S. Albeverio, University of Bonn, Germany;
H. Föllmer, Humboldt University, Berlin, Germany;
L. Gross, Cornell University, Ithaca, NY, USA

Mathematical Physics at Saint-Flour

Gross, Leonard: Thermodynamics, statistical mechanics, and random fields.-Föllmer, Hans: Random fields and diffusion processes.- Nelson, Edward: Stochastic mechanics and random fields.- Albeverio, Sergio: Theory of Dirichlet forms and applications.

Contents
Gross, Leonard: Thermodynamics, statistical mechanics, and random fields.-Föllmer, Hans: Random fields and diffusion processes.- Nelson, Edward: Stochastic mechanics and random fields.- Albeverio, Sergio: Theory of Dirichlet forms and applications.

Fields of interest
Probability Theory and Stochastic Processes

Target groups
Research

Product category
Contributed volume

Due January 2012

Reprint of lectures originally published in the Lecture Notes in Mathematics volumes 929 (1982), 1362 (1988) and 1816 (2003).

2012. Approx. 340 p. (Probability at Saint-Flour) Softcover
► **approx. $49.95**
ISBN 978-3-642-25955-5

K. Atkinson, W. Han, University of Iowa, Iowa City, IA, USA

Spherical Harmonics and Approximations on the Unit Sphere: An Introduction

These notes provide an introduction to the theory of spherical harmonics in an arbitrary dimension as well as an overview of classical and recent results on some aspects of the approximation of functions by spherical polynomials and numerical integration over the unit sphere. The notes are intended for graduate students in the mathematical sciences and researchers who are interested in solving problems involving partial differential and integral equations on the unit sphere, especially on the unit sphere in three-dimensional Euclidean space. Some related work for approximation on the unit disk in the plane is also briefly discussed, with results being generalizable to the unit ball in more dimensions.

Features
► An easily accessible introduction to the theory of spherical harmonics in an arbitrary dimension ► A summarizing account of classical and recent results on some aspects of function approximations by spherical polynomials and numerical integration over the unit sphere ► Useful for graduate students and researchers interested in solving problems over the sphere ► Good for a graduate level topic course on spherical harmonics and approximations over the sphere

Contents
1 Preliminaries.- 2 Spherical Harmonics.- 3 Differentiation and Integration over the Sphere.- 4 Approximation Theory.- 5 Numerical Quadrature.- 6 Applications: Spectral Methods.

Fields of interests
Numerical Analysis; Special Functions; Approximations and Expansions

Target groups
Research

Product category
Monograph

Due March 2012

2012. X, 236 p. 19 illus., 11 in color. (Lecture Notes in Mathematics, Volume 2044) Softcover
► **$59.95**
ISBN 978-3-642-25982-1

D. Bakry, Université Paul Sabatier, Toulouse, France; **M. Ledoux,** Université de Paul Sabatier, Toulouse, France; **L. Saloff-Coste,** Cornell University, Ithaca, NY, USA

Markov Semigroups at Saint-Flour

Bakry, Dominique: Hypercontractivity and its Usage in Semigroup Theory.- Ledoux, Michel: Isoperimetry and Gaussian Analysis.- Saloff-Coste, Laurent: Lectures on Finite Markov Chains.

Contents
Bakry, Dominique: Hypercontractivity and its Usage in Semigroup Theory.- Ledoux, Michel: Isoperimetry and Gaussian Analysis.- Saloff-Coste, Laurent: Lectures on Finite Markov Chains.

Fields of interest
Probability Theory and Stochastic Processes

Target groups
Research

Product category
Contributed volume

Due February 2012

Reprint of lectures originally published in the Lecture Notes in Mathematics volumes 1581 (1994), 1648 (1996) and 1665 (1997).

2012. VI, 359 p. (Probability at Saint-Flour) Softcover
► **$49.95**
ISBN 978-3-642-25937-1

L. Beilina, University of Technology, Gothenburg, Sweden; **M. V. Klibanov,** University of North Carolina, Charlotte, NC, USA

Approximate Global Convergence and Adaptivity for Coefficient Inverse Problems

Approximate Global Convergence and Adaptivity for Coefficient Inverse Problems is the first book in which two new concepts of numerical solutions of multidimensional Coefficient Inverse Problems (CIPs) for a hyperbolic Partial Differential Equation (PDE) are presented: Approximate Global Convergence and the Adaptive Finite Element Method (adaptivity for brevity).

