICS, AND PLANETARY ATMOSPHERES

by **Chjan C Lim, Xueru Ding & Joseph Nebus** (*Rensselaer Polytechnic Institute, USA*)
- 9789812839121 (hbk) / 9789812839138 (pbk)

MULTI-SCALE PHENOMENA IN COMPLEX FLUIDS: MODELING, ANALYSIS AND NUMERICAL SIMULATIONS

edited by **Thomas Y Hou** (*California Institute of Technology, USA*) et al.
- 9789814273251

GENERAL

:: Bestselling Textbook

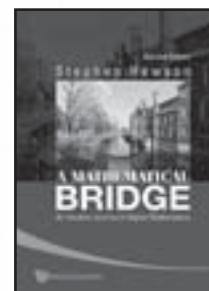
A MATHEMATICAL BRIDGE

An Intuitive Journey in Higher Mathematics
(Second Edition)

by **Stephen Hewson**

Key Features

- Inclusion of a new introductory chapter covering material on the foundations of mathematics, mathematical thought processes, thinking styles and problem solving skills
- Extension of the chapter on Probability to include material on financial mathematics and the Black-Scholes equation
- Incorporation of new material on the history of mathematics and the achievements of the greatest mathematicians



672pp Jan 2009
978-981-283-407-2 US\$104 £61
978-981-283-408-9(pbk) US\$61 £36

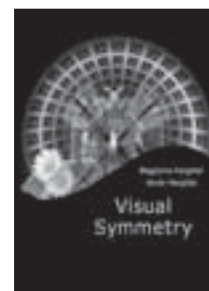
VISUAL SYMMETRY

by **Magdolna Hargittai & István Hargittai** (*Budapest University of Technology and Economics, Hungary*)

"It is a wonderful book..."

Martínus Veltman
Nobel laureate in Physics

This book provides aesthetic pleasure and covert education, immersing the reader in both the familiar and the unknown and leading always to unexpected discoveries.



Contents: Introduction; Mirror Symmetry; Chirality; Multiple Mirrors; Rotational Symmetry; Shape and Movement; Polyhedra; Repetitions; Helical Symmetry; Planar Patterns; Crystals; Antisymmetry; Epilogue; Acknowledgments.

224pp Apr 2009
978-981-283-531-4 US\$48 £36

INPUT-OUTPUT ECONOMICS: THEORY AND APPLICATIONS

Featuring Asian Economies

by **Thijs ten Raa** (*Tilburg University, The Netherlands*)

Thijs ten Raa, author of the acclaimed text *The Economics of Input-Output Analysis*, now takes the reader to the forefront of the field. This volume collects and unifies his and his co-authors' research papers on national accounting, input-output coefficients, economic theory, dynamic models, stochastic analysis, and performance analysis. The research is driven by the task to analyze national economies. The final part of the book scrutinizes the emerging Asian economies in the light of international competition.

550pp (approx.) Oct 2009
978-981-283-366-2 US\$120 £90

MATHEMATICAL MODELING

:: Textbook

APPLICATIONS OF AUTOMATA THEORY AND ALGEBRA

Via the Mathematical Theory of Complexity to Biology, Physics, Psychology, Philosophy, and Games

by **John Rhodes** (*University of California at Berkeley, USA*)

edited by **Christopher L. Nehaniv** (*University of Hertfordshire, UK*)

foreword by **Morris W. Hirsch** (*University of California at Berkeley, USA*)

Key Features

- Available for the first time in published book format, replete with an in-depth exposition of emerging research in algebraic engineering
- Applies Krohn–Rhodes complexity to yield profound insights and provide generalized coordinates for understanding systems in diverse application areas
- Makes available to the general public for the first time a work highly requested in manuscript form and read by many leading researchers in mathematics, complex systems, business models artificial intelligence, and systems biology
- Provides the foundation for applications into other areas beyond mathematics
- Substantial portions will be accessible to non-mathematicians, including students and experts with diverse backgrounds. Also includes many detailed figures for easy comprehension.

292pp	Sept 2009	
978-981-283-696-0	US\$58	£44
978-981-283-697-7(pbk)	US\$35	£26

World Scientific Series on Nonlinear Science, Series A – Vol. 69

MODELING BY NONLINEAR DIFFERENTIAL EQUATIONS

Dissipative and Conservative Processes

by **Paul E. Phillipson** (*University of Colorado, USA*) & **Peter Schuster** (*Universität Wien, Austria*)

This book aims to provide mathematical analyses of nonlinear differential equations, which have proved pivotal to understanding many phenomena in physics, chemistry and biology. Topics of focus are autocatalysis and dynamics of molecular evolution, relaxation oscillations, deterministic chaos, reaction diffusion driven chemical pattern formation, solitons and neuron dynamics.

