Thermodynamics of Materials with Memory

Theory and Applications

Contents


Fields of interest

Mathematical Applications in the Physical Sciences; Characterization and Evaluation of Materials; Continuum Mechanics and Mechanics of Materials

Target groups

Research

Discount group

P

Due November 2011

2012. XV, 562 p. 4 illus. Hardcover

$124.00


Algebraic Geometry over the Complex Numbers

D. Arapura, Purdue University, West Lafayette, IN, USA

This is a relatively fast paced graduate level introduction to complex algebraic geometry, from the basics to the frontier of the subject. It covers sheaf theory, cohomology, some Hodge theory, as well as some of the more algebraic aspects of algebraic geometry.

Features

- Contains a rapid introduction to complex algebraic geometry
- Includes background material on topology, manifold theory and sheaf theory
- Analytic and algebraic approaches are developed somewhat in parallel
- Easy-going style will not intimidate newcomers to algebraic geometry

Contents


Fields of interest

Algebraic Geometry; Several Complex Variables and Analytic Spaces; Topology

Target groups

Graduate

Discount group

P

Due February 2012

2012. XII, 332 p. 17 illus., 4 in color. (Universitext)

Hardcover

$74.95


Probability in Banach Spaces at Saint-Flour

A. Badrikian, J. Hoffmann-Jørgensen, University of Aarhus, Denmark; J. Kuelbs, University of Minnesota, Madison, WI; USA; F. Xavier, Université Louis Pasteur et C.N.R.S., Strasbourg, France

This is a relatively fast paced graduate level introduction to complex algebraic geometry, from the basics to the frontier of the subject. It covers sheaf theory, cohomology, some Hodge theory, as well as some of the more algebraic aspects of algebraic geometry.

Features

- Contains a rapid introduction to complex algebraic geometry
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- Easy-going style will not intimidate newcomers to algebraic geometry

Contents


Fields of interest

Algebraic Geometry; Several Complex Variables and Analytic Spaces; Topology

Target groups

Research

Discount group

P

Available


$69.95

ISBN 978-3-642-25276-1
Optimization for Industrial Problems

Industrial optimization lies on the crossroads between mathematics, computer science, engineering and management. This book presents these fields in interdependence as a conversation between theoretical aspects of mathematics and computer science and the mathematical field of optimization theory at a practical level. The 19 case studies that were conducted by the author in real enterprises in cooperation and co-authorship with some of the leading industrial enterprises, including RWE, Vattenfall, EDF, PetroChina, Vestolit, Sasol, and Hella, illustrate the results that may be reasonably expected from an optimization project in a commercial enterprise.

Features
▸ Presentation of modern methods to solve real and pressing industrial optimization problems in a practical way together with real-life examples
▸ With examples usually hard to come by or not published at all
▸ Presents new methods or new results about existing methods to information science

Contents

Fields of interest
Optimization; Operations Research, Management Science

Target groups
Professional/practitioner

Discount group
P

Available
2012. XXII, 247 p. 60 illus., 24 in color. Softcover
▸ approx. $99.00
ISBN 978-3-642-24973-0

Elements of the Representation Theory of the Jacobi Group

The Jacobi group is a semidirect product of a symplectic group with a Heisenberg group. It is an important example for a non-reductive group and sets the frame within which to treat theta functions as well as elliptic functions - in particular, the universal elliptic curve. This text gathers for the first time material from the representation theory of this group in both local (archimedean and non-archimedean) cases and in the global number field case. Via a bridge to Waldspurger's theory for the metaplectic group, complete classification theorems for irreducible representations are obtained. Further topics include differential operators, Whittaker models, Hecke operators, spherical representations and theta functions. The global theory is aimed at the correspondence between automorphic representations and Jacobi forms.

Features
▸ Very well written monograph combining algebraic groups and number theory
▸ Recommended reading for researchers of modular and automorphic forms
▸ Up to date and structured collection of known results

Contents

Fields of interest
Algebraic Geometry; Number Theory; Group Theory and Generalizations

Target groups
Research

Discount group
P

Available
▸ $69.95
ISBN 978-3-0348-0282-6

Mathematical Models in Population Biology and Epidemiology

This textbook provides an introduction to the field of mathematical biology through the integration of classical applications in ecology with more recent applications to epidemiology, particularly in the context of spread of infectious diseases.