Features
► Introduces pioneering results of the authors' own experiments on coefficient inverse problems ► Provides recipes for numerical implementations of developed algorithms ► Demonstrates performance of algorithms in both synthetic and experimental data

Contents
Two Central Questions of This Book and an Introduction to the Theories of Ill-Posed and Coefficient Inverse Problems.- Approximately Globally Convergent Numerical Method.- Numerical Implementation of the Approximately Globally Convergent Method.- The Adaptive Finite Element Technique and its Synthesis with the Approximately Globally Convergent Numerical Method.- Blind Experimental Data.- Backscattering Data.

Fields of interests
Partial Differential Equations; Numerical and Computational Physics; Appl.Mathematics/Computational Methods of Engineering

Target groups
Research

Product category
Monograph

Due March 2012

2012. XIV, 388 p. 78 illus., 75 in color. Hardcover
► **$169.00**
ISBN 978-1-4419-7804-2

J. Bertoin, University of Zürich, Switzerland; **J. Bretagnolle,** Université de Paris Sud, Orsay, France; **R. A. Doney,** University of Manchester, UK; **I. A. Ibragimov,** Russian Academy of Sciences, St. Petersburg, Russia; **J. Jacod,** Université Paris VI, France

Lévy Processes at Saint-Flour

Bretagnolle, Jean: Processus a accroissements indépendants.- Ibragimov, Ildar: Théorèmes limites pour les marches aléatoires.- Jacod, Jean: Théorèmes limite pour les processus.- Bertoin, Jean: Subordinators: Examples and applications.- Doney, Ronald A.: Fluctuation theory for Lévy processes.

Contents
Bretagnolle, Jean: Processus a accroissements indépendants.- Ibragimov, Ildar: Théorèmes limites pour les marches aléatoires.- Jacod, Jean: Théorèmes limite pour les processus.- Bertoin, Jean: Subordinators: Examples and applications.- Doney, Ronald A.: Fluctuation theory for Lévy processes.

Fields of interest
Probability Theory and Stochastic Processes

Target groups
Research

Product category
Contributed volume

Due January 2012

Reprint of lectures originally published in the Lecture Notes in Mathematics volumes 307 (1973), 1117 (1985), 1717 (1999) and 1897 (2007).

2012. VI, 479 p. (Probability at Saint-Flour) Softcover
► **approx. $49.95**
ISBN 978-3-642-25940-1

D. A. Dawson, Carleton University, Ottawa ON, Canada; **E. Perkins,** The University of British Columbia, Vancouver BC, Canada

Superprocesses at Saint-Flour

Contents
Dawson, Donald A.: Measure-valued Markov processes.- Perkins, Edwin Dawson-Watanabe superprocesses and measure-valued diffusions.

Fields of interest
Probability Theory and Stochastic Processes

Target groups
Research

Product category
Contributed volume

Due December 2011

2012. Approx. 310 p. WithReprint of lectures originally published in the Lecture Notes in Mathematics volumes 1541 (1993) and 1781 (2002).. (Probability at Saint-Flour, Volume) Softcover
► **$49.95**
ISBN 978-3-642-25431-4

M. P. do Carmo, IMPA, Rio de Janeiro, Brasil
K. Tenenblat, University of Brasilia, Brazil (Ed)

Manfredo P. do Carmo – Selected Papers

This volume of selected academic papers demonstrates the significance of the contribution to mathematics made by Manfredo P. do Carmo. Twice a Guggenheim Fellow and the winner of many prestigious national and international awards, the professor at the institute of Pure and Applied Mathematics in Rio de Janeiro is well known as the author of influential textbooks such as Differential Geometry of Curves and Surfaces. The area of differential geometry is the main focus of this selection, though it also contains do Carmo's own commentaries on his life as a scientist as well as assessment of the impact of his researches and a complete list of his publications. Aspects covered in the featured papers include relations between curvature and topology, convexity and rigidity, minimal surfaces, and conformal immersions, among others.

Features
► M. do Carmo is one of the outstanding differential geometers of his time ► M.do Carmo in one of the pioneers of modern mathematics in Brazil ► M. do Carmo is well-known to many students who have used his excellent and popular textbooks

Contents
Preface.- A Summary of the Scientific Activities of Manfredo P. do Carmo.- Summary of thePapers in this Volume by Manfredo P. do Carmo.- Contributions.- Complete List of Publications of Manfredo P. do Carmo.- List of D.Sc. Students of Manfredo P. do Carmo.

