Arfken 7th Edition

Wer Konflikte und schwierige Situationen anpackt und mit der Macht des Dialogs löst, schafft es, das eigene Potenzial und das der Mitarbeiter auszuschöpfen. So kann vermieden werden, dass das Unternehmen, das Team oder die eigene Person an den schwelenden Konflikten zerbricht oder durch die - meist nur in den Köpfen existierende - Ausweglosigkeit dauerhaft gelähmt wird. George Kohlrieser, der sein enormes Wissen nicht nur aus seiner Arbeit als klinischer und als Organisationspsychologe, sondern auch aus seinen Erfolgen als Verhandlungsführer bei Geiselnahmen schöpft, vermittelt dem Leser Schritt für Schritt, wie man selbst immer Herr der Lage bleibt. Anhand von realen Geiselsituationen beschreibt der Autor die Schlüsselfaktoren, die den Leser befähigen, mentale Blockaden zu beseitigen, die uns alle immer wieder zu Gefangenen werden lassen. Führungskräfte erfahren, was sie tun müssen, um eine vertrauensvolle Zusammenarbeit und eine positive, engagierte Einstellung im Team zu erreichen: - Sprechen Sie die Situation klar an. - Bauen Sie echte Beziehungen auf - auch zum "Feind". - Denken Sie niemals wie eine Geisel. - Nutzen Sie die Macht von Dialog und Verhandlung. - Seien Sie selbst eine verlässliche Basis und bilden Sie so Vertrauen. - Verstehen Sie, dass eine Person niemals das Problem ist. - Richten Sie Ihr geistiges Auge auf Erfolg.

International Edition University Physics aims to provide an authoritative treatment and pedagogical presentation in the subject of physics. The text covers basic topics in physics such as scalars and vectors, the first and second condition of equilibrium, torque, center of gravity, and velocity and acceleration. Also covered are Newton’s laws; work, energy, and power; the conservation of energy, linear momentum, and angular momentum; the mechanical properties of matter; fluid mechanics, and wave kinematics. College students who are in need of a textbook for introductory physics would find this book a reliable reference material.

"Problem Solving in Theoretical Physics" helps students mastering their theoretical physics courses by posing advanced problems and providing their solutions - along with discussions of their physical significance and possibilities for generalization and transfer to other fields. Designed for engineering graduate students, this book connects basic mathematics to a variety of methods used in engineering problems. The book begins with a thorough introduction to complex analysis, which is then used to understand the properties of ordinary differential equations and their solutions. The latter are obtained in both series and integral representations. Integral transforms are introduced, providing an opportunity to complement complex analysis with techniques that flow from an algebraic approach. This moves naturally into a discussion of eigenvalue and boundary vale problems. A thorough discussion of multi-dimensional boundary value problems then introduces the reader to the fundamental partial differential equations and “special functions” of mathematical physics. Moving to non-homogeneous boundary value problems the reader is presented with an analysis of Green’s functions from both analytical and algebraic points of view. This leads to a concluding chapter on integral equations.

nen (die fast unverändert in moderne Lehrbücher der Analysis übernommen wurde) ermöglichten ihm nach seinen eigenen Worten, "in einer halben Vier telstunde" die Flächen beliebiger Figuren zu vergleichen. Newton zeigte, daß die Koeffizienten seiner Reihen proportional zu den sukzessiven Ableitungen der Funktion sind, doch ging er darauf nicht weiter ein, da er zu Recht meinte, daß die Rechnungen in der Analysis bequemer auszuführen sind, wenn man nicht mit höheren Ableitungen arbeitet, sondern die ersten Glieder der Reihenentwicklung ausrechnet. Für Newton diente der Zusammenhang zwischen den Koeffizienten der Reihe und den Ableitungen eher dazu, die Ableitungen zu berechnen als die Reihe aufzustellen. Eine von Newtons wichtigsten Leistungen war seine Theorie des Sonnensy stems, die in den "Mathematischen Prinzipien der Naturlehre" ("Principia") ohne Verwendung der mathematischen Analysis dargestellt ist. Allgemein wird angenommen, daß Newton das allgemeine Gravitationsgesetz mit Hilfe seiner Analysis entdeckt habe. Tatsächlich hat Newton (1680) lediglich be wiesen, daß die Bahnkurven in einem Anziehungsfeld Ellipsen sind, wenn die Anziehungskraft invers proportional zum Abstandsquadrat ist: Auf das Ge setz selbst wurde Newton von Hooke (1635-1703) hingewiesen (vgl. § 8) und es scheint, daß es noch von weiteren Forschern vermutet wurde.