Features
▸ Free supplementary material available on the author’s website involving problems using both Mathematica and Maple
▸ Text offers nice balance of theory and application
▸ Concentration is on applications in population biology, epidemiology, and resource management

Contents

Fields of interest
Community & Population Ecology

Target groups
Graduate

Discount group
P

Due November 2011
2nd ed. 2012. X, 518 p. 120 illus., 2 in color. (Texts in Applied Mathematics, Volume 40) Hardcover
▸ $84.95

Available
A. E. Brouwer, Eindhoven University of Technology, Netherlands; W. H. Haemers, Tilburg University, Netherlands

Spectra of Graphs

This book gives an elementary treatment of the basic material about graph spectra, both for ordinary, and Laplace and Seidel spectra. The text progresses systematically, by covering standard topics before presenting some new material on trees, strongly regular graphs, two-graphs, association schemes, p-ranks of configurations and similar topics. Exercises at the end of each chapter provide practice and vary from easy yet interesting applications of the treated theory, to little excursions into related topics. Tables, references at the end of the book, an author and subject index enrich the text. Spectra of Graphs is written for researchers, teachers and graduate students interested in graph spectra. The reader is assumed to be familiar with basic linear algebra and eigenvalues, although some more advanced topics in linear algebra, like the Perron-Frobenius theorem and eigenvalue interlacing are included.

Features
► Provides an excellent introduction to advanced topics in graph spectral theory ► Written by experts in this area ► Includes tables, references, author and subject index

Contents
Graph spectrum.- Linear algebra.- Eigenvalues and eigenvectors of graphs.- The second largest eigenvalue.- Trees.- Groups and graphs.- Topology.- Euclidean representations.- Strongly regular graphs.- Regular two-graphs.- Association schemes.- Distance regular graphs.- p-ranks.- Spectral characterizations.- Graphs with few eigenvalues.- References.- Author Index.- Subject Index.

Fields of interest
Algebraic Geometry; Group Theory and Generalizations

Target groups
Graduate

Discount group
P

R. Der, MPI-MIS, Leipzig, Germany; G. Martius, MPI-DS, Göttingen, Germany

The Playful Machine

Theoretical Foundation and Practical Realization of Self-Organizing Robots
Foreword by: R. Pfeifer, University of Zurich, Switzerland

Autonomous robots may become our closest companions in the near future.

Features
► This work opens a new field of research ► The reader learns everything about the self-organization of behavior in robots that is known today ► A simulation software enables the reader to make immediately contact with the applications and provides the him with the tools to start developing its own variations and ideas quickly

Contents

Fields of interest
Applications of Mathematics; Artificial Intelligence (incl. Robotics)

Target groups
Research

Discount group
P

R. Durrett, Duke University, Durham, NC, USA; T. M. Liggett, University of California, Los Angeles, CA, USA; F. Spitzer, A.-S. Sznitman, ETH Zürich, Switzerland

Interacting Particle Systems at Saint-Flour


Contents
Introduction aux processus de Markov à paramètre dans Z∞.- The stochastic evolution of infinite systems of interacting particles.- Topics in propagation of chaos.- Ten lectures on particle systems.

Fields of interest
Probability Theory and Stochastic Processes;

Target groups
Research

Discount group
P
J. S. Golan, University of Haifa, Israel

The Linear Algebra a Beginning Graduate Student Ought to Know

Linear algebra is a living, active branch of mathematics which is central to almost all other areas of mathematics, both pure and applied, as well as to computer science, to the physical, biological, and social sciences, and to engineering.