Fields of interests
Differential Geometry; Geometry; History of Mathematical Sciences

Target groups
Research

Product category
Collected works

Due March 2012

2012. 470 p. 2 illus. in color. Hardcover
► **approx. $149.00**
ISBN 978-3-642-25587-8

A. Facchini, University of Padova, Italy

Module Theory

Endomorphism rings and direct sum decompositions in some classes of modules

The purpose of this expository monograph is three-fold. First, the solution of a problem posed by Wolfgang Krull in 1932 is presented. He asked whether what is now called the „Krull-Schmidt Theorem" holds for artinian modules. A negative answer was published only in 1995 by Facchini, Herbera, Levy and Vámos. Second, the answer to a question posed by Warfield in 1975, namely, whether the Krull-Schmidt-Theorem holds for serial modules, is described. Facchini published a negative answer in 1996. The solution to the Warfield problem shows an interesting behavior; in fact, it is a phenomena so rare in the history of Krull-Schmidt type theorems that its presentation to a wider mathematical audience provides the third incentive for this monograph. Briefly, the Krull-Schmidt-Theorem holds for some, not all, classes of modules.

Features
► Adds to the list of fundamental books on rings and modules ► Develops the necessary background in a logical way ► Joyful reading for algebraists

Contents
Preface.- List of Symbols.- 1 Basic Concepts.- 2 The Krull-Schmidt-Remak-Azumaya Theorem.- 3 Semiperfect Rings.- 4 Semilocal Rings.- 5 Serial Rings.- 6 Quotient Rings.- 7 Krull Dimension and Serial Rings.- 8 Krull-Schmidt Fails for Finitely Generated Modules and Artinian Modules.- 9 Biuniform Modules.- 10 (Sigma)-pure-injective Modules and Artinian Modules.- 11 Open Problems.- Bibliography.- Index.

Fields of interest
Algebra

Target groups
Research

Product category
Monograph

Due January 2012

2012. XIV, 285 p. (Modern Birkhäuser Classics)
Softcover
► **approx. $69.95**
ISBN 978-3-0348-0302-1

A. Galbis, M. Maestre, Universidad de Valencia, Burjasot, Spain

Vector Analysis Versus Vector Calculus

The aim of this book is to facilitate the use of Stokes' Theorem in applications. The text takes a differential geometric point of view and provides for the student a bridge between pure and applied mathematics by carefully building a formal rigorous development of the topic and following this through to concrete applications in two and three variables. Several practical methods and many solved exercises are provided. This book tries to show that vector analysis and vector calculus are not always at odds with one another. Key topics include: -vectors and vector fields; -line integrals; -regular k-surfaces; -flux of a vector field; -orientation of a surface; -differential forms; -Stokes' theorem; -divergence theorem.

Features
► Presents a precise and rigorous exposition of Stokes' theorem ► Takes a differential geometric point of view on vector calculus and analysis ► Designed as a textbook for upper-undergraduate students, and can also be useful for engineering and physics students

Contents
Preface.- 1 Vectors and Vector Fields.- 2 Line Integrals.- 3 Regular k-surfaces.- 4 Flux of a Vector Field.- 5 Orientation of a Surface.- 6 Differential Forms.- Integration on Surfaces.- 8 Surfaces with Boundary.- 9 The General Stokes' Theorem.- Solved Exercises.- References.- Index.

Fields of interests
Global Analysis and Analysis on Manifolds; Differential Geometry; Mathematical Applications in the Physical Sciences

Target groups
Upper undergraduate

Product category
Graduate/Advanced undergraduate textbook

Due March 2012

2012. XII, 328 p. 79 illus., 59 in color. (Universitext)
Softcover
► **$74.95**
ISBN 978-1-4614-2199-3

Y. Guivarc'h, IRMAR, Rennes, France; **J. F. Kingman,** Bristol, UK; **F. Ledrappier,** University of Notre Dame, IN, USA

Dynamical Systems and Ergodic Theory at Saint-Flour

Conze, J.P.:Systemes topologiques et métriques en théorie ergodique.-Kingman, J.F.C.: Subadditive Processes.-Guivarc'h, Y.: Quelques propriétés asymptotiques des produits de matricesaléatoires.- Ledrappier, F.:Quelques proprietés des exposants caractéristiques.

Contents
Conze, J.P.:Systemes topologiques et métriques en théorie ergodique.-Kingman, J.F.C.: Subadditive Processes.-Guivarc'h, Y.: Quelques propriétés asymptotiques des produits de matricesaléatoires.- Ledrappier, F.:Quelques proprietés des exposants caractéristiques.

