Hydromagnetic Waves in the Magnetosphere and the Ionosphere

The book deals with Ultra-Low-Frequency (ULF)-electromagnetic waves observed on the Earth and in Space. These are so-called geomagnetic variations or pulsations. Alfvén's discovery related to the influence of the strong magnetic field on the conducting fluids (magnetohydrodynamics) led to development of the concept that the ULF-waves are magnetospheric magnetohydrodynamic (MHD)-waves. MHD-waves at their propagation gather information about the magnetosphere, ionosphere, and the ground. There are two applied aspects based on using the ULF electromagnetic oscillations. The first one is the ground-based diagnostics of the magnetosphere. This is an attempt to monitor in the real time the magnetosphere size, distance to the last closed field-lines, distribution of the cold plasma, etc. The second one is the deep electromagnetic sounding of the Earth. The basis for these studies is the capability of any electromagnetic wave to penetrate a conductor to a finite depth.

Features
- Integrates topics pertaining to all scales of the MHD-waves, emphasizing the linkages between the ULF-waves below the ionosphere on the ground and magnetospheric MHD-waves

From the contents
1 Partially Ionized Plasma. 2 Electrodynamic Properties Of Space. 3 ULF-Waves On The Ground And In Space. 4 Magnetohydrodynamic Waves. 5 Hydromagnetic Resonators. 6 FLR In Plasma Configurations. 7 MHD-Waves In Layered Media. 8 Propagation Of MHD-Beams. 9 Inhomogeneous Ionosphere. 10 Effective Conductivity Of A Cloudy Ionosphere. 11 ULF-Sounding Of Magnetosphere And Earth.

Fields of interest
Astronomy, Astrophysics and Cosmology; Extrasolar Terrestrial Physics, Space Sciences

Target groups
Advanced graduate students, scientists.

Discount group
P

Relativistic Physics and Cosmology – Einstein's Legacy
International Astrophysics Conference, Munich, 7-11 November 2005

“Relativistic Astrophysics and Cosmology” have developed into important and fruitful research areas with a hitherto unprecedented public interest. The year 2005, which marked the 100th anniversary of the “annus mirabilis”, that year in which Albert Einstein published three of his most important scientific papers, was the perfect opportunity to review and to present the current scientific understanding of relativistic topics including cosmological models, cosmology related measurements, the large scale properties of the Universe, dark matter and dark energy, the theory of gravity, black holes, theory and measurements, active galactic nuclei, clusters of galaxies, jets. Each of these subjects is addressed and the book represents a useful reference tool both for the expert and the new-comer in these fields.

Features
- Up-to-date reference on the theory of gravity, relativistic astrophysics and cosmology

Contents

Fields of interest
Relativity and Cosmology; Astronomy, Astrophysics and Cosmology

Target groups
Expert and the new-comer in these fields

Discount group
P

Jets from Young Stars II
Clues from High Angular Resolution Observations

This volume contains the edited lecture notes of the Second JETSET School on Jets from Young Stars: Clues from High Angular Resolution Observations held by the “Marie Curie Research and Training Network JET Simulations, Experiments and Theory”. After the opening two chapters on jet emission, readers can learn the fundamental background of modern high-spatial-resolution techniques, and how such methods have impacted on our understanding of young stars. The lectures provide hands-on insight into Observing from space, e.g. from HST and in the future JWST, and from the ground with adaptive optics, The use of interferometers at millimetre and infrared wavelengths, Spectro-astrometry, Image analysis and spectral diagnostic techniques, High-Angular Resolution studies of the inner regions of circumstellar disks which play a fundamental role in jet launching.

The books’ practical approach makes it an outstanding and extremely useful textbook for PhD students and young researchers in astronomy.

Features
- Introduction to astrophysics and observation of jets from young stars for advanced graduate, PhD students
- Second of a series of 6 volumes forming a comprehensive account of jets from young stars

Contents

Fields of interest
Astrophysics; Astronomy

Target groups
PhD students of astrophysics, young researchers

Discount group
P
Equilibrium Statistical Physics
Phases of Matter and Phase Transitions

This is a textbook which gradually introduces the student to the statistical mechanical study of the different phases of matter and to the phase transitions between them. Throughout, only simple models of both ordinary and soft matter are used but these are studied in detail. The subject is developed in a pedagogical manner, starting from the basics, going from the simple ideal systems to the interacting systems, and ending with the more modern topics. The latter include the renormalisation group approach to critical phenomena, the density functional theory of interfaces, the topological defects of nematic liquid crystals and the kinematic aspects of the phase transformation process. This textbook provides the student with a complete overview, intentionally at an introductory level, of the theory of phase transitions. References include suggestions for more detailed treatments and four appendices supply overviews of the mathematical tools employed in the text.