Although the Fourier transform is among engineering's most widely used mathematical tools, few engineers realize that the extension of harmonic analysis to functions on groups holds great potential for solving problems in robotics, image analysis, mechanics, and other areas. This self-contained approach, geared toward readers with a standard background in engineering mathematics, explores the widest possible range of applications to fields such as robotics, mechanics, tomography, sensor calibration, estimation and control, liquid crystal analysis, and conformational statistics of macromolecules. Harmonic analysis is explored in terms of particular Lie groups, and the text deals with only a limited number of proofs, focusing instead on specific applications and fundamental mathematical results. Forming a bridge between pure mathematics and the challenges of modern engineering, this updated and expanded volume offers a concrete, accessible treatment that places the general theory in the context of specific groups.

This book offers a detailed and stimulating account of the Lagrangian, or variational, approach to general relativity and beyond. The approach more usually adopted when describing general relativity is to introduce the required concepts of differential geometry and derive the field and geodesic equations from purely geometrical properties. Demonstration of the physical meaning then requires the weak field approximation of these equations to recover their Newtonian counterparts. The potential downside of this approach is that it tends to suit the mathematical mind and requires the physicist to study and work in a completely unfamiliar environment. In contrast, the approach to general relativity described in this book will be especially suited to physics students. After an introduction to field theories and the variational approach, individual sections focus on the variational approach in relation to special relativity, general relativity, and alternative theories of gravity. Throughout the text, solved exercises and examples are presented. The book will meet the needs of both students specializing in theoretical physics and those seeking a better understanding of particular aspects of the subject.

Das Buch bietet eine Einführung in die zum Studium der Theoretischen Physik notwendigen mathematischen Grundlagen. Der erste Teil des Buches beschäftigt sich mit der Theorie der Distributionen und vermittelt daneben einige Grundbegriffe der linearen Funktionalanalysis. Der zweite Teil baut darauf auf und gibt eine auf das Wesentliche beschränkte Einführung in die Theorie der linearen Operatoren in Hilbert-Räumen. Beide Teile werden von je einer Übersicht begleitet, die die zentralen Ideen und Begriffe knapp erläutert und den Inhalt kurz beschreibt. In den Anhängen werden einige grundlegende Konstruktionen und Konzepte der Funktionalanalysis dargestellt und wichtige Konsequenzen entwickelt.

Providing coverage of the mathematics necessary for advanced study in physics and engineering, this text focuses on problem-solving skills and offers a vast array of exercises, as well as clearly illustrating and proving mathematical relations.

Learn the fundamentals of materials design with this all-inclusive approach to the basics in the field Study of materials science is an important aspect of curricula at universities worldwide. This text is designed to serve students at a fundamental level, positioning materials design as an essential aspect of the study of electronics, medicine, and energy storage. Now in its 3rd edition, Principles of Inorganic Materials Design is an introduction to relevant topics including inorganic materials structure/property relations and material behaviors. The new edition now includes chapters on

computational materials science, intermetallic compounds, and covalent compounds. The text is meant to aid students in their studies by providing additional tools to study the key concepts and understand recent developments in materials research. In addition to the many topics covered, the textbook includes: • Accessible learning tools to help students better understand key concepts • Updated content including case studies and new information on computational materials science • Practical end-of-chapter exercises to assist students with the learning of the material • Short biographies introducing pioneers in the field of inorganic materials science For undergraduates just learning the material or professionals looking to brush up on their knowledge of current materials design information, this text covers a wide range of concepts, research, and topics to help round out their education. The foreword to the first edition was written by the 2019 Chemistry Nobel laureate Prof. John B. Goodenough.