Fields of interest
Probability Theory and Stochastic Processes

Target groups
Research

Product category
Contributed volume

Due January 2012

Reprint of lectures originally published in the Lecture Notes in Mathematics volumes 480 (1975), 539 (1976), 774 (1980) and 1097 (1984).

2012. VI, 284 p. (Probability at Saint-Flour) Softcover
► **$49.95**
ISBN 978-3-642-25965-4

N. Ikeda, Sanda, Hyogo, Japan; **D. Nualart,** University of Kansas, Lawrence, KS, USA; **D. Stroock,** MIT, Cambridge, MA, USA

Malliavin Calculus at Saint-Flour

Stroock, Daniel W.: Some applications of stochastic calculus to partial differential equations.- Ikeda, Nobuyuki: Probabilistic methods in the study of asymptotics.- Nualart, David: Analysis on Wiener space and anticipating stochastic calculus.

Contents
Stroock, Daniel W.: Some applications of stochastic calculus to partial differential equations.- Ikeda, Nobuyuki: Probabilistic methods in the study of asymptotics.- Nualart, David: Analysis on Wiener space and anticipating stochastic calculus.

Fields of interest
Probability Theory and Stochastic Processes

Target groups
Research

Product category
Contributed volume

Due February 2012

Reprint of lectures originally published in the Lecture Notes in Mathematics volumes 976 (1983), 1427 (1990) and 1690 (1998).

2012. VI, 354 p. (Probability at Saint-Flour) Softcover
► **$49.95**
ISBN 978-3-642-25931-9

B. Korte, J. Vygen, University of Bonn, Germany

Combinatorial Optimization

Theory and Algorithms

This comprehensive textbook on combinatorial optimization places special emphasis on theoretical results and algorithms with provably good performance, in contrast to heuristics. It is based on numerous courses on combinatorial optimization and specialized topics, mostly at graduate level. This book reviews the fundamentals, covers the classical topics (paths, flows, matching, matroids, NP-completeness, approximation algorithms) in detail, and proceeds to advanced and recent topics, some of which have not appeared in a textbook before.

Features
► Well-written, popular textbook on combinatorial optimization ► One of very few textbooks on this topic ► Subject area has manifold applications ► Offers complete but concise proofs, making it an invaluable practical tool for students ► Updated fifth edition

Contents
1 Introduction.- 2 Graphs.- 3 Linear Programming.- 4 Linear Programming Algorithms.- 5 Integer Programming.- 6 Spanning Trees and Arborescences.- 7 Shortest Paths.- 8 Network Flows.- 9 Minimum Cost Flows.- 10 Maximum Matchings.- 11 Weighted Matching.- 12 b-Matchings and T -Joins.- 13 Matroids.- 14 Generalizations of Matroids.- 15 NP-Completeness.- 16 Approximation Algorithms.- 17 The Knapsack Problem.- 18 Bin-Packing.- 19 Multicommodity Flows and Edge-Disjoint Paths.- 20 Network Design Problems.- 21 The Traveling Salesman Problem.- 22 Facility Location.- Indices.

Fields of interests
Combinatorics; Calculus of Variations and Optimal Control; Optimization; Mathematics of Computing

Target groups
Graduate

Product category
Graduate/Advanced undergraduate textbook

Due December 2011

5thed. 2012. XIX, 661 p. 77 illus. (Algorithms and Combinatorics, Volume 21) Hardcover
► **$89.95**
ISBN 978-3-642-24487-2

G. Kutyniok, Technische Universität Berlin, Germany; **D. Labate,** University of Houston, TX, USA (Eds)

Shearlets

Multiscale Analysis for Multivariate Data

Over the last 20 years, multiscale methods and wavelets have revolutionized the field of applied mathematics by providing an efficient means of encoding isotropic phenomena. Directional multiscale systems, particularly shearlets, are now having the same dramatic impact on the encoding of multidimensional signals. Since its introduction about five years ago, the theory of shearlets has rapidly developed and gained wide recognition as the superior way of achieving a truly unified treatment in both a continuous and a digital setting. By now, it has reached maturity as a research field, with rich mathematics, efficient numerical methods, and various important applications.

Features
► The first book published on the topic of shearlets or geometric multiscale analysis ► Unified notation used throughout ► Comprehensive presentation of shearlet theory and applications ► Valuable for an interdisciplinary audience of graduate students and researchers in applied mathematics, computer science, and engineering

Contents
Introduction.- Shearlets and Microlocal Spaces.- The Shearlet Transform and Related Smoothness Spaces.- Analysis and Identification of Multidimensional Singularities Using the Continuous Shearlet Transform.- Shearlets and Optimally Sparse Approximations.- Shearlet Multiresolution and Multiple Refinement.- Image Processing with Shearlets.- ShearLab and Applications to Neurobiology.