Features
► Unique and consistent mathematical disquisition
► All equations and deductions included
► Problems and solutions

Contents

Fields of interest
Statistical Physics; Soft Matter, Complex Fluids; Thermodynamics

Target groups
Graduate students in physics, chemical engineering and materials sciences

Discount group
P

IUTAM Symposium on Hamiltonian Dynamics, Vortex Structures, Turbulence
Proceedings of the IUTAM Symposium held in Moscow, 25-30 August, 2006

This work brings together previously unpublished notes contributed by participants of the IUTAM Symposium on Hamiltonian Dynamics, Vortex Structures, Turbulence (Moscow, 25-30 August 2006). The study of vortex motion is of great interest to fluid and gas dynamics: since all real flows are vortical in nature, applications of the vortex theory are extremely diverse, many of them (e.g., aircraft dynamics, atmospheric and ocean phenomena) being especially important. The last few decades have shown that serious possibilities for progress in the research of real turbulent vortex motions are essentially related to the combined use of mathematical methods, computer simulation and laboratory experiments. These approaches have led to a series of interesting results which allow us to study the these processes from new perspectives.

Features
► High quality research from leading scientific schools all over the world

Fields of interest
Fluids; Oceanography; Numerical and Computational Methods

Target groups
Students, postgraduate students, research fellows, postdoctoral workers, lecturers and researchers across the theory of vortices, dynamical systems, fluid and gas dynamics, water problems, oceanography and other applications of vortex theory

Discount group
P

Schrödinger Operators
With Applications to Quantum Mechanics and Global Geometry

A complete understanding of Schrödinger operators is a necessary prerequisite for unveiling the physics of nonrelativistic quantum mechanics. Furthermore recent research shows that it also helps to deepen our insight into global differential geometry. This monograph written for both graduate students and researchers summarizes and synthesizes the theory of Schrödinger operators emphasizing the progress made in the last decade by Lieb, Enss, Witten and others. Besides general properties, the book covers, in particular, multiparticle quantum mechanics including bound states of Coulomb systems and scattering theory, quantum mechanics in constant electric and magnetic fields, Schrödinger operators with random and almost periodic potentials and, finally, Schrödinger operator methods in differential geometry to prove the Morse inequalities and the index theorem. This corrected and extended reprint contains updated proofs and references as well as notes on the development in the field over the past twenty years.

Contents

Fields of interest
Quantum Physics; Quantum Computing, Information and Physics; Operator Theory

Target groups
Advanced students

Discount group
P

Due December 2007

2008. Approx. 400 p. 82 illus. Hardcover
► $109.00
ISBN 978-3-540-74631-7

Due November 2007

► $199.00

Due October 2007

► $59.95
ISBN 978-3-540-16758-7
TCP 2006
Proceedings of the 4th International Conference on Trapped Charged Particles and Fundamental Physics, TCP 2006, held in Parksville, Canada, 3-8 September, 2006

The TCP06 conference in Parksville on Vancouver Island showcased the impressive progress in the study of fundamental physics using trapped charged particles. Atom and ion trapping has revolutionized atomic physics and related fields. It has proven to be particularly useful for fundamental physics experiments, as the tight control over the particles’ degrees of freedom leads to increased precision and efficient use of exotic species such as radioactive atoms or anti-matter. The topics of the meeting included fundamental interactions and symmetries, quantum electrodynamics, quantum state manipulation and quantum information, precision spectroscopy and frequency standards, storage ring physics, highly charged ions in traps, traps for radioactive isotopes, plasmas and collective behaviour, and anti-hydrogen. Highlights from related fields such as fundamental physics studies with neutral, trapped atoms were also presented. The combination of overview articles by leaders in the field and detailed reports on recent research results will without doubt make these proceedings an extremely useful reference for researchers within the community, but also for those who study similar physics with different techniques, or use trapping methods for different purposes.