250pp (approx.)	Sep 2009	
978-981-4271-59-2	US\$78	£59

:: Textbook

Mathematical Olympiad Series – Vol. 2

PROBLEMS OF NUMBER THEORY IN MATHEMATICAL COMPETITIONS

by **Yu Hong-Bing** (*Suzhou University, China*)

translated by **Lin Lei** (*East China Normal University, China*)

Number theory is an important research field of mathematics. In mathematical competitions, problems of elementary number theory occur frequently. These problems use little knowledge and have many variations. They are flexible and diverse. In this book, the author introduces some basic concepts and methods in elementary number theory via problems in mathematical competitions. Readers are encouraged to try to solve the problems by themselves before they read the given solutions of examples. Only in this way can they truly appreciate the tricks of problem-solving.

Readership: High-school mathematics students and teachers; coaches of mathematical olympiads, undergraduates and graduates in mathematics, non-experts interested in mathematical competitions.

100pp (approx.)	Sep 2009	
978-981-4271-14-1(pbk)	US\$25	£19

STOCHASTIC RELIABILITY MODELING, OPTIMIZATION AND APPLICATIONS

by **Syouji Nakamura** (*Kinjo Gakuin University, Japan*) &

Toshio Nakagawa (*Aichi Institute of Technology, Japan*)

This book aims to survey new research topics in reliability theory and useful applied techniques in reliability engineering. This book focuses mainly on how to apply the results of reliability theory to practical models. Theoretical results of coherent, inspection, and damage systems are summarized methodically, using the techniques of stochastic processes. Furthermore, some useful techniques applied to the analysis of stochastic models in management science and plants are shown. The reader will learn new topics and techniques, and how to apply reliability models to actual ones. The book will serve as an essential guide to a subject of study for graduate students and researchers and as a useful guide for reliability engineers engaged not only in maintenance work but also in management and computer works.

300pp (approx.)	Oct 2009	
978-981-4277-43-3	US\$98	£74

:: Textbook

World Scientific Series in Information Studies – Vol. 1

THEORY OF INFORMATION

Fundamentality, Diversity and Unification

by **Mark Burgin** (*University of California, Los Angeles, USA*)

Key Features

- Provides a comprehensive and unified presentation of the general theory of information
- Suitable for students and professionals who wish to delve further into the subject and explore the research literature, and also for non-experts in information theory who wish to understand what information is and how it is modeled in science

Readership: Professionals in information processing, and general readers interested in information and information processes.

670pp (approx.)	Oct 2009	
978-981-283-548-2	US\$118	£89

:: Forthcoming

Interdisciplinary Mathematical Sciences

PERSPECTIVES IN MATHEMATICAL SCIENCES

edited by **Yisong Yang** (*Polytechnic Institute of New York University, USA*), **Xinchu Fu** (*Shanghai University, China*) & **Jinqiao Duan** (*Illinois Institute of Technology, USA*)

This is a review volume on some timely and interesting topics in applied mathematical sciences. It reviews new developments and presents some future research directions in these topics. The chapters are written by reknowned experts in these fields. The volume is written with a wide audience in mind and hence will be accessible to graduate students, junior researchers and other professionals who are interested in the subject. The contributions of Professor Youzhong Guo, a leading expert in these areas, will be celebrated. An entire chapter will be devoted to his achievements. The underlying theme that binds the various chapters seamlessly is a set of dedicated ideas and techniques from partial differential equations and dynamical systems.

400pp (approx.)	Jan 2010	
978-981-4289-30-6	US\$98	£74

MATHEMATICAL MODELING

:: Forthcoming

Catalytic Science Series – Vol. 7

COMBINATORIAL DEVELOPMENT OF SOLID CATALYTIC MATERIALS

Design of High-Throughput Experiments, Data Analysis, Data Mining
by **Manfred Baerns** (*Fritz-Haber Institute of Max-Planck Society, Berlin, Germany*) & **Martin Holena** (*Academy of Sciences, Czech Republic*)

The book provides a comprehensive treatment of combinatorial development of heterogeneous catalysts. In particular, two computer-aided approaches that have played a key role in combinatorial catalysis and high-throughput experimentation during the last decade — evolutionary optimization and artificial neural networks — are described. The book is unique in that it describes evolutionary optimization in a broader context of methods of searching for optimal catalytic materials, including statistical design of experiments, as well as presents neural networks in a broader context of data analysis. It is the first book that demystifies the attractiveness of artificial neural networks, explaining its rational fundamental — their universal approximation capability.