Fields of interests
Fourier Analysis; Signal,Image and Speech Processing; Numerical Analysis

Target groups
Graduate

Product category
Monograph

J. Lewis, University of Kentucky, Lexington, KY, USA; **P. Lindqvist,** Norwegian University of Science & Technology, Trondheim, Norway; **J. J. Manfredi,** University of Pittsburgh, PA, USA; **S. Salsa,** Politecnico di Milano, Italy

Regularity Estimates for Nonlinear Elliptic and Parabolic Problems

Cetraro, Italy 2009
Editors: Ugo Gianazza, John Lewis

Scientific editors: **J. Lewis,** University of Kentucky, Lexington, KY, USA; **U. Gianazza,** University of Pavia, Italy

The issue of regularity has played a central role in the theory of Partial Differential Equations almost since its inception, and despite the tremendous advances made it still remains a very fruitful research field. In particular considerable strides have been made in regularity estimates for degenerate and singular elliptic and parabolic equations over the last several years, and in many unexpected and challenging directions.

Features
► The notes trace a timely overview of the main issues in the regularity theory for degenerate and singular elliptic and parabolic PDEs ► The deep connections among seemingly unrelated topics are shown ► The main results are thoroughly discussed and proper counterexamples are presented

Contents
Applications of Boundary Harnack Inequalities for p Harmonic Functions and Related Topics.- Regularity of Supersolutions.- Introduction to random Tug-of-War games and PDEs.- The Problems of the Obstacle in Lower Dimension and for the Fractional Laplacian.

Fields of interests
Partial Differential Equations; Calculus of Variations and Optimal Control; Optimization

Target groups
Research

Product category
Contributed volume

S. Liao, Shanghai Jiao Tong University, China

Homotopy Analysis Method in Nonlinear Differential Equations

„Homotopy Analysis Method in Nonlinear Differential Equations“ presents the latest developments and applications of the analytic approximation method for highly nonlinear problems, namely the homotopy analysis method (HAM). Unlike perturbation methods, the HAM has nothing to do with small/large physical parameters. In addition, it provides great freedom to choose the equation-type of linear sub-problems and the base functions of a solution. Above all, it provides a convenient way to guarantee the convergence of a solution. This book consists of three parts.

Features
► Develops a powerful analytic method for strongly nonlinear differential equations ► Offers the latest theoretical developments of the method ► Demonstrates various novel, interesting applications in science, engineering and finance Includes free symbolic computation codes for easy understanding and use

Contents
Introduction.- Basic Ideas.- Systematic Descriptions.- Advanced Approaches.- Convergent Series For Divergent Taylor Series.- Nonlinear Initial Value Problems.- Nonlinear Eigenvalue Problems.- Nonlinear Problems In Heat Transfer.- Nonlinear Problems With Free Or Moving Boundary.- Steady-State Similarity Boundary-Layer Flows.- Unsteady Similarity Boundary-Layer Flows.- Non-Similarity Boundary-Layer Flows.- Applications In Numerical Methods.

Fields of interests
Partial Differential Equations; Nonlinear Dynamics; Appl.Mathematics/Computational Methods of Engineering

Target groups
Research

Product category
Monograph

Birkhäuser

Due March 2012

2012. XVI, 325 p. 50 illus., 18 in color. (Applied and Numerical Harmonic Analysis) Hardcover
► **approx. $99.00**
ISBN 978-0-8176-8315-3

Due March 2012

2012. 256 p. 3 illus. (Lecture Notes in Mathematics / C.I.M.E. Foundation Subseries, Volume 2045) Softcover
► **$69.95**
ISBN 978-3-642-27144-1

Due January 2012

Jointly published with Higher Education Press

Distribution rights in China: Higher Education Press

2012. X, 400 p. 50 illus. Hardcover
► **$124.00**
ISBN 978-3-642-25131-3

W. Liu, University of Central Arkansas, Conway, AR, USA

Introduction to Modeling Biological Cellular Control Systems

This textbook contains the essential knowledge in modeling, simulation, analysis, and applications in dealing with biological cellular control systems. In particular, the book shows how to use the law of mass balance and the law of mass action to derive an enzyme kinetic model - the Michaelis-Menten function or the Hill function, how to use a current-voltage relation, Nernst potential equilibrium equation, and Hodgkin and Huxley's models to model an ionic channel or pump, and how to use the law of mass balance to integrate these enzyme or channel models into a complete feedback control system.

