A. Chinchuluun, P. M. Pardalos, R. Enkhbat, I. Tseveendorj (Eds.)

Optimization and Optimal Control

Theory and Applications

During the last four decades there has been a remarkable development in optimization and optimal control. Due to its wide variety of applications, many scientists and researchers have paid attention to fields of optimization and optimal control. A huge number of new theoretical, algorithmic, and computational results have been observed in the last few years. This book gives the latest advances, and due to the rapid development of these fields, there are no other recent publications on the same topics.

Features
► Collection of selected contributions giving a state-of-the-art account of recent developments in the field ► Covers a broad range of topics in optimization and optimal control, including unique applications ► Written by an international group of experts in their respective disciplines ► Broad audience of esearchers, practitioners, and advanced graduate students in applied mathematics and engineering

Fields of interest
Calculus of Variations and Optimal Control; Optimization; Mathematical Modeling and Mathematics in Industry; Operations Research, Management Science

Target groups
Research

Type of publication
Contributed volume

Due June 2010

2010. XIII, 499 p. 58 illus., 29 in color.
(Springer Optimization and Its Applications, Volume 39)
Hardcover

► **€ 99,95 | £90.00**
► *** € (D) 106,95 | € (A) 109,95 | sFr 155,50**
ISBN 978-0-387-89495-9

K. L. Chung

Collected Articles from LNM

A Special Selection on the Occasion of the Memorial Conference for Kai Lai Chung, Beijing 13. – 16. June, 2010

This is a collection of articles by Kai Lai Chung, previously published in the series Séminaire de Probabilités of the Lecture Notes in Mathematics, published on the occasion of the 2010 conference in Hong Kong in memory of Kai Lai Chung.

Fields of interest
Probability Theory and Stochastic Processes; Potential Theory

Target groups
Research

Type of publication
Collection of essays

Available

Only available in print

2010. 60 p. 1 illus. Softcover

► **€ 24,95 | £19.99**
► *** € (D) 26,70 | € (A) 27,45 | sFr 39,00**
ISBN 978-3-642-12694-9

L. Devroye, B. Karasözen, M. Kohler, R. Korn (Eds.)

Recent Developments in Applied Probability and Statistics

Dedicated to the Memory of Jürgen Lehn

This book presents surveys on recent developments in applied probability and statistics. The contributions include topics such as nonparametric regression and density estimation, option pricing, probabilistic methods for multivariate interpolation, robust graphical modelling and stochastic differential equations.
Due to its broad coverage of different topics the book offers an excellent overview of recent developments in applied probability and statistics.

Features
► Presents surveys on recent developments in applied probability and statistics ► Topics such as nonparametric regression and density estimation, option pricing, probabilistic methods for multivariate interpolation, robust graphical modelling and stochastic differential equations ► Excellent overview of recent developments in applied probability and statistics

From the contents
On Exact Simulation Algorithms for Some Distributions Related to Brownian Motion and Brownian Meanders.- A Review on Regression-based Monte Carlo Methods for Pricing American Options.- Binomial Trees in Option Pricing.- History, Practical Applications and Recent Developments.- Uncertainty in Gaussian Process Interpolation.- On the Inversive Pseudorandom Number Generator.- Strong and Weak Approximation Methods for Stochastic Differential Equations – Some Recent Developments.- On Robust Gaussian Graphical Modelling.

Fields of interest
Probability Theory and Stochastic Processes; Statistical Theory and Methods; Probability and Statistics in Computer Science

Target groups
Research

Type of publication
Monograph

Physica-Verlag

Available

2010. XII, 235 p. 54 illus., 27 in color.
Hardcover

► **€ 69,95 | £62.99**
► *** € (D) 74,85 | € (A) 76,95 | sFr 109,00**
ISBN 978-3-7908-2597-8

D. R. Durran, University of Washington, Atmospheric Sciences, Seattle, WA, USA

Numerical Methods for Fluid Dynamics

with Applications to Geophysics

This book is a major revision of Numerical Methods for Wave Equations in Geophysical Fluid Dynamics; the new title of the second edition conveys its broader scope. The second edition is designed to serve graduate students and researchers studying geophysical fluids, while also providing a non-discipline-specific introduction to numerical methods for the solution of time-dependent differential equations. The methods considered are those at the foundation of real-world atmospheric or ocean models, with the focus being on the essential mathematical properties of each method. The fundamental character of each scheme is examined in prototypical fluid-dynamical problems like tracer transport, chemically reacting flow, shallow-water waves, and waves in an internally stratified fluid. The book includes exercises and is well illustrated with figures linking theoretical analyses to results from actual computations. Changes from the first edition include new chapters, discussions and updates throughout.