Fields of interest
Elementary Particles, Quantum Field Theory

Target groups
Scientists

Discount group
P

Information published in these Proceedings books will be useful for researcher working in Astronomy and Astrophysics, mainly in the field of observational and theoretical studies of compact objects (such as super-massive and stellar mass black holes, highly and weakly magnetized neutron stars, and white dwarfs, isolated or in binary systems, Galactic or extra-galactic) and their progenitors or end points (such as Supernovae and Gamma-ray Bursts).

All papers have been peer-reviewed. These two Proceedings books contain the scientific discussions that more than one hundred scientists from all over the world have had during a two-weeks conference held in Cefalù (in the beautiful island of Sicily, Italy) from 11 to 24 June 2006. Oral contributions and posters were presented at the conference dealing with the astrophysics of compact objects, such as super-massive and stellar mass black holes, highly and weakly magnetized neutron stars, and white dwarfs, both isolated and in binary systems, and of their progenitors or end-points, such as Supernovae and Gamma Ray Bursts. In particular the meeting (and the following Proceedings books) are focused on several scientific areas that are briefly described in the following.

Fields of interest
Astronomy, Astrophysics and Cosmology; Astronomy; Astrophysics

Target groups
Researcher working in Astronomy and Astrophysics, mainly in the field of observational and theoretical studies of compact objects (such as super-massive and stellar mass black holes, highly and weakly magnetized neutron stars, and white dwarfs, isolated or in binary systems, Galactic or extra-galactic) and their progenitors or end points (such as Supernovae and Gamma-ray Bursts)

Discount group
P

Computational Many-Particle Physics

Complicated many-particle problems abound in nature and in research alike. Plasma physics, for example, or statistical and condensed matter physics are all heavily dependent on efficient methods for solving such problems. Addressing graduate students and young researchers, this book presents an overview and introduction to state-of-the-art numerical methods for studying interacting classical and quantum many-particle systems. A broad range of techniques and algorithms are covered, and emphasis is placed on their implementation on modern high-performance computers.

Features
► Covers the major developments in computational many-particle physics ► Integrates classical and quantum physics and computational methods ► Both a study text for students and a reference work for researchers ► Graduate students will benefit from the basic introductions and explanations of the application of the theories

Contents

Fields of interest
Mathematical and Computational Physics; Nuclear Physics, Heavy Ions, Hadrons

Target groups
Graduate students and young researchers

Discount group
P

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Fields of interest
Elementary Particles, Quantum Field Theory

Target groups
Scientists

Discount group
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Discount group
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Contents

Fields of interest
Mathematical and Computational Physics; Nuclear Physics, Heavy Ions, Hadrons

Target groups
Graduate students and young researchers

Discount group
P
Geology and Habitability of Terrestrial Planets

Given the fundamental importance of and universal interest in whether extraterrestrial life has developed or could eventually develop in our solar system and beyond, it is vital that an examination of planetary habitability go beyond simple assumptions such as, “Where there is water, there is life”. This book has resulted from a workshop at the International Space Science Institute (ISSI) in Bern, Switzerland which brought together planetary geologists, geophysicists, atmospheric scientists and biologists to discuss the multifaceted problem of how the habitability of a planet co-evolves with the geology of the surface and interior, the atmosphere, and the magnetosphere.

Features
► Presents the combined scientific expertise of researchers studying the conditions of life on other planets

From the contents

Fields of interest
Extraterrestrial Physics, Space Sciences; Astrobiology; Planetology

Target groups
Libraries in Astronomy and Geosciences, researchers in Planetary Geology, Astrobiology, and Planetary Geophysics

Discount group
P

Statistical Physics

In this revised and enlarged second edition of an established text Tony Guénault provides a clear and refreshingly readable introduction to statistical physics, an essential component of any first degree in physics. The treatment itself is self-contained and concentrates on an understanding of the physical ideas, without requiring a high level of mathematical sophistication.

A straightforward quantum approach to statistical averaging is adopted from the outset (easier, the author believes, than the classical approach). The initial part of the book is geared towards explaining the equilibrium properties of a simple isolated assembly of particles. Thus, several important topics, for example an ideal spin-½ solid, can be discussed at an early stage. The treatment of gases gives full coverage to Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein statistics.