An integrated, modern approach to transport phenomena for graduate students, featuring traditional and contemporary examples to demonstrate the diverse practical applications of the theory. Written in an easy to follow style, the basic principles of transport phenomena, and model building are recapped in Chapters 1 and 2 before progressing logically through more advanced topics including physicochemical principles behind transport models. Treatments of numerical, analytical, and computational solutions are presented side by side, often with sample code in MATLAB, to aid students' understanding and develop their confidence in using computational skills to solve real-world problems. Learning objectives and mathematical prerequisites at the beginning of chapters orient students to what is required in the chapter, and summaries and over 400 end-of-chapter problems help them retain the key points and check their understanding. Online supplementary material including solutions to problems for instructors, supplementary reading material, sample computer codes, and case studies complete the package.

Graut Ihnen vor dem GMAT? Keine Panik! Mit "GMAT für Dummies" können Sie sich systematisch auf die GMAT-Fragen einstellen und so Ihre Testpunktzahl nach oben treiben. Sie lernen, nach GMAT-Art zu denken, Texte und knifflige Korrekturaufgaben zu entschlüsseln, hervorragende Essays zu schreiben und die GMAT-Mathematikaufgaben analytisch zu lösen. Außerdem finden Sie in diesem Buch zwei komplette Übungsprüfungen für Ihre Vorbereitung auf den Test.

Ellipsometry is a powerful tool used for the characterization of thin films and multi-layer semiconductor structures. This book deals with fundamental principles and applications of spectroscopic ellipsometry (SE). Beginning with an overview of SE technologies the text moves on to focus on the data analysis of results obtained from SE, Fundamental data analyses, principles and physical backgrounds and the various materials used in different fields from LSI industry to biotechnology are described. The final chapter describes the latest developments of real-time monitoring and process control which have attracted significant attention in various scientific and industrial fields.

The classic book that presents a unified approach to crystallography and the defects found within crystals, revised and updated This new edition of Crystallography and Crystal Defects explains the modern concepts of crystallography in a clear, succinct manner and shows how to apply these concepts in the analyses of point, line and planar defects in crystalline materials. Fully revised and updated, this book now includes: Original source references to key crystallographic terms familiar to materials scientists Expanded discussion on the elasticity of cubic materials New content on texture that contains more detail on Euler angles, orientation distribution functions and an expanded discussion on examples of textures in engineering materials Additional content on dislocations in materials of symmetry lower than cubic An expanded discussion of twinning which includes the description and classification of growth twins The inclusion and explanation of results from atomistic modelling of twin boundaries Problem sets with new questions, detailed worked solutions, supplementary lecture material and online computer programs for crystallographic calculations. Written by authors with extensive lecturing experience at undergraduate level, Crystallography and Crystal Defects, Third Edition continues to take its place as the core text on the topic and provides the essential resource for students and researchers in metallurgy, materials science, physics, chemistry, electrical, civil and mechanical engineering.

Fourier Transforms: Principles and Applications explains transform methods and their applications to electrical systems from circuits, antennas, and signal processors—ably guiding readers from vector space concepts through the Discrete Fourier Transform (DFT), Fourier series, and Fourier transform to other related transform methods. Featuring chapter end summaries of key results, over two hundred examples and four hundred homework problems, and a Solutions Manual this book is perfect for graduate students in signal processing and communications as well as practicing engineers. Class-tested at Dartmouth Provides the same solid background as classic texts in the field, but with an emphasis on digital and other contemporary applications to signal and image processing Modular coverage of material allows for topics to be covered by preference MATLAB files and Solutions Manual available to instructors Over 300 figures, 200 worked examples, and 432 homework problems

This book covers the advanced mathematical techniques useful for physics and engineering students, presented in a form accessible to physics students, avoiding precise mathematical jargon and laborious proofs. Instead, all proofs are given in a simplified form that is clear and convincing for a physicist. Examples, where appropriate, are given from physics contexts. Both solved and unsolved problems are provided in each chapter. Mathematics for Natural Scientists II: Advanced Methods is the second of two volumes. It follows the first volume on Fundamentals and Basics.