Features
► This book contains a description of the most commonly used ODE models used in the study of biochemical processes ► The main chemical laws used are well explained ► The contents of Chapters two and three are written in a good readable way, and probably is not easy to find all of them in a single volume ► Chapter six containing the most classical models of ions pumps and channels is of interest for a wide audience

Contents
Enzyme Kinetics.- Preliminary Systems Theory.- Control of Blood Glucose.- Control of Calcium in Yeast Cells.- Kinetics of Ion Pumps and Channels.- Store-Operated Calcium Entry.- Control of Mitochondrial Calcium.- Control of Phosphoinositide Synthesis.- PreliminaryMATLAB.

Fields of interests
Mathematical and Computational Biology; Systems Biology; Math. Applications in Chemistry

Target groups
Upper undergraduate

Product category
Graduate/Advanced undergraduate textbook

Due December 2011

2012. X, 290 p. 61 illus. (MS&A, 0) Hardcover
► **$69.95**
ISBN 978-88-470-2489-2

A. Machì, Università La Sapienza, Roma, Italia

Groups

An Introduction to Ideas and Methods of the Theory of Groups

Groups are a means of classification, via the group action on a set, but also the object of a classification. How many groups of a given type are there, and how can they be described? Hölder's program for attacking this problem in the case of finite groups is a sort of leitmotiv throughout the text. Infinite groups are also considered, with particular attention to logical and decision problems. Abelian, nilpotent and solvable groups are studied both in the finite and infinite case. Permutation groups and are treated in detail; their relationship with Galois theory is often taken into account. The last two chapters deal with the representation theory of finite group and the cohomology theory of groups; the latter with special emphasis on the extension problem.

Features
► More than 400 exercises for almost all of which a solution is provided, help the reader check his/her comprehension of the text ► Some topics like representation theory, word problem or the meaning of some group-theoretic concepts in cohomology of groups are usually found in more specialized books ► The meaning of some group-theoretic concepts in Galois theory

Contents
Normal Subgroups, Conjugation and Isomorphism Theorems.- Group Actions and Permutation Groups.- Generators and Relations.- Nilpotent Groups and Solvable Groups.- Representations.- Extensions and Cohomology.- Solution to the exercises.

Fields of interests
Algebra; Group Theory and Generalizations; Commutative Rings and Algebras

Target groups
Research

Product category
Undergraduate textbook

Due December 2011

2012. XII, 350 p. 1 illus. (UNITEXT / La Matematica per il 3+2) Softcover
► **approx. $59.95**
ISBN 978-88-470-2420-5

P. M. Pardalos, P. Xanthopoulos, University of Florida, Gainesville, FL, USA; **M. Zervakis,** Technical University of Crete, Chania, Greece (Eds)

Data Mining for Biomarker Discovery

Contents
Preface.- 1. Data Mining Strategies Applied in Brain Injury Models (S. Mondello, F. Kobeissy, I. Fingers, Z. Zhang, R.L. Hayes, K.K.W. Wang).- Application of Decomposition Methods in the Filtering of Event Related Potentials (K. Michalopoulos, V. Iordanidou, M. Zervakis).- 3. EEG Features as Biomarkers for Discrimination of Pre-ictal states (A. Tsimpiris, D. Kugiumtzis).- 4. Using Relative Power Asymmetry as a Biomarker for Classifying Psychogenic Non-epileptic Seizure and Complex Partial Seizure Patients (J.H. Chien, D.-S. Shiau, J.C. Sackellares, J.J. Halford, K.M. Kelly, P.M. Pardalos).- 5. Classification of Tree and Network Topology Structures in Medical Images (A. Skoura, V. Megalooikonomou, A. Diamantopolous, G.C. Kagadis, D. Karnabatidis).- 6. A Framework for Multi-Modal Imagin Biomarker Extraction with Application to Brain MRI (K. Maria, V. Sakkalis, N. Graf).- 7. A Statistical Diagnostic Decision Support Tool Using Magnetic Resonance Spectroscopy Data (E. Tsolaki, E. Kousi, E. Kapsalaki, I. Dimou, K. Theodorou, G. C. Manikis, C. Kappas, I. Tsougos).- 8. Data Mining for Cancer Biomarkers with Raman Spectroscopy (M.B.Fenn, V. Pappu).- 9. Nonlinear Recognition Methods for Oncological Pathologies (G. Patrizi, V. Pietropaolo, A. Carbone, R. De Leone, L. Di Giacomo, V. Losaco, G. Patrizi).- 10. Studying Connectivity Properties in Human Protein Interation Network in Cancer Pathway (V. Tomaino, A. Arulselvan, P. Veltri, P.M. Pardalos). [...]