Features
► A comprehensive and fundamental, but down-to-earth approach of statistical physics ► Also featuring statistics of gases, condensed matter physics, applications such as superfluids and astrophysics, and a discussion of chemical thermodynamics including chemical equilibrium

Contents

Fields of interest
Statistical Physics; Thermodynamics; Statistics for Engineering, Physics, Computer Science, Chemistry & Geosciences

Target groups
Undergraduate and graduate students

Discount group
P
African Cultural Astronomy
Current Archaeoastronomy and Ethnoastronomy Research in Africa

This is the first scholarly collection of articles focused on the cultural astronomy of Africans. It weaves together astronomy, anthropology, and Africa and it includes African myths and legends about the sky, alignments to celestial bodies found at archaeological sites and at places of worship, rock art with celestial imagery, and scientific thinking revealed in local astronomy traditions including ethnomathematics and the creation of calendars. Authors include astronomers Kim Malville, Johnson Urama, and Thebe Medupe; archaeologist Felix Chami, and geographer Michael Bonine, and many new authors. As an emerging subfield of cultural astronomy, African cultural astronomy researchers are focused on training students specifically for doing research in Africa.

Features
► There are no other books that deal solely with African Cultural Astronomy ► Brings together the latest research on African Cultural Astronomy

Fields of interest
Astronomy, Astrophysics and Cosmology; History

Target groups
Archaeoastronomers, Africanists, ethnoastronomers, historians of science, undergraduate and graduate students

Discount group
P

Multiple Stars across the H-R Diagram
Proceedings of the ESO Workshop held in Garching, Germany, 12-15 July 2005

The ESO workshop “Multiple Stars across the H-R Diagram” was held in Garching on July 12-15, 2005. The topics included observations of multiple stars from ground and space, dynamical and stellar evolution in multiple systems, effects of the environment on multiplicity, formation and early evolution of multiple stars, and special components of multiple stars.

Research on multiple stars has seen major developments during recent years due to the availability of large-aperture telescopes equipped with highly sophisticated instruments for multi-wavelength observations, of modern interferometers and of new satellites. The combination of results from satellites and ground-based facilities led to vivid interaction between the experts of all stellar type.

Features
► Reviews current state of observational and theoretical knowledge of Multiple Stars ► Discusses future studies for further progress in the field

From the contents

Fields of interest
Astronomy, Astrophysics and Cosmology

Target groups
Researchers and professionals

Discount group
P

From Parity Violation to Hadronic Structure and more

This book contains the proceedings of the third international workshop on “From Parity Violation to Hadronic Structure and more...” which was held from May 16 to May 20, 2006, at the George Eliopoulos conference center on the Greek island of Milos. It is part of a series that started in Mainz in 2002 and was followed by a second workshop in Grenoble in 2004. While originally initiated by the extraction of the strangeness contribution to the electromagnetic form factors of the nucleon, the workshop series has continuously broadened the focus to the application of Parity Violation using hadronic probes and to Parity Violation experiments in atomic physics. Meanwhile there have been many exciting new proposals for using Parity Violation in other areas like in the search for new physics beyond the standard model or in exploring hadron structure. There are also close connections to the open question on the size of the two photon exchange amplitude.

Contents

Fields of interest
Nuclear Physics, Heavy Ions, Hadrons; Elementary Particles, Quantum Field Theory

Target groups
Researchers

Discount group
P

Due November 2007
► approx. $129.00

Due November 2007
► approx. $109.00
ISBN 978-3-540-74744-4

Due October 2007
► approx. $199.00
Rugged Free Energy Landscapes
Common Computational Approaches in Spin Glasses, Structural Glasses and Biological Macromolecules

This collection of lectures and tutorial reviews by renowned experts focusses on the common computational approaches in use to unravel the static and dynamical behaviour of complex physical systems at the interface of physics, chemistry and biology. Paradigmatic examples of condensed matter physics are spin and structural glasses and protein folding, as well as their aggregation and adsorption to hard and soft surfaces, in physico-chemical biology.

Among the most prominent joint key features of the systems considered in this volume are rugged free-energy landscapes. These generate metastability and are often responsible for very slow dynamics allowing for the system to be trapped in one of the many available local minima.