Dieser Buchtitel ist Teil des Digitalisierungsprojekts Springer Book Archives mit Publikationen, die seit den Anfängen des Verlags von 1842 erschienen sind. Der Verlag stellt mit diesem Archiv Quellen für die historische wie auch die disziplingeschichtliche Forschung zur Verfügung, die jeweils im historischen Kontext betrachtet werden müssen. Dieser Titel erschien in der Zeit vor 1945 und wird daher in seiner zeittypischen politisch-ideologischen Ausrichtung vom Verlag nicht beworben.

The classical theory of electrodynamics is based on Maxwell's equations and the Lorentz law of force. This book begins

with a detailed analysis of these equations, and proceeds to examine their far-reaching consequences. The traditional approach to electrodynamics treats the ‘microscopic’ equations of Maxwell as fundamental, with electric charge and electric current as the sole sources of the electric and magnetic fields. Subsequently, polarization and magnetization are introduced into Maxwell's equations to account for the observed behavior of material media. The augmented equations, known as Maxwell's ‘macroscopic’ equations, are considered useful for practical applications, but are also ultimately reducible to the more fundamental ‘microscopic’ equations. In contrast, this textbook treats Maxwell's ‘macroscopic’ equations as the foundation of classical electrodynamics, and treats electrical charge, electrical current, polarization, and magnetization as the basic constituents of material media. The laws that govern the distribution of electromagnetic energy and momentum in space-time are also introduced in an early chapter, then discussed in great detail in subsequent chapters. The text presents several examples that demonstrate the solution of Maxwell's equations in diverse situations, aiming to enhance the reader’s understanding of the flow of energy and momentum as well as the distribution of force and torque throughout the matter-field systems under consideration. This revised edition of Field, Force, Energy and Momentum in Classical Electrodynamics features revised chapters, some of which include expanded discussions of fundamental concepts or alternative derivations of important formulas. The new edition also features three additional chapters covering Maxwell’s equations in spherical coordinates (Chapter 10), the author’s recent discussion (and streamlined proof) of the Optical Theorem (Chapter 13), and the fascinating connections between electromagnetism and Einstein’s special theory of relativity (Chapter 15). A new appendix covers the SI system of units that has been used throughout the book. The book is a useful textbook for physics majors studying classical electrodynamics. It also serves as a reference for industry professionals and academic faculty in the fields of optics and advanced electronics.

Now in its 7th edition, Mathematical Methods for Physicists continues to provide all the mathematical methods that aspiring scientists and engineers are likely to encounter as students and beginning researchers. This bestselling text provides mathematical relations and their proofs essential to the study of physics and related fields. While retaining the key features of the 6th edition, the new edition provides a more careful balance of explanation, theory, and examples. Taking a problem-solving-skills approach to incorporating theorems with applications, the book's improved focus will help students succeed throughout their academic careers and well into their professions. Some notable enhancements include more refined and focused content in important topics, improved organization, updated notations, extensive explanations and intuitive exercise sets, a wider range of problem solutions, improvement in the placement, and a wider range of difficulty of exercises. Revised and updated version of the leading text in mathematical physics Focuses on problem-solving skills and active learning, offering numerous chapter problems Clearly identified definitions, theorems, and proofs promote clarity and understanding New to this edition: Improved modular chapters New up-to-date examples More intuitive explanations

In diesem Band der "50 Schlüsselideen"-Reihe präsentiert Joanne Baker für ein breites Publikum die grundlegenden Konzepte der Physik. Sie führt ihre Leser in 50 Stationen durch die historischen Meilensteine in der Entwicklung der Disziplin, durch die bedeutsamen Theorien und die großen Fragen. Jedem Konzept sind zwei Doppelseiten gewidmet; zahlreiche informative Exkurse, einfache Grafiken und kurze Zeitleisten begleiten den Grundtext. Endlich wird Physik nachvollziehbar und verständlich. Lassen Sie sich zu einer spannenden Entdeckungsreise in den Mikro- und Makrokosmos einladen und gewinnen Sie Schritt für Schritt ein Gefühl für das Gedankengebäude der modernen Physik.