180pp (approx.) Dec 2009
978-1-84816-343-0 US\$68 £51

:: Forthcoming Textbook

FRACTIONAL CALCULUS AND WAVES IN LINEAR VISCOELASTICITY

An Introduction to Mathematical Models
by **Francesco Mainardi** (*University of Bologna, Italy*)

This monograph provides a comprehensive overview of the author's work on the fields of fractional calculus and waves in linear viscoelastic media, which includes his pioneering contributions on the applications of special functions of the Mittag-Leffler and Wright types. It is intended to serve as a general introduction to the above-mentioned areas of mathematical modeling.

300pp (approx.) Feb 2010
978-1-84816-329-4 US\$70 £53

:: Forthcoming Textbook

Mathematical Olympiad Series – Vol. 3

GRAPH THEORY

by **Xiong Bin** (*East China Normal University, China*) & **Zheng Zhongyi** (*High School Attached to Fudan University, China*)

In 1736, the mathematician Euler invented graph theory while solving the Königsberg seven-bridge problem. Over 200 years later, graph theory remains the skeleton content of discrete mathematics, which serves as a theoretical basis for computer science and network information science. This book introduces some basic knowledge and the primary methods in graph theory by many interesting problems and games.

100pp (approx.) Jan 2010
978-981-4271-12-7 (pbk) US\$25 £19

Series on Advances in Mathematics for Applied Sciences – Vol. 78

ADVANCED MATHEMATICAL AND COMPUTATIONAL TOOLS IN METROLOGY AND TESTING

AMCTM VIII
edited by **F Pavese** (*INRIM, Italy*), **M Bär** (*Physikalisch-Technische Bundesanstalt, Germany*), **A B Forbes** (*National Physical Laboratory, UK*), **J M Linares** (*Université de la Méditerranée, France*), **C Perruchet** (*UTAC, France*) & **N F Zhang** (*NIST, USA*)

This review volume consists of reviewed papers prepared on the basis of the oral and poster presentations of the Conference participants from AMCTM 2008. It covers all the general matters of advanced statistical modeling, metrology software, numerical methods and data fusion techniques and design and analysis of inter-laboratory comparisons.

424pp Apr 2009
978-981-283-951-0 US\$146 £120

8 www.worldscientific.com

:: Bestselling Textbook

Advanced Series on Statistical Science and Applied Probability – Vol. 12

AN ELEMENTARY INTRODUCTION TO STOCHASTIC INTEREST RATE MODELING

by **Nicolas Privault** (*City University of Hong Kong, Hong Kong*)

Key Features

- Provides a fairly complete introduction accessible to advanced undergraduates
- Also covers recent aspects of interest rate modeling
- Includes many graphs illustrating the multidimensional aspects of interest rate models
- Contains accompanying exercises and their complete solutions in each chapter

192pp Oct 2008
978-981-283-273-3 US\$51 £30

MATHEMATICAL PHYSICS

:: Textbook

BLACK HOLES

An Introduction

(Second Edition)

by **Derek Raine** & **Edwin Thomas** (*University of Leicester, UK*)

The book provides an accessible introduction to the exact solutions of Einstein's vacuum field equations describing spherical and axisymmetric (rotating) black holes. In this new edition the problems in each chapter have been revised and solutions are provided. The text has been expanded to include new material on wormholes and clarify various other issues.

212pp Sept 2009
978-1-84816-382-9 US\$51 £38
978-1-84816-383-6 (pbk) US\$28 £21

METHODS OF WAVE THEORY IN DISPERSIVE MEDIA

by **MV Kuzelev** (*Moscow State University, Russia*) & **AA Rukhadze** (*Russian Academy of Sciences, Russia*)

Key Features

- Presents mathematical methods for considering linear waves in dispersive media
- Describes waves in equilibrium (stable) as well as nonequilibrium (unstable) systems and media, both without (eigenmodes) and with a source (radiation therapy)
- Describes waves in all important physical systems which are traditional subjects of mechanics of continuous media, plasma physics, electronics, and physical kinetics
- Discusses the transition from spontaneous to induced radiation with an increase in the number of emitters, using Cherenkov radiation as an example

300pp (approx.) Oct 2009
978-981-4261-69-2 US\$95 £71

MATHEMATICAL PHYSICS

FUNDAMENTAL INTERACTIONS

A Memorial Volume for Wolfgang Kummer edited by **Daniel Grumiller, Anton Rebhan** (Vienna University of Technology, Austria) & **Dimitri Vassilevich** (Universidade Federal do ABC, Brazil & St Petersburg State University, Russia)

This memorial volume on the work of Wolfgang Kummer brings together articles devoted to the history of high energy physics with detailed coverage on the scientific concepts and scientific institutions, in particular CERN — and the underlying physics involved. Covering recent advances and developments as well as giving a reminiscent overview in two rapidly evolving fields of high energy/particle physics, and gravitational physics, the commemorative volume contains more than 20 original invited paper contributions — which will appear for the first time in print — from eminent and renowned physicists who interacted and collaborated with Wolfgang Kummer, including Physics Nobel Laureate Jack Steinberger.