Fields of interests
Operations Research, Management Science; Data Mining and Knowledge Discovery; Health Informatics

Target groups
Research

Product category
Contributed volume

Due February 2012

2012. XXIII, 283 p. 89 illus., 58 in color. (Springer Optimization and Its Applications, Volume 65) Hardcover
► **$124.00**
ISBN 978-1-4614-2106-1

M. L. Pinedo, New York University, New York, NY, USA

Scheduling

Theory, Algorithms, and Systems

Features
► Discussion of the basic properties of scheduling models ► Computational as well as theoretical exercises at the end of each chapter ► Thorough examination of numerous applications ► Investigation of the latest developments in the field ► Discussion of future research developments ► Covers deterministic models as well as stochastic models ► Covers theoretical models as well as practical applications

Contents
Preface.- Supplementary Electronic Material.- Introduction.- Deterministic Models: Preliminaries.- Single Machine Models (Deterministic).- Advanced Single Machine Models (Deterministic).- Parallel Machine Models (Deterministic).- Flow Shops and Flexible Flow Shops (Deterministic).- Job Shops (Deterministic.- Open Shops (Deterministic).- Stochastic Models: Preliminaries.- Single Machine Models (Stochastic).- Single Machine Models with Release Dates (Stochastic).- Parallel Machine Models (Stochastic).- Flow Shops, Job Shops and Open Shops (Stochastic).- General Purpose Procedures for Deterministic Scheduling.- More Advanced General Purpose Procedures.- Modeling and Solving Scheduling Problems in Practice.- Design and Implementation of Scheduling Systems: Basic Concepts.- Design and Implementation of Scheduling Systems: More Advanced Concepts.- Examples of System Designs and Implementations.- What Lies Ahead?.- Appendices.- References.

Fields of interests
Operations Research, Management Science; Industrial and Production Engineering; Probability Theory and Stochastic Processes

Target groups
Graduate

Product category
Graduate/Advanced undergraduate textbook

R. B. Schinazi, University of Colorado, Colorado Springs, CO, USA

From Calculus to Analysis

This comprehensive textbook is intended for a two-semester sequence in analysis.

Features
► Contains excellent exercise sets ► Introduces the principles of real analysis, as a formidable counterpart to calculus ► Places appropriate emphasis on techniques and definitions ► Carefully written book with a thoughtful perspective for students

Contents
Preface.- Ch. 1 Number Systems.- 1.1 The algebra of the reals.- 1.2 Natural numbers and integers.- .1.3 Rational numbers and real numbers.- 1.4 Power functions.- Ch. 2 Sequences and Series.- 2.1 Sequences.- 2.2 Montone sequences, Bolzano-Weirestrass theorem and operations on limits.- 2.3 Series.- 2.4 Absolute convergence.- Ch. 3 Power series and special functions.-3.1 Power series.-3.2 Tigonometric functions.- 3.3 Inverse trigonometric functions.- 3.4 Exponential and logarithmic functions.- Ch 4 Fifty Ways to Estimate the Number pi.-4.1 Power series expansions.- 4.2 Wallis' integrals, Euler's formula, and Stirling's formula.-4.3 Convergence of infinite products.- 4.4 The number pi is irrational.- Ch. 5 Continuity, Limits, and Differentiation.- 5.1 Continuity.- 5.2 Limits of functions and derivatives.- 5.3 Algebra of derivatives and mean value theorems.- 5.4 Intervals, continuity, and inverse functions.- Ch. 6 Riemann Integration.- 6.1 Construction of the integral.- 6.2 Properties of the integral.- 6.3 Uniform continuity.- Ch 7 Decimal Represenation of Numbers.- Ch 8 Countable and Uncountable Sets.- Further Readings.- Index.

Fields of interests
Analysis; Sequences, Series, Summability; Approximations and Expansions

Target groups
Upper undergraduate

Product category
Undergraduate textbook

J. M. Steele, Brown University, Providence, RI, USA

Ancient Astronomical Observations and the Study of the Moon's Motion (1691-1757)

The discovery of a gradual acceleration in the moon's mean motion by Edmond Halley in the last decade of the seventeenth century led to a revival of interest in reports of astronomical observations from antiquity. These observations provided the only means to study the moon's 'secular acceleration', as this newly-discovered acceleration became known.