Features
- Contains a wealth of biographical notes and thumbnail photos
- Facilitates the transition from concrete exemplification to theoretical abstraction and thus enables a deeper level of understanding for use in a real world context
- 131 exercises have been added to the already extensive collection supplied in the 2nd edition
- Can be used as a self-study guide, textbook or reference work

Contents
Notation and terminology.
- Fields.
- Vector spaces over a field.
- Algebras over a field.
- Linear independence and dimension.
- Linear transformations.
- The endomorphism algebra of a vector space.
- Representation of linear transformations by matrices.
- The algebra of square matrices.
- Linear algebra in finite dimensions.
- Systems of linear equations.
- Determinants.
- Eigenvalues and eigenvectors.
- Krylov subspaces.
- Inner product spaces.
- Orthogonality.
- Selfadjoint Endomorphisms.
- Unitary and Normal endomorphisms.
- Moore-Penrose pseudoinverses.
- Bilinear transformations and forms.
- Summary of Notation.
- Index to thumbnail photos.

Fields of interest
Linear and Multilinear Algebra, Matrix Theory; Associative Rings and Algebras; Non-associative Rings and Algebras

Target groups
Graduate

Discount group
P

J. Hilgert, University of Paderborn, Germany; K.-H. Neeb, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany

Structure and Geometry of Lie Groups

This self-contained text is an excellent introduction to Lie groups and their actions on manifolds.

Features
- Systematically presents the structure theory of general, unrestricted Lie groups
- Self-contained, with two appendices on covering theory and multilinear algebra
- Includes abundant classroom-tested exercises
- Useful as both a graduate text and as a research reference for a broad range of mathematicians

Contents
Preface.
- 1 Introduction.
- Part I Matrix Groups.
- 2 Concrete Matrix Groups.
- 3 The Matrix Exponential Function.
- 4 Linear Lie Groups.
- Part II Lie Algebras.
- 5 Elementary Structure Theory of Lie Algebras.
- 6 Root Decomposition.
- 7 Representation Theory of Lie Algebras.
- Part III Manifolds and Lie Groups.
- 8 Smooth Manifolds.
- 9 Basic Lie Theory.
- 10 Smooth Actions of Lie Groups.
- Part IV Structure Theory of Lie Groups.
- 11 Normal Subgroups, Nilpotent and Solvable Lie Groups.
- 12 Compact Lie Groups.
- 13 Semisimple Lie Groups.
- 14 General Structure Theory.
- 15 Complex Lie Groups.
- 16 Linearity of Lie Groups.
- 17 Classical Lie Groups.
- 18 Nonconnected Lie Groups.
- Part V Appendices.
- A Basic Covering Theory.
- B Some Multilinear Algebra.
- C Some Functional Analysis.
- D Hints to Exercises.
- References.
- Index.

Fields of interest
Topological Groups, Lie Groups; Differential Geometry; Algebraic Topology

Target groups
Research

Discount group
P

J. A. Hogan, University of Newcastle, Callaghan, NSW, Australia; J. D. Lakey, New Mexico State University, NM, USA

Duration and Bandwidth Limiting

Prolate Functions, Sampling, and Applications

Decreasingly important in the field of communications, the study of time and band limiting is crucial for the modeling and analysis of multiband signals. This concise but comprehensive monograph is the first to be devoted specifically to this subdiscipline, providing a thorough investigation of its theory and applications. Through cutting-edge numerical methods, it develops the tools for applications not only to communications engineering, but also to optical engineering, geosciences, planetary sciences, and biomedicine.

Features
- Combines research and methods from many sources to present an impressively comprehensive analysis
- Includes ample discussion of both theory and applications
- Features chapter-by-chapter supplemental material illustrating results in further depth and detail

Contents
Preface.
- Chapter 1: The Bell Labs Theory.
- Chapter 2: Numerical Aspects of Time- and Bandlimiting.
- Chapter 3: Thomson’s Multitaper Method and Applications to Channel Modeling.
- Chapter 4: Time- and Bandlimiting of Multiband Signals.
- Chapter 5: Sampling of Bandlimited and Multiband Signals.
- Chapter 6: Time-localized Sampling Approximations.
- Appendix: Notation and Mathematical Prerequisites.
- References.
- Index.

Fields of interest
Fourier Analysis; Communications Engineering, Networks; Abstract Harmonic Analysis

Target groups
Graduate

Discount group
P

Available
Originally published as volume 27 in the series: Kluwer Texts in the Mathematical Sciences

3rd ed. 2012. XII, 488 p. 201 illus. Softcover
- $69.95

Due November 2011
2012. X, 744 p. 4 illus. (Springer Monographs in Mathematics) Hardcover
- $129.00

Birkhäuser

Due November 2011
- $99.00
- ISBN 978-0-8176-8306-1
Mathematics.