The challenge set forth by the authors of this volume is to provide a common basis and technical language for the (computational) technology transfer between the fields and systems considered.

Contents
Introduction.- Spin Glasses.- Structural Glasses.- Protein Folding.- Algorithmic Developments.- Index.

Fields of interest
Partially Ordered Systems, Glasses, Quasicrystals; Statistical Physics; Numerical and Computational Methods

Target groups
Graduate students, lecturers, researchers

Discount group
P

First Light in the Universe
Saas-Fee Advanced Course 36. Swiss Society for Astrophysics and Astronomy

The exploration of the first billion years of the history of the Universe, from the so-called dark ages to cosmic reionisation, represents one of the great challenges of contemporary astrophysics. During these phases the first structures start to grow forming the first stars, galaxies, and possibly also the first quasars. At the same time the dark, neutral Universe starts to be lit up and ionised by these sources, leading to its progressive reionisation and even direct observational signatures of reionisation.

Furthermore, observations of signatures of reionisation and even direct observations of galaxies at redshifts larger than 6 are now becoming feasible.

Features
► A comprehensive introduction to the physics of galaxies, stars, the interstellar and intergalactic medium in the early Universe
► The topic of this book is particularly timely, as many new important observational facilities are being built, for which “first light in the universe” is one of the main science drivers
► A book for graduate students or PhDs, researchers and alike

Fields of interest
Astronomy, Astrophysics and Cosmology; Relativity and Cosmology

Target groups
Advanced students of astronomy

Discount group
P

Exoplanets
Detection, Formation, Properties, Habitability


Features
► The first collection of review articles in one volume covering the very latest developments in exoplanet research
► An invaluable introduction to all the key aspects of exoplanetary systems
► Contains topical reviews of carefully selected research areas
► An easily accessible point of reference in a fast moving and exciting field

Fields of interest
Astronomy; Astrophysics; Extraterrestrial Physics, Space Sciences

Target groups
Professional astronomers, planetary scientists, astrobiologists, final year undergraduates, postgraduate and research students working in astrophysics, astrobiology and planetary science

Discount group
P

Due November 2007

Due November 2007

Due December 2007

2008. Approx. 400 p. 177 illus. (Lecture Notes in Physics, Volume 736) Hardcover
► $99.00
ISBN 978-3-540-74025-4

2008. Approx. 355 p. (Saas-Fee Advanced Courses, Number 36) Hardcover
► approx. $99.00
ISBN 978-3-540-74162-6

► approx. $149.00
ISBN 978-3-540-74007-0

Springer News 10/2007
Time in Quantum Mechanics. Volume 1

The treatment of time in quantum mechanics is still an important and challenging open question in the foundation of the quantum theory. This book describes the problems, and the attempts and achievements in defining, formalizing and measuring different time quantities in quantum theory, such as the parametric (clock) time, tunneling times, decay times, dwell times, delay times, arrival times or jump times. This multi-authored book, written as an introductory guide for newcomers to the subject, as well as a useful source of information for the expert, covers many of the open questions. After the brief historical overview in the introduction, 12 contributions are devoted to conceptual and theoretical investigations as well as experimental issues in quantum-mechanical time measurements. This novel monograph should attract physicists as well as philosophers of science working in the foundations of quantum physics. For this revised second edition, all chapters have been updated and extended where appropriate.

Contents

Fields of interest
Quantum Physics; Measurement Science, Instrumentation

Target groups
Graduate students, lecturers, scientists

Discount group
P

Single Crystal – Large Grain Niobium Technology
Proceedings of the International Niobium Workshop

All papers have been peer-reviewed. SRF Technology based accelerators, FELs, and ERLs are becoming common worldwide. Several new frontier technologies and applications are expected to be evolving in coming years as the cost of SRF technology comes down because the Large Grain-Single Crystal Niobium Technology is maturing very rapidly. Terra Hertz (THz) Science could benefit from these advances, and many applications are likely to be developed in the fields of medical imaging, material science, pharmaceuticals, communications etc.

Fields of interest
Particle Acceleration and Detection, Beam Physics; Crystallography; Partially Ordered Systems, Glasses, Quasicrystals

Target groups
Scientists, engineers, technologists and materials scientists

Discount group
P

Quantum Information Theory and Quantum Statistics

This concise and readable book addresses primarily readers with a background in classical statistical physics and introduces quantum mechanical notions as required. Conceived as a primer to bridge the gap between statistical physics and quantum information, a field to which the author has contributed significantly himself, it emphasizes concepts and thorough discussions of the fundamental notions and prepares the reader for deeper studies, not the least through a selection of well chosen exercises.

Features
▼ Focuses on the real introductory explanation of certain important concepts of quantum information theory and quantum statistics ▼ The mathematically rigorous presentation is supported by numerous examples and exercises ▼ With an appendix summarizing the relevant part of linear analysis

Contents

Fields of interest
Quantum Computing, Information and Physics; Probability Theory and Stochastic Processes; Quantum Physics

Target groups
Graduate students in mathematics, physics, and natural sciences

Discount group
P

Due November 2007

Originally published as volume m 72 in the series: Lecture Notes in Physics
2nd ed. 2007. Approx. 430 p. 62 illus. (Lecture Notes in Physics, Volume 734) Hardcover
► approx. $99.00
ISBN 978-3-540-73472-7

Due October 2007

Only available in print
► $81.00

Due December 2007

► $79.95
ISBN 978-3-540-74634-8

AIP
M. O. Steinhauser, Fraunhofer Ernst-Mach-Institute, Freiburg, Germany

Computational Multiscale Modeling of Fluids and Solids
Theory and Applications

The idea of the book is to provide a comprehensive overview of computational physics methods and techniques, that are used for materials modeling on different length and time scales. Each chapter first provides an overview of the physical basic principles which are the basis for the numerical and mathematical modeling on the respective length scale. The book includes the micro scale, the meso-scale and the macro scale. The chapters follow this classification. The book will explain in detail many tricks of the trade of some of the most important methods and techniques that are used to simulate materials on the perspective levels of spacial and temporal resolution. Case studies are occasionally included to further illustrate some methods or theoretical considerations. Example applications for all techniques are provided, some of which are from the author's own contributions to some of the research areas.

Features
► First book on methods and numerical techniques on multiscales in a concise way ► Recent applications

From the contents

Fields of interest
Mathematical and Computational Physics; Mathematical Methods in Physics; Mechanics, Fluids, Thermodynamics

Target groups
Scientists

Discount group
P

Due December 2007
► $159.00
ISBN 978-3-540-75116-8

M. P. Stockli, Oak Ridge National Laboratory, Oak Ridge, TN, USA (Ed.)

Production and Neutralization of Negative Ions and Beams
11th International Symposium on the Production and Neutralization of Negative Ions and Beams

The reported advances with small sources of negative ions, especially negative hydrogen ions, drive the progress of many accelerators and enable new research methods and technologies. Large sources of negative deuterium ions are being developed for the international experimental fusion reactor (ITER) that will require 40 MW of plasma heating. The developments increasingly use computer modeling to understand the underlying physics, improve existing, and develop new technologies.

Field of interest
Particle Acceleration and Detection, Beam Physics

Target groups
Scientists, engineers, and graduate students interested in ion sources, particle beams, accelerator physics, fusion reactors, plasma science, and/or atomic and molecular physics

Discount group
P

Due October 2007
Only available in print
► $137.00

M. Thriert, Université Pierre et Marie Curie, Paris, France

Biology and Mechanics of Blood Flows
Part I: Biology

Biology and Mechanics of Blood Flows presents the basic knowledge and state-of-the-art techniques necessary to carry out investigations of the cardiovascular system using modeling and simulation. Part I of this two-volume sequence, Biology, addresses the nanoscopic and microscopic scales. The nanoscale corresponds to the scale of biochemical reaction cascades involved in cell adaptation to mechanical stresses among other stimuli. The microscale is the scale of stress-induced tissue remodeling associated with acute or chronic loadings. The cardiovascular system, like any physiological system, has a complicated three-dimensional structure and composition. Its time dependent behavior is regulated, and this complex system has many components. In this authoritative work, the author provides a survey of relevant cell components and processes, with detailed coverage of the electrical and mechanical behaviors of vascular cells, tissues, and organs.