This book is a rewritten and annotated version of Leo P. Kadanoff and Gordon Baym’s lectures that were presented in the book Quantum Statistical Mechanics: Green’s Function Methods in Equilibrium and Nonequilibrium Problems. The lectures were devoted to a discussion on the use of thermodynamic Green’s functions in describing the properties of many-particle systems. The functions provided a method for discussing finite-temperature problems with no more conceptual difficulty than ground-state problems, and the method was equally applicable to boson and fermion systems and equilibrium and nonequilibrium problems. The lectures also explained nonequilibrium statistical physics in a systematic way and contained essential concepts on statistical physics in terms of Green’s functions with sufficient and rigorous details. In-Gee Kim thoroughly studied the lectures during one of his research projects but found that the unspecialized method used to present them in the form of a book reduced their readability. He started the tedious work of rewriting and annotating them to fully understand the formalism of nonequilibrium quantum statistical mechanics. While doing so, he realized they can be a useful resource for students of modern physics but will have to be upgraded to match pace with the evolved curricula. Being aware that besides completing the course work and passing the relevant examinations, it is necessary for graduate students of modern physics to make the knowledge of a topic concrete in their minds. This book is a systematically prepared summary of those lectures and will be extremely useful for graduate students as well as senior researchers to settle down the key knowledge of the subject.

How can computer modeling and simulation tools be used to understand and analyze common situations and everyday problems? Readers will find here an easy-to-follow, enjoyable introduction for anyone even with little background training. Examples are incorporated throughout to stimulate interest and engage the reader. Build the necessary skillsets with operating systems, editing, languages, commands, and visualization. Obtain hands-on examples from sports, accidents, and disease to problems of heat transfer, fluid flow, waves, and groundwater flow. Includes discussion of parallel computing and graphics processing units. This introductory, practical guide is suitable for students at any level up to professionals looking to use modeling and simulation to help solve basic to more advanced problems. Michael W. Roth, PhD, serves as Dean of the School of STEM and Business at Hawkeye Community College in Waterloo, Iowa. He was most recently Chair for three years at Northern Kentucky University's Department of Physics, Geology and Engineering Technology, and holds several awards for teaching excellence.

(Autor) Christian Lang / Norbert Pucker (Titel) Mathematische Methoden in der Physik (HL) Die gesamte Mathematik für

Physiker in einem Band! (USP) > didaktisch hervorragend, mathematisch exakt > in der 2. Auflage deutlich erweitert (copy) Das vorliegende Buch ist für Studenten in den ersetn Semestern gedacht. Es soll mit den wichtigsten mathematischen Konzepten vertraut machen und möglichst schnell eine entsprechende Geläufigkeit in ihrer Anwendung vermitteln. Als Vorlesungsunterlage entspricht das Buch einer dreisemestrigen Vorlesung mit Übungen. Durhc die Erläuterung anhand von Beispielen ist das Buch auch gut geeignet für das Selbststudium. Die 2. Auflage ist um die Kapitel Gruppentheorie, Variationsrechnung und Differenzialformen erweitert. (Biblio) 2. Aufl. 2005. 720 S., 178 Abb., geb. € 45,- / sfr 72,- ISBN 3-8274-1558-6 (Störer) neu!

"The book has two primary goals. The first is to challenge and strengthen the reader's understanding of addiction by exploring how others in the field have come to know it. We hope that this will enable the reader to create a clear and logically consistent perspective on addiction. The second goal is to show the reader how theory and research are important to both the prevention and the treatment of substance abuse. This information should provide the reader with an array of strategies for addressing substance abuse problems and help make him or her an effective practitioner"--

This best-selling title provides in one handy volume the essential mathematical tools and techniques used to solve problems in physics. It is a vital addition to the bookshelf of any serious student of physics or research professional in the field. The authors have put considerable effort into revamping this new edition. Updates