J. Jacod, Université Paris VI, France; P. Protter, Columbia University, New York, NY, USA

Discretization of Processes

In applications, and especially in mathematical finance, random time-dependent events are often modeled as stochastic processes.

Features
► The first and so far the only book in this area ► Presents the important results in a coherent and unified manner ► Includes systematic, creative and original ways to use sophisticated (but highly technical) tools

Contents

Fields of interest
Probability Theory and Stochastic Processes; Statistics for Business/Economics/Mathematical Finance/Insurance; Econometrics

Target groups
Research

Discount group P

H. Kunze, University of Guelph, ON, Canada; D. La Torre, University of Milan, Italy; F. Mendivil, Acadia University, Wolfville, NS, Canada; E. R. Vrscay, University of Waterloo, ON, Canada

Fractal-Based Methods in Analysis

The idea of modeling the behaviour of phenomena at multiple scales has become a useful tool in both pure and applied mathematics.

Features
► Extensive coverage of both the theory and the applications of IFS fractals ► Unified presentation of almost 20 years of research literature, with new viewpoints and results which stimulate the reader and show the state-of-the-art of research in this area ► The book illustrates a large number of analytical applications of IFS methods ► Includes both direct applications of IFS methods as well as new analytical methods inspired by the IFS fractal framework ► Self-contained and readable mathematical book with background appendices on topological and metric spaces, measure theory, and basic notions from set-valued analysis, which make the book suitable for self-study or for specialized graduate courses

Contents
What do we mean by “Fractal-Based Analysis”- Basic IFS.- IFS on Spaces of Functions.- IFS, Multifunctions, and Measure-Valued Functions.- IFS on Spaces of Measures.- The Chaos Game.- Inverse Problems and Fractal-Based Methods.- Further Developments and Extensions.- References.- Index.

Fields of interest
Dynamical Systems and Ergodic Theory; Mathematical Methods in Physics; Approximations and Expansions

Target groups
Research

Discount group P

M. Lifshits, St.Petersburg State University, Russia

Lectures on Gaussian Processes

Gaussian processes can be viewed as a far-reaching infinite-dimensional extension of classical normal random variables. Their theory presents a powerful range of tools for probabilistic modelling in various academic and technical domains such as Statistics, Forecasting, Finance, Information Transmission, Machine Learning - to mention just a few. The objective of these Briefs is to present a quick and condensed treatment of the core theory that a reader must understand in order to make his own independent contributions. The primary intended readership are PhD/Masters students and researchers working in pure or applied mathematics. The first chapters introduce essentials of the classical theory of Gaussian processes and measures with the core notions of reproducing kernel, integral representation, isoperimetric property, large deviation principle.

Feature
► A quick and condensed treatment of the core theory

Contents

Fields of interest
Probability Theory and Stochastic Processes

Target groups
Graduate

Discount group P

Available

Due November 2011
2012. XII, 424 p. 72 illus., 8 in color. Hardcover ► $124.00 ISBN 978-3-642-24190-0

Available
Non-vanishing of L-Functions and Applications

This book systematically develops some methods for proving the non-vanishing of certain L-functions at points in the critical strip. Researchers in number theory, graduate students who wish to enter into the area and non-specialists who wish to acquire an introduction to the subject will benefit by a study of this book. One of the most attractive features of the monograph is that it begins at a very basic level and quickly develops enough aspects of the theory to bring the reader to a point the latest discoveries as are presented in the final chapters can be fully appreciated.

Features
► Well-written monograph on a difficult but attractive subject in number theory ► Provides an excellent easy-to-read introduction to the modern analytic theory of L-functions ► Each chapter is accompanied by exercises

Contents
Preface.- Introduction.- Chapter 1 The Prime Number Theorem and Generalizations.- Chapter 2 Artin L-functions.- Chapter 3 Equidistribution and L-functions.- Chapter 4 Modular Forms and Dirichlet Series.- Chapter 5 Dirichlet L-functions.- Chapter 6 Non-vanishing of Quadratic Twists of Modular L-functions.- Chapter 7 Selberg’s Conjectures.- Chapter 8 Suggestions for further reading.- Author index.- Subject index.