400pp (approx.) **Oct 2009**
978-981-4273-07-7 **US\$98** **£74**

STEPS TOWARDS A UNIFIED BASIS FOR SCIENTIFIC MODELS AND METHODS

by **Inge S Helland** (University of Oslo, Norway)

Culture, in fact, also plays an important role in science which is, per se, a multitude of different cultures. The book attempts to build a bridge across three cultures: mathematical statistics, quantum theory and chemometrical methods.

Contents: The Basic Elements; Statistical Theory and Practice; Statistical Inference Under Symmetry; The Transition from Statistics to Quantum Theory; Quantum Mechanics from a Statistical Basis; Further Development of Quantum Mechanics; Decisions in Statistics; Multivariate Data Analysis and Statistics; Quantum Mechanics and the Diversity of Concepts.

Readership: Graduate students and researchers in the field of statistics and mathematical physics.

280pp (approx.) **Oct 2009**
978-981-4280-85-3 **US\$75** **£56**



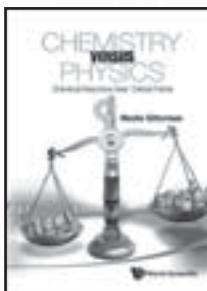
:: Textbook

CHEMISTRY VERSUS PHYSICS

Chemical Reactions Near Critical Points by **Moshe Gitterman** (Bar-Ilan University, Israel)

Chemical reactions at high pressures are widely used in modern technology (supercritical extraction is an example). On the other hand, critical phenomena is the more advanced field in statistical mechanics. There are thousands of theoretical and experimental articles published by physicists, chemists, biologists, chemical engineers and material scientists, but, to our knowledge, there are no books which link these two phenomena together. This book sums up the results of 222 published articles, both theoretical and experimental, which will be of great benefit to students and all researchers working in this field.

180pp (approx.) **Oct 2009**
978-981-4291-20-0 **US\$58** **£44**



:: Textbook

INTRODUCTION TO CLASSICAL AND MODERN ANALYSIS AND THEIR APPLICATION TO GROUP REPRESENTATION THEORY

by **Debabrata Basu** (Indian Institute of Technology, India)

This book is suitable for use in any graduate course on analytical methods and their application to representation theory. Each concept is developed with special emphasis on lucidity and clarity. The book also shows the direct link of Cauchy–Pochhammer theory with the Hadamard–Reisz–Schwartz–Gel’fand et al. regularization. The flaw in earlier works on the Plancherel formula for the universal covering group of $SL(2, \mathbb{R})$ is pointed out and rectified. This topic appears here for the first time in the correct form.

Readership: Academics, research scholars and graduate students of mathematical physics, mathematics and theoretical physics.

400pp (approx.) **Nov 2009**
978-981-4273-29-9 **US\$85** **£64**
978-981-4273-30-5 (pbk) **US\$58** **£44**

World Scientific Series in 20th Century Physics – Vol. 40

MURRAY GELL-MANN

Selected Papers edited by **Harald Fritzsche** (University of Munich, Germany)

Murray Gell-Mann is one of the leading physicists in the world. He was awarded the Nobel Prize in Physics in 1969 for his work on the $SU(3)$ symmetry. His list of publications, albeit relatively short, is highly impressive — he has written mainly papers, which have become landmarks in physics. These major publications of Gell-Mann are collected in this volume, thus providing physicists with easy access to the important publications of Gell-Mann. There are no competing titles.

Readership: Researchers in high energy physics and theoretical physics.

300pp (approx.) **Dec 2009**
978-981-283-684-7 **US\$95** **£71**
978-981-4261-62-3 (pbk) **US\$48** **£36**

TITLES OF YOUR INTEREST

THERMAL QUANTUM FIELD THEORY: ALGEBRAIC ASPECTS AND APPLICATIONS by Faqir C Khanna (University of Alberta & TRIUMF, Canada) et al. - 9789812818874
HYBRID GRAND UNIFIED THEORY, THE by V Lakshmikantham (Florida Institute of Technology, USA) et al. - 9789078677215
STATISTICAL DYNAMICS: A STOCHASTIC APPROACH TO NONEQUILIBRIUM THERMODYNAMICS (2ND EDITION) by R F Streater (King's College London, UK) - 9781848162440 (hbk) / 9781848162501 (pbk)
ADVANCED CLASSICAL FIELD THEORY by Giovanni Giachetta, Luigi Mangiarotti (University of Camerino, Italy) et al. - 9789812838957
SELECTED PAPERS OF K C CHOU edited by Yue-Liang Wu (Chinese Academy of Sciences, China) - 9789814280372
PATH INTEGRALS IN QUANTUM MECHANICS, STATISTICS, POLYMER PHYSICS, AND FINANCIAL MARKETS (5TH EDITION) by Hagen Kleinert (Freie Universität Berlin, Germany) - 9789814273558 (hbk) / 9789814273565 (pbk)
MATHEMATICAL FEYNMAN PATH INTEGRALS AND THEIR APPLICATIONS by Sonia Mazzucchi (University of Trento, Italy) - 9789812836908
CLASSICAL AND RELATIVISTIC MECHANICS by David Agmon (Technion Israel Institute of Technology, Israel) et al. - 9789812836694 (hbk) / 9789812836700 (pbk)

MATHEMATICAL PHYSICS

:: Forthcoming Textbook

WAVES AND RAYS IN ELASTIC CONTINUA

(Second Edition)

by **Michael Slawinski** (*Memorial University, Canada*)

This is the second edition of the textbook that was first published by Elsevier Science. Professor Slawinski has the copyright to the textbook and the second edition is significantly extended. The present book emphasizes the interdependence of mathematical formulation and physical meaning in the description of seismic phenomena. Herein, we use aspects of continuum mechanics, wave theory and ray theory to explain phenomena resulting from the propagation of seismic waves.

Readership: Physicists and mathematicians interested in seismology.

460pp (approx.) Dec 2009
978-981-4289-00-9 US\$88 £66

:: Forthcoming Textbook

Advanced Series in Nonlinear Dynamics

GEOMETRICAL THEORY OF DYNAMICAL SYSTEMS AND FLUID FLOWS

Revised Edition

by **Tsutomu Kambe** (*Institute of Dynamical Systems, Japan*)

This is an introductory textbook on the geometrical theory of dynamical systems, fluid flows and certain integrable systems. The topics are interdisciplinary and extend from mathematics, mechanics and physics to mechanical engineering, and the approach is very fundamental. The main theme of this book is a unified formulation to understand dynamical evolutions of physical systems within mathematical ideas of Riemannian geometry and Lie groups by using well-known examples. In the latest edition, a new formulation of fluid flows is also presented in a unified fashion on the basis of the gauge principle of theoretical physics and principle of least action along with new type of Lagrangians. A great deal of effort has been directed toward making the description elementary, clear and concise, to provide beginners easy access to the topics.

500pp (approx.) Dec 2009
978-981-4282-24-6 US\$88 £66

:: Forthcoming

FEYNMAN MOTIVES

Renormalization, Algebraic Varieties, and Galois Symmetries

by **Matilde Marcolli** (*California Institute of Technology, USA*)

This book presents recent and ongoing research work aimed at understanding the mysterious relation between the computations of Feynman integrals in perturbative quantum field theory and the theory of motives of algebraic varieties and their periods.

Key Features

- Presents recent and ongoing research work in Feynman Motives
- Used as lecture notes in a graduate course of Caltech

Readership: Graduate students and researchers in mathematical physics and theoretical physics.

150pp (approx.) Feb 2010
978-981-4271-20-2 US\$42 £32

TITLES OF YOUR INTEREST

RANDOM MATRIX THEORY AND ITS APPLICATIONS: MULTIVARIATE STATISTICS AND WIRELESS COMMUNICATIONS
edited by **Zhidong Bai** (*National University of Singapore, Singapore*) et al.
- 9789814273114

PROBLEMS AND SOLUTIONS IN THEORETICAL AND MATHEMATICAL PHYSICS, VOL I: INTRODUCTORY LEVEL (3RD EDITION)
by **Willi-Hans Steeb** (*University of Johannesburg, South Africa*)
9789814282147 (hbk) / 9789814282154 (pbk)

:: Bestselling Textbook

World Scientific Lecture Notes in Physics – Vol. 61

MODERN DIFFERENTIAL GEOMETRY FOR PHYSICISTS

Second Edition

by **Chris J Isham** (*Imperial College*)

"The mathematical notions are sprinkled with many remarks and hints of physical flavour; therefore, the text may be extremely valuable for those mathematics students interested in applications of differential geometry to other areas."

Mathematics Abstracts

304pp Mar 1999
978-981-02-3555-0 US\$57 £43
978-981-02-3562-8(pbk) US\$30 £22

MATHEMATICS IN COMPUTER SCIENCE

Series on Knots and Everything – Vol. 22

THE MATHEMATICS OF HARMONY

From Euclid to Contemporary Mathematics and Computer Science

by **Alexey Stakhov** (*International Club of the Golden Section, Canada*)

assisted by **Scott Olsen** (*Central Florida Community College, USA*)

Key Features

- Three "key" problems of mathematics on the stage of its origin and a new approach to the history of mathematics
- The "Strategic Mistakes" in the Mathematics Development and the role of the Harmony Mathematics in their overcoming
- Ternary mirror-symmetrical arithmetic as a base for designing ternary fault-tolerant computers for special applications
- A new class of error-correcting codes based on Fibonacci matrices, which exceeds the classical error-correcting codes in 1 000 000 and more times by their correcting ability
- The "golden" cryptography as a base for designing the fast, simple for technical realization and super-reliable cryptosystems for special applications

748pp Sept 2009
978-981-277-582-5 US\$114 £86

:: Textbook

AN INTRODUCTION TO THE ANALYSIS OF ALGORITHMS

by **Michael Soltys** (*McMaster University, Canada*)

This textbook covers the mathematical foundations of the analysis of algorithms. The two key ideas of the proof of correctness, induction and invariance, are employed in the framework of pre/post-conditions and loop invariants. The algorithms considered are the basic and traditional algorithms of computer science, such as Greedy, Dynamic and Divide & Conquer. In addition, two classes of algorithms that rarely make it into introductory textbooks are discussed.

Readership: Undergraduate students in computer science, software engineers and mathematicians.

150pp (approx.) Nov 2009
978-981-4271-40-0 US\$45 £34

**MATHEMATICS IN
COMPUTER SCIENCE**

:: Textbook

Advances in Computer Science and Engineering: Texts – Vol. 4

ANALYSIS AND SYNTHESIS OF COMPUTER SYSTEMS

(2nd Edition)

by **Erol Gelenbe** (*Imperial College, UK*) & **Isi Mitrani** (*University of Newcastle upon Tyne, UK*)

Analysis and Synthesis of Computer Systems presents a broad overview of methods that are used to evaluate the performance of computer systems and networks, manufacturing systems, and interconnected services systems. Aside from a highly readable style that rigorously addresses all subjects, this second edition includes new chapters on numerical methods for queueing models and on G-networks, the latter being a new area of queuing theory that one of the authors has pioneered. This book will have a broad appeal to students, practitioners and researchers in several different areas, including practicing computer engineers as well as computer science and engineering students.

350pp (approx.) **Nov 2009**
978-1-84816-395-9 **US\$88** **£66**

:: Forthcoming

Lecture Notes Series, Institute for Mathematical Sciences, National University of Singapore – Vol. 19

BRAIDS

Introductory Lectures on Braids, Configurations and Their Applications

edited by **A Jon Berrick** (*National University of Singapore, Singapore*), **Frederick R Cohen** (*University of Rochester, USA*), **Elizabeth Hanbury** (*National University of Singapore, Singapore and Durham University, UK*), **Yan-Loi Wong** & **Jie Wu** (*National University of Singapore, Singapore*)

This book is an indispensable guide for anyone seeking to familiarize themselves with research in braid groups, configuration spaces and their applications. Starting at the beginning, and assuming only basic topology and group theory, the volume's noted expositors take the reader through the fundamental theory and on to current research and applications in fields as varied as astrophysics, cryptography and robotics. As leading researchers themselves, the authors write enthusiastically about their topics, and include many striking illustrations.

420pp (approx.) **Dec 2009**
978-981-4291-40-8 **US\$98** **£74**

TITLES OF YOUR INTEREST

APPROXIMATION BY COMPLEX BERNSTEIN AND CONVOLUTION TYPE OPERATORS

by **Sorin G Gal** (*University of Oradea, Romania*)
- 9789814282420

UNIVERSAL ALGEBRA AND COALGEBRA

by **Klaus Denecke** (*Universität Potsdam, Germany*)
- 9789812837455

LABELLED MARKOV PROCESSES

by **Prakash Panangaden** (*McGill University, Canada*)
- 9781848162877

MODELING INDOOR AIR POLLUTION

by **Darrell W Pepper** (*University of Nevada, Las Vegas, USA*) et al.
- 9781848163249

PRACTICAL GUIDE TO COMPUTER SIMULATIONS (WITH CD-ROM)

by **Alexander K Hartmann** (*University of Oldenburg, Germany*)
- 9789812834140 (hbk) / 9789812834157 (pbk)

:: Forthcoming

Series on Knots and Everything – Vol. 23

DIAMOND

A Paradox Logic
(2nd Edition)

by **N S Hellerstein** (*City College of San Francisco, USA*)

Review of the First Edition

"This book should be interesting for everyone, and especially for logicians."

Mathematical Reviews

This book is about "diamond", a logic of paradox. In diamond, a statement can be true yet false; an "imaginary" state, midway between being and non-being. Diamond's imaginary values solve many logical paradoxes unsolvable in two-valued boolean logic. In this volume, paradoxes by Russell, Cantor, Berry and Zeno are all resolved. This book has three sections: Paradox Logic, which covers the classic paradoxes of mathematical logic, shows how they can be resolved in this new system; The Second Paradox, which relates diamond to Boolean logic and the Spencer-Brown "modulator"; and Metamathematical Dilemma, which relates diamond to Gödelian meta-mathematics and dilemma games.

300pp (approx.) **Dec 2009**
978-981-4287-13-5 **US\$85** **£64**

:: Forthcoming Textbook

Progress in Neural Processing – Vol. 19

VISION: IMAGES, SIGNALS AND NEURAL NETWORKS

Models of Neural Processing in Visual Perception

by **Jeanny Hérault** (*University Joseph Fourier & Institut National Polytechnique of Grenoble, France*)

At the fascinating frontiers of neurobiology, mathematics and psychophysics, this book addresses the problem of human and computer vision on the basis of cognitive modeling.

Contents: From Photons to Images; The Visual System of Primate; Basic Model of the Retina; Neuromorphic Circuits and Motion Estimation; Color Processing in the Retina; Non-Linear, Irregular and Non-Stationary Processes; Cortical Processing of Images.

Readership: Students, teachers and researchers in human vision modeling.

320pp (approx.) **Dec 2009**
978-981-4273-68-8 **US\$65** **£49**

Mathematics, Computing, Language, and Life: Frontiers in Mathematical Linguistics and Language Theory – Vol. 1

SCIENTIFIC APPLICATIONS OF LANGUAGE METHODS

edited by **Carlos Martín-Vide** (*European Research Council, Brussels*)

Presenting interdisciplinary research at the forefront of present advances in information technologies and their foundations, *Scientific Applications of Language Methods* is a multi-author volume containing pieces of work (either original research or surveys) exemplifying the application of formal language tools in several fields, including logic and discrete mathematics, natural language processing, artificial intelligence, natural computing and bioinformatics.

400pp (approx.) **Aug 2010**
978-1-84816-544-1 **US\$116** **£87**

NUMERICAL ANALYSIS & COMPUTATIONAL MATHEMATICS

TRULY NONLINEAR OSCILLATIONS

Harmonic Balance, Parameter Expansions, Iteration, and Averaging Methods

by **Ronald E Mickens** (Clark Atlanta University, USA)

Key Features

- This is the first published book on "truly nonlinear (TNL)" oscillators
- The book provides a complete introduction to the major techniques needed for the determination of approximations to the solutions of TNL oscillator equations
- The book is authored by a world leader in the area of nonlinear oscillations

200pp (approx.) Jan 2010
978-981-4291-65-1 US\$79 £59

:: Textbook

NONNEGATIVE MATRICES, POSITIVE OPERATORS, AND APPLICATIONS

by **Jiu Ding** (The University of Southern Mississippi, USA) & **Aihui Zhou** (Chinese Academy of Sciences, China)

Key Features

- Possibly the first-ever textbook that combines two related subjects in the pursuit of closing the gap between theory, computation, and modern applications of BOTH nonnegative matrices and positive operators, and their interrelation in numerical functional analysis
- The combined approach used in the text serves to broaden the reader's appreciation of direct applications of nonnegative matrices to structure-preserving approximations of positive operators in various areas
- An extremely useful reference for further research in pure, applied and computational mathematics, science and engineering

364pp Aug 2009
978-981-283-917-6 US\$70 £53

:: Textbook

Imperial College Press Optimization Series – Vol. 1

MOMENTS, POSITIVE POLYNOMIALS AND THEIR APPLICATIONS

by **Jean Bernard Lasserre** (LAAS-CNRS and Institute of Mathematics, University of Toulouse, France)

Key Features

- The first book ever written that provides timely update on the recent advances in polynomial optimization from the modern perspective of mathematical programming
- Illustrates the use of the *Generalized Moment Problem* (GMP) in various and diverse applications
- The Matlab-based software GloptiPoly to solve the GMP is also described in this book

300pp (approx.) Sep 2009
978-1-84816-445-1 US\$75 £56

THE BIRTH OF NUMERICAL ANALYSIS

edited by **Adhemar Bultheel** & **Ronald Cools** (Katholieke Universiteit Leuven, Belgium)

The 1947 paper by John von Neumann and Herman Goldstine, "Numerical Inverting of Matrices of High Order" (Bulletin of the AMS, Nov. 1947), is considered as the birth certificate of numerical analysis. Since its publication, the evolution of this domain has been enormous. This book is a unique collection of contributions by researchers who have lived through this evolution, testifying about their personal experiences and sketching the evolution of their respective subdomains since the early years.

250pp (approx.) Sep 2009
978-981-283-625-0 US\$80 £60

:: Bestselling Textbook

INTRODUCTION TO COMPUTATIONAL MATHEMATICS

by **Xin-She Yang** (University of Cambridge, UK)

"This book is excellent and can be recommended for undergraduates and graduates to acquire rapidly the basic knowledge in computational mathematics."

Zentralblatt MATH

Key Features

- Written in a self-contained manner
- Includes numerous step-by-step worked examples to show how each algorithm works

260pp Jun 2008
978-981-281-817-1 US\$73 £41

Series on Advances in Mathematics for Applied Sciences – Vol. 79

FROM GENETICS TO MATHEMATICS

edited by **Miroslaw Lachowicz** & **Jacek Miękisz** (University of Warsaw, Poland)

Key Features

- Gives combined perspectives of biologists, physicists and mathematicians
- Analyzes models of biological processes on different time scales: molecular, ecological, and evolutionary
- Gives a comparison of computational and mathematical modeling

244pp Apr 2009
978-981-283-724-0 US\$80 £64

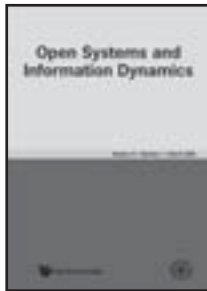
Proceedings

TITLE	AUTHORS	PUB DATE	ISBN 13	US\$	£
APPLIED AND INDUSTRIAL MATHEMATICS IN ITALY III - PROCEEDINGS OF THE 9TH CONFERENCE SIMAI	DE BERNARDIS ENRICO ET AL	29-Oct-09	9789814280297	158	119
ARTIFICIAL LIFE AND EVOLUTIONARY COMPUTATION - PROCEEDINGS OF WIVACE 2008	SERRA ROBERTO ET AL	29-Oct-09	9789814287449	122	92
ALGEBRAIC APPROACH TO DIFFERENTIAL EQUATIONS	LE DUNG TRANG	15-Dec-09	9789814273237	60	45
DISCRETE DYNAMICS AND DIFFERENCE EQUATIONS - PROCEEDINGS OF THE TWELFTH INTERNATIONAL CONFERENCE ON DIFFERENCE EQUATIONS AND APPLICATIONS	ELAYDI SABER N ET AL	31-Jan-10	9789814287647	118	89

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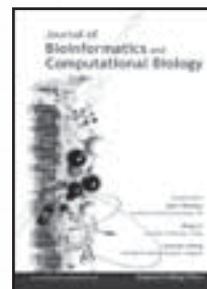
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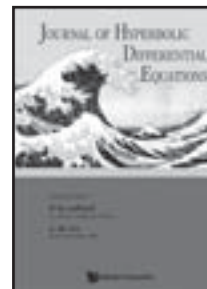
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New Hot Paper featured in September 2009 of ScienceWatch

Volume: 18, Issue: 4
 Page: 593-646, Year: April 2008

On The Foundations Of Cancer Modelling: Selected Topics, Speculations, And Perspectives
 by **N. Bellomo** (Politecnico Torino, Italy), **N. K. Li** & **P. K. Maini** (Mathematical Institute, UK)

Abstract: This paper presents a critical review of selected topics related to the modelling of cancer onset, evolution and growth, with the aim of illustrating, to a wide applied mathematical readership, some of the novel mathematical problems in the field. This review attempts to capture, from the appropriate literature, the main issues involved in the modelling of phenomena related to cancer dynamics at all scales which characterise this highly complex system: from the molecular scale up to that of tissue. The last part of the paper discusses the challenge of developing a mathematical biological theory of tumour onset and evolution.

<http://sciencewatch.com/dr/nhp/2009/09sepnhp/09sepnhpBellE/>

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Volume 1, Issue 1 (May 2009)

- Slope Filtrations
Yves André (*École Normale Supérieure, France*)
- Detecting Integral Polyhedral Functions
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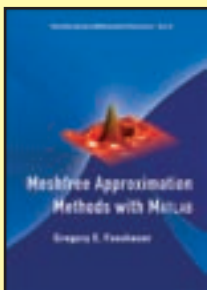
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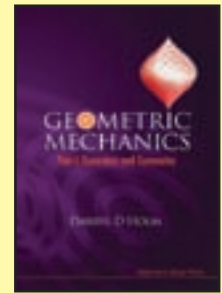
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