Features
► Multidisciplinary approach starting from the description of accumulated knowledge on the biology of the cardiovascular system to the numerical simulation of flows in the vasculature, incorporating rheology and mechanical data ► Applications of modeling and simulations on health problems as well as therapeutic strategies ► State of the art in applied mathematics to physiological flows

From the contents

Fields of interest
Biophysics/Biomedical Physics; Biomedical Engineering; Cardiology

Target groups
Researchers in Biomechanics, Fluid Mechanics, Applied Mathematics, and Biology/Medicine

Discount group
P

Due December 2007
2008. Approx. 665 p. 60 illus. (CRM Series in Mathematical Physics) Hardcover
► approx. $129.00
Biology and Mechanics of Blood Flows

Part II: Mechanics and Medical Aspects

Biology and Mechanics of Blood Flows presents the basic knowledge and state-of-the-art techniques necessary to carry out investigations of the cardiovascular system using modeling and simulation. Part II of this two-volume sequence, Mechanics and Medical Aspects, refers to the extraction of input data at the macroscopic scale for modeling the cardiovascular system, and complements Part I, which focuses on nanoscopic and microscopic components and processes. This volume contains chapters on anatomy, physiology, continuum mechanics, as well as pathological changes in the vascular walls including the heart and their treatments. Methods of numerical simulations are given and illustrated in particular by application to wall diseases. This authoritative book will appeal to any biologist, chemist, physicist, or applied mathematician interested in the functioning of the cardiovascular system.

Features
- Multidisciplinary approach starting from the description of accumulated knowledge on the biology of the cardiovascular system to the numerical simulation of flows in the vasculature, incorporating rheology and mechanical data
- Applications of modeling and simulations on health problems as well as therapeutic strategies
- State of the art in applied mathematics to physiological flows

From the contents
Anatomy of the Cardiovascular System.- Cardiovascular Physiology.- Images, Signals and Movements.- Rheology.- Hemodynamics.- Numerical Simulations.- Cardiovascular Diseases.- Treatments of Cardiovascular Diseases.

Fields of interest
Biophysics/Biomedical Physics; Biomedical Engineering; Cardiology

Target groups
Researchers in Biomechanics, Fluid Mechanics, Applied Mathematics, and Biology/Medicine

Discount group
P

Due December 2007

- approx. $129.00
Linear Algebra Thoroughly Explained

Milan Vujicic was Professor of Theoretical Physics at the University of Belgrade and the book is based on lectures he gave there to both undergraduate and postgraduate students over a period of several decades. He also lectured on the applications of linear algebra in particle physics at the University of Adelaide and, after retirement, taught the subject at the most basic level to Teaching Diploma students at the University of Malta. It was his success in this most recent endeavour that inspired him to write this book which sets out to explain Linear Algebra from its fundamentals to the most advanced level where he, himself, used it throughout his career to solve problems involving linear and anti-linear correlations and symmetries in quantum mechanical applications.

Linear Algebra is one of the most important topics in mathematics, of interest in its own right to mathematicians, but also as an enormously powerful tool in the applied sciences, particularly in physics and engineering.

Features
- Subject is taught and illustrated by numerous worked examples
- Much more comprehensive coverage of subjects than competitors

Contents

Fields of interest
Mathematical Methods in Physics; Algebra

Target groups
Students in physics

Discount group
P

Electromagnetic Theory for Microwaves and Optoelectronics

Translated from the Chinese by: K. Zhang, D. Li

This book is a first year graduate text on electromagnetic fields and waves. At the same time it serves as a useful reference for researchers and engineers in the areas of microwaves and optoelectronics.

Following the presentation of the physical and mathematical foundations of electromagnetic theory, the book discusses the field analysis of electromagnetic waves confined in material boundaries, or so-called guided waves, electromagnetic waves in open space, scalar diffraction theory and active devices. The theories and methods presented in the book are foundations of wireless engineering, microwave and millimeter wave techniques, optoelectronics and optical fiber transmission.

Features
- Offers a unified theory of electromagnetic devices in the areas of microwave, millimeter-wave and light-wave technologies
- Provides a detailed and systematical analysis and gives clear physical concepts

Fields of interest
Electromagnetism, Optics and Lasers; Electronics and Microelectronics, Instrumentation; Communications Engineering, Networks

Target groups
Graduate students and lecturers in optoelectronics and electromagnetics, researchers and engineers

Discount group
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