Fields of interest
Number Theory; Algebraic Geometry

Target groups
Research

Discount group
P

The Geometry of Minkowski Spacetime

An Introduction to the Mathematics of the Special Theory of Relativity

This book offers a presentation of the special theory of relativity that is mathematically rigorous and yet spells out in considerable detail the physical significance of the mathematics. It treats, in addition to the usual menu of topics one is accustomed to finding in introductions to special relativity, a wide variety of results of more contemporary origin. These include Zeeman’s characterization of the causal automorphisms of Minkowski spacetime, the Penrose theorem on the apparent shape of a relativistically moving sphere, a detailed introduction to the theory of spinors, a Petrov-type classification of electromagnetic fields in both tensor and spinor form, a topology for Minkowski spacetime whose homeomorphism group is essentially the Lorentz group, and a careful discussion of Dirac’s famous Scissors Problem and its relation to the notion of a two-valued representation of the Lorentz group. This second edition includes a new chapter on the de Sitter universe which is intended to serve two purposes.

Features
► Mathematically rigorous treatment of special relativity with precise statement of the physical interpretation ► Detailed introduction to the the theory of spinors in Minkowski spacetime ► Thorough treatments of numerous topics not generally discussed at the introductory level

Contents

Fields of interest
Partial Differential Equations; Computational Mathematics and Numerical Analysis

Target groups
Research

Discount group
P

The Geometry of Minkowski Spacetime

An Introduction to the Mathematics of the Special Theory of Relativity

G. L. Naber, Drexel University, Department of Mathematics, Philadelphia, PA

Equations in Mathematical Physics

A practical course

V. P. Pikulin, Moscow Power Engineering Institute, Russia; S. I. Pohozaev, Steklov Institute of Mathematics, Moscow, Russia

Many physical processes in fields such as mechanics, thermodynamics, electricity, magnetism or optics are described by means of partial differential equations. The aim of the present book is to demonstrate the basic methods for solving the classical linear problems in mathematical physics of elliptic, parabolic and hyperbolic type. In particular, the methods of conformal mappings, Fourier analysis and Green’s functions are considered, as well as the perturbation method and integral transformation method, among others. Every chapter contains concrete examples with a detailed analysis of their solution. The book is intended as a textbook for students in mathematical physics, but will also serve as a handbook for scientists and engineers.

Features
► Presents main methods and tools for solving basic problems from mathematical physics ► Offers quick access to principal facts and valuable tools ► A very good example of a valuable manual for future engineers and scientists

Contents

Fields of interest
Partial Differential Equations; Computational Mathematics and Numerical Analysis

Target groups
Research

Discount group
P
K. Schmidt, Universität Wien, Austria

Dynamical Systems of Algebraic Origin

Although much of classical ergodic theory is concerned with single transformations and one-parameter flows, the subject inherits from statistical mechanics not only its name, but also an obligation to analyze spatially extended systems with multidimensional symmetry groups. However, the wealth of concrete and natural examples which has contributed so much to the appeal and development of classical dynamics, is noticeably absent in this more general theory. The purpose of this book is to help remedy this scarcity of explicit examples by introducing a class of continuous Zd-actions diverse enough to exhibit many of the new phenomena encountered in the transition from Z to Zd, but which nevertheless lends itself to systematic study: the Zd-actions by automorphisms of compact, abelian groups.

Features
- Beautifully written monograph on an interesting topic in ergodic theory
- First systematic account of the ergodic theory of algebraic Zd-actions
- Valuable to researchers and graduate students of ergodic theory

Contents
Introduction.- Chapter I. Group actions by automorphisms to compact groups.- Chapter II. Zd-actions on compact abelian groups.- Chapter III. Expansive automorphisms of compact groups.- Chapter IV. Periodic points.- Chapter V. Entropy.- Chapter VI. Positive entropy.- Chapter VII. Zero entropy.- Chapter VIII. Mixing.- Chapter IX. Rigidity.- Bibliography.- Index.