Features
► A thorough introduction to a broad spectrum of methods of the solution of time dependent differential equations ► The theoretical properties of the various schemes are extensively illustrated by figures ► Well illustrated and includes examples and exercises throughout

Contents
Introduction.-Ordinary Differential Equations.-Finite-Difference Approximations for One-Dimensional Transport.-Beyond One-Dimensional Transport.-Conservation Laws and Finite-VolumeMethods.- Series-Expansion Methods.-Semi LagrangianMethods.-Physically Insignificant FastWaves.-Nonreflecting Boundary Conditions.-References.

Fields of interest
Numerical Analysis; Geophysics/Geodesy; Mechanical Engineering

Target groups
Research

Type of publication
Graduate/Advanced undergraduate textbook

Due June 2010

2nd ed. 2010. 530 p. 220 illus., 110 in color. (Texts in Applied Mathematics, Volume 32) Hardcover

► **€ 64,95 | £58.99**
► *** € (D) 69,50 | € (A) 71,45 | sFr 101,00**
ISBN 978-1-4419-6411-3

W. Forst, University of Ulm, Germany; **D. Hoffmann**, University of Konstanz, Germany

Optimization – Theory and Practice

Optimization is a field important in its own right but is also integral to numerous applied sciences, including operations research, management science, economics, finance and all branches of mathematics-oriented engineering. Constrained optimization models are one of the most widely used mathematical models in operations research and management science.This book gives a modern and well-balanced presentation of the subject, focusing on theory but also including algorithims and examples from various real-world applications. The text is easy to read and accessible to anyone with a knowledge of multi-dimensional calculus, linear algebra and basic numerical methods. Detailed examples and counter-examples are provided - as are exercises, solutions and helpful hints, and Matlab/Maple supplements.The intended readership is advanced undergraduates, graduates, and professionals in any of the applied fields.

Features
► Optimization is used in almost all branches of applied sciences today ► Text appeals to a wide readership because of its real life applications ► Self-contained text with a rich collection of detailed examples and two-color graphics to assist the reader in full comprehension ► Book includes many exercises, often supplemented by helpful hints or Matlab/Maple supplements

Fields of interest
Optimization; Symbolic and Algebraic Manipulation; Computational Mathematics and Numerical Analysis

Target groups
Upper undergraduate

Type of publication
Undergraduate textbook

Due July 2010

2010. XVIII, 402 p. 10 illus., 5 in color. (Springer Undergraduate Texts in Mathematics and Technology) Hardcover

► **€ 59,95 | £53.99**
► *** € (D) 64,15 | € (A) 65,95 | sFr 93,00**
ISBN 978-0-387-78976-7

A. Quarteroni, **F. Saleri**, **P. Gervasio**

Scientific Computing with MATLAB and Octave

This textbook is an introduction to Scientific Computing, in which several numerical methods for the computer-based solution of certain classes of mathematical problems are illustrated. The authors show how to compute the zeros or the integrals of continuous functions, solve linear systems, approximate functions using polynomials and construct accurate approximations for the solution of ordinary and partial differential equations. To make the format concrete and appealing, the programming environments Matlab and Octave are adopted as faithful companions. The book contains the solutions to several problems posed in exercises and examples, often originating from important applications. At the end of each chapter, a specific section is devoted to subjects which were not addressed in the book and contains bibliographical references for a more comprehensive treatment of the material.

Features
► Features a sound combination of problems, algorithms, programs, exercises, illustrations and numerical solutions ► Contains more than 70 examples, 120 solved exercises and 35 Matlab and Octave programs ► Each chapter starts with the formulation of a few representative problems stemming from various fields of applications, continues with the construction and analysis of algorithms, ad-hoc programs for their implementation

From the contents
1. What can' t be ignored.- 2. Nonlinear equations.- 3. Approximation of functions and data.- 4. Numerical differentiation and integration.- 5. Linear systems.- 6. Eigenvalues and eigenvectors.- 7. Ordinary differential equations.