Features
► Presents a detailed study of previously unexplored aspect of the history of astronomy ► The study makes extensive use of previously unpublished and unstudied manuscript material ► The work of eighteenth century lunar theory is place in a broader cultural context

Contents
Preface.- 1. Introduction.- 2. Edmond Halley's Discovery of the Secular Acceleration of the Moon.- 3. A Forgotten Episode in the History of the Secular Acceleration: William Whiston, Arthur Ashley Sykes and the Eclipse of Phlegon.- 4. The Gradual Acceptance of the Existence of the Secular Acceleration During the 1740s.- 5. Eighteenth Century Views of Ancient Astronomy.- 6. The First Detailed Study of the Moon's Secular Acceleration: Richard Dunthorne.- 7. An Integrated Approach: Tobias Mayer.- 8. The Final Synthesis: Jérôme Lalande.- 9. Epilogue.- References.- Index.

Fields of interests
History of Mathematical Sciences; Astronomy, Observations and Techniques; Astronomy, Astrophysics and Cosmology

Target groups
Research

Product category
Monograph

Birkhäuser

Due March 2012

Originally published by Prentice-Hall

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J. Steimle, TU Darmstadt, Germany

Pen-and-Paper User Interfaces

Interaction Concepts for Integrating Printed and Digital Documents

Foreword by: **M. Mühlhäuser,** TU Darmstadt, Germany; **J. D. Hollan,** University of California, San Diego, CA, USA

Even at the beginning of the 21st century, we are far from becoming paperless. Pen and paper is still the only truly ubiquitous information processing technology. Pen-and-paper user interfaces bridge the gap between paper and the digital world. Rather than replacing paper with electronic media, they seamlessly integrate both worlds in a hybrid user interface. Classical paper documents become interactive. This opens up a huge field of novel computer applications at our workplaces and in our homes. This book provides readers with a broad and extensive overview of the field, so as to provide a full and up-to-date picture of pen-and-paper computing. It covers the underlying technologies, reviews the variety of modern interface concepts and discusses future directions of pen-and-paper computing.

Features

► First book in this field ► A well-motivated introduction to the field of paper-based user interfaces ► Color figures included

Contents

1.Introduction.- 2.-Survey of Pen-and-Paper Computing.- 3.Interaction Model of Pen-and-Paper User Interfaces.- 4.Collaborative Cross-media Annotation of Documents.- 5.Hyperlinking between Printed and Digital Documents.- 6.Paper-based Tagging of Documents.- 7.Conclusions.- References.- Index.

Fields of interests

Applications of Mathematics; User Interfaces and Human Computer Interaction

Target groups

Research

Product category

Monograph

A. Tromba, University of California by Santa Cruz, CA, USA

A Theory of Branched Minimal Surfaces

One of the most elementary questions in mathematics is whether an area minimizing surface spanning a contour in three space is immersed or not; i.e. does its derivative have maximal rank everywhere. The purpose of this monograph is to present an elementary proof of this very fundamental and beautiful mathematical result. The exposition follows the original line of attack initiated by Jesse Douglas in his Fields medal work in 1931, namely use energy as opposed to area. Remarkably, the author shows how to calculate arbitrarily high orders of derivatives of the Douglas Energy defined on the infinite dimensional manifold of all surfaces spanning a contour, breaking new ground in the Calculus of Variations, where normally only the second derivative or variation is calculated.

Features

► Presents an elementary proof of a very fundamental and beautiful mathematical result ► First complete presentation of this results in the mathematical literature ► It can be read by almost anyone with a basic graduate education

Contents

1.Introduction.- 2.Higher order Derivatives of Dirichlets' Energy.- 3.Very Special Case; The Theorem for n + 1 Even and m + 1 Odd .- 4.The First Main Theorem; Non-Exceptional Branch Points.- 5.The Second Main Theorem: Exceptional Branch Points; The Condition k > l.- 6.Exceptional Branch Points Without The Condition k > l.- 7.New Brief Proofs of the Gulliver-Osserman-Royden Theorem .- 8.Boundary Branch Points.- Scholia.- Appendix.- Bibliography.

Fields of interests

Functions of a Complex Variable; Sequences, Series, Summability; Differential Geometry

Target groups

Research

Product category

Monograph

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