Fields of interest
Topological Groups, Lie Groups; Algebraic Geometry; Probability Theory and Stochastic Processes

Target groups
Research

Discount group
P

V. Shikhman, RWTH Aachen, Germany

Topological Aspects of Nonsmooth Optimization

This book deals with nonsmooth structures arising within the optimization setting. It considers four optimization problems, namely, mathematical programs with complementarity constraints, general semi-infinite programming problems, mathematical programs with vanishing constraints and bilevel optimization. The author uses the topological approach and topological invariants of corresponding feasible sets are investigated. Moreover, the critical point theory in the sense of Morse is presented and parametric and stability issues are considered. The material progresses systematically and establishes a comprehensive theory for a rather broad class of optimization problems tailored to their particular type of nonsmoothness.

Features
- Establishes a comprehensive theory for a rather broad class of optimization problems tailored to their particular type of nonsmoothness
- Considers four optimization problems and uses a topological approach
- Handles various equilibrium optimization problems from the same topological point of view
- Links ideas from singularity and transversality theory with nonsmooth optimization

Contents

Fields of interest
Optimization; Functional Analysis

Target groups
Research

Discount group
P

Available
2012. XI, 189 p. 29 illus. (Springer Optimization and Its Applications / Nonconvex Optimization and Its Applications, Volume 64) Hardcover
- $99.00

Due November 2011
2012. XI, 189 p. 29 illus. (Springer Optimization and Its Applications / Nonconvex Optimization and Its Applications, Volume 64) Hardcover
- $99.00

Available
- $74.95
ISBN 978-3-0348-0276-5

The Cinderella.2 Manual

Working with The Interactive Geometry Software

Cinderella.2, the new version of the well-known interactive geometry software, has become an even more versatile tool than its predecessor. It now consists of three connected parts: An enhanced geometry component with new features like transformations and dynamic fractals, a simulation laboratory to explore basic laws of Newton mechanics, and an easy to use scripting language which interacts smoothly with the geometry and simulation components, and a complete reference. Cinderella.2 is Math in Motion all the way, and enables any user to quickly extend the software even further. The Cinderella.2 Manual is the first book to offer complete instruction and techniques for using Cinderella.2. It contains a wealth of examples, in particular for the CindyScript language for using Cinderella.2. It contains a wealth of examples, in particular for the CindyScript language which interacts smoothly with the geometry and simulation components, and a complete reference. Cinderella.2 is Math in Motion all the way, and this book provides comprehensive documentation from start to finish.

Feature
- Best geometry and physics simulation and teaching software available

Fields of interest
Geometry; Electronics and Microelectronics, Instrumentation; Algorithms

Target groups
Lower undergraduate

Discount group
P
G. Shimura, Princeton University, NJ, USA

**Modular Forms: Basics and Beyond**

This is an advanced book on modular forms. While there are many books published about modular forms, they are written at an elementary level, and not so interesting from the viewpoint of a reader who already knows the basics. This book offers something new, which may satisfy the desire of such a reader. However, we state every definition and every essential fact concerning classical modular forms of one variable. One of the principal new features of this book is the theory of modular forms of half-integral weight, another being the discussion of theta functions and Eisenstein series of holomorphic and nonholomorphic types. Thus the book is presented so that the reader can learn such theories systematically.

**Features**
- Contains advanced material but always reminds the reader of basic facts
- Features the theory of modular forms of half-integral weight, and the discussion of theta functions and Eisenstein series of holomorphic and nonholomorphic types
- Discusses special values of various Dirichlet series associated to one or two modular forms

**Contents**
- Preface
- Notation and Terminology
- Chapter I. Preliminaries
- Chapter II. Theta Functions and Factors of Automorphy
- Chapter III. The Rationality and Eisenstein Series
- Chapter IV. The Correspondence between Forms of Integral and Half-integral Weight
- Chapter V. The Arithmeticity of Critical Values of Dirichlet Series
- Appendix
- References
- Index

**Fields of interest**
- Numerical Analysis

**Target groups**
- Research

**Discount group**
- P

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**Handbook of Networks in Power Systems I**

The Handbook of Networks in Power Systems has as an objective to include the state-of-the-art developments that occurred in the power systems network, in particular gas, electricity, liquid fuels, freight network and network interactions. It is separated into six sections with different subjects where one scientific paper or more, depending on the importance is included. Each subject is identified following the activity on the domain and the recognition of each subject as an area of research. The scientific papers are authored by a world specialist on the domain. Preliminary.