Fields of interest
Computational Science and Engineering; Numerical and Computational Physics; Computational Intelligence

Target groups
Lower undergraduate

Type of publication
Undergraduate textbook

Due June 2010

Original Italian edition published by Springer-Verlag, Italia, 2006

3rd ed. 2010. XIV, 360 p. (Texts in Computational Science and Engineering, Volume 2) Hardcover

► **€ 49,95 | £44.99**
► *** € (D) 53,45 | € (A) 54,95 | sFr 77,50**
ISBN 978-3-642-12429-7

A. Quarteroni, École Polytéchnique Fédérale de Lausanne, Suisse; **F. Saleri**, Politecnico di Milano, Italie

Calcul Scientifique

Cours, exercices corrigés et illustrations en Matlab et Octave

Ce livre constitue une introduction au Calcul Scientifique. Son objectif est de présenter des méthodes numériques permettant de résoudre avec un ordinateur certains problèmes mathématiques qui ne peuvent être traités simplement avec un papier et un crayon. Les questions classiques du Calcul Scientifique sont abordées: la recherche des zéros ou le calcul d'intégrales de fonctions continues, la résolution de systèmes linéaires, l'approximation de fonctions par des polynômes, la résolution approchée d'équations différentielles. La présentation de ces méthodes est rendue vivante par le recours systématique aux environnements de programmation Matlab et Octave dont les principales commandes sont introduites progressivement. Tous les algorithmes sont présentés sous la forme de programmes. Ceci permet de vérifier très rapidement leurs propriétés théoriques, en particulier la stabilité, la précision et la complexité. La résolution de divers problèmes, souvent motivés par des applications concrètes, fait l'objet de nombreux exemples et exercices. À la fin de chaque chapitre, une section présente des aspects plus avancés et fournit des indications bibliographiques qui permettront au lecteur d'appronfondir les connaissances acquises. Le dernier chapitre est consacré à la correction des exercices proposés tout au long du livre

Features
► Calcul d'intégrales de fonctions continues
► Systèmes linéaires ► Équations différentielles
► MATLAB et Octave

Fields of interest
Mathématiques appliquées; Analyse; Mathématiques informatiques et analyses numériques

Target groups
Lower undergraduate

Type of publication
Manuel 1er cycle

A paraître septembre 2010

2nd ed. 2010. 360 p. Broché

► **approx. € 33,13 | £29.99**
► **approx. * € (D) 35,45 | € (A) 36,44 | sFr 51,50**
ISBN 978-88-470-1675-0

H. Schoutens, City University of New York, NY, USA

The Use of Ultraproducts in Commutative Algebra

In spite of some recent applications of ultraproducts in algebra, they remain largely unknown to commutative algebraists, in part because they do not preserve basic properties such as Noetherianity. This work wants to make a strong case against these prejudices. More precisely, it studies ultraproducts of Noetherian local rings from a purely algebraic perspective, as well as how they can be used to transfer results between the positive and zero characteristics, to derive uniform bounds, to define tight closure in characteristic zero, and to prove asymptotic versions of homological conjectures in mixed characteristic. Some of these results are obtained using variants called chromatic products, which are often even Noetherian. This book, neither assuming nor using any logical formalism, is intended for algebraists and geometers, in the hope of popularizing ultraproducts and their applications in algebra.

Features
► Novel use of ultraproducts in algebra
► Provides a gentle introduction to tight closure in characteristic zero ► Contains a survey chapter on various flatness criteria

Fields of interest
Commutative Rings and Algebras; Algebraic Geometry

Target groups
Research

Type of publication
Monograph

Due August 2010

2010. X, 200 p. (Lecture Notes in Mathematics, Volume 1999) Softcover

► **approx. € 44,95 | £40.99**
► **approx. * € (D) 48,10 | € (A) 49,45 | sFr 70,00**
ISBN 978-3-642-13367-1

The Cavity 9mm is a primary weapon available in PAYDAY 2. It was added along with the release of The Golden Grin Casino Heist DLC. The Cavity 9mm is a compact, high damage semi-automatic rifle. In combat, its raw strength allows the player to kill most enemies with one headshot. It is also reasonably accurate, which helps with nailing down precise shots at long range.