**Features**
- Provides a state-of-the-art overview in the field of networks in power systems
- Also for non-experts
- Covers all major fields in power systems networks

**Contents**
- Part I: Electricity - Network

**Fields of interest**
- Calculus of Variations and Optimal Control; Optimization; Operation Research/Decision Theory; Energy Technology

**Target groups**
- Research

**Discount group**
- P

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**Handbook of Networks in Power Systems II**

The Handbook of Networks in Power Systems has as an objective to include the state-of-the-art developments that occurred in the power systems network, in particular gas, electricity, liquid fuels, freight network and network interactions. It is separated into six sections with different subjects where one scientific paper or more, depending on the importance is included. Each subject is identified following the activity on the domain and the recognition of each subject as an area of research. The scientific papers are authored by a world specialist on the domain. See Volume 1.

**Features**
- Covers all major topics in power systems networks
- Contains a collection of state-of-the-art review articles
- Includes topics like natural gas, electricity, liquid fuels, freight and network interactions

**Contents**
- Part II: Gas Network
- Part III: Network Interactions

**Fields of interest**
- Calculus of Variations and Optimal Control; Optimization; Operation Research/Decision Theory; Energy Technology

**Target groups**
- Research

**Discount group**
- P

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**Due November 2011**

2012, X, 176 p. (Springer Monographs in Mathematics) Hardcover
- $99.00

2012, X, 600 p. 147 illus., 87 in color. (Energy Systems) Hardcover
- $239.00
- ISBN 978-3-642-23192-6

2012, X, 580 p. 46 illus., 5 in color. (Energy Systems) (In 2 volumes, not available separately) Hardcover
- $239.00
- ISBN 978-3-642-23405-7
Generalized Polygons

Generalized Polygons is the first book to cover, in a coherent manner, the theory of polygons from scratch. In particular, it fills elementary gaps in the literature and gives an up-to-date account of current research in this area, including most proofs, which are often unified and streamlined in comparison to the versions generally known. Generalized Polygons will be welcomed both by the student seeking an introduction to the subject as well as the researcher who will value the work as a reference. In particular, it will be of great value for specialists working in the field of generalized polygons (which are, incidentally, the rank 2 Tits-buildings) or in fields directly related to Tits-buildings, incidence geometry and finite geometry.

Features
- Provides a complete introduction to generalized polygons
- Develops the theory from scratch
- Provides geometric proofs of algebraic results
- Serves as an extensive source for references

Contents

Fields of interest
Geometry; Algebraic Geometry

Target groups
Research

Available
► $84.95
ISBN 978-3-0348-0270-3

Visual Complex Functions

This course on complex functions is distinguished by consistently using phase portraits, a special color representation which visualizes functions as images. The text introduces the basic concepts of complex analysis, and, parallel to a systematic investigation of analytic and meromorphic functions, readers learn how properties of a function are reflected in and can be recovered from its phase portrait. The approach emphasizes constructive aspects, it is intuitive, and requires only basic knowledge of calculus. More advanced readers will get a fresh view on classical results and may be inspired by the pictures to new and challenging questions.

Features
- First introduction to complex functions systematically using phase portraits (which are expected to become an indispensable tool for exploring complex functions in teaching, mathematical research and applications alike)
- Reorganization of the traditional material covered by textbooks in complex analysis and emphasis on special aspects of the topic.
- A companion to rather than a substitute for existing textbooks on complex analysis, although mostly self-contained
- Enhances intuitive understanding of basic concepts and special functions by visualizing complex functions by phase plots
- Complete text equipped with color illustrations

Contents

Fields of interest
Functions of a Complex Variable; Special Functions

Target groups
Graduate

Available
2012. 200 p. 200 illus. in color. Softcover
► approx. $49.95
ISBN 978-3-0348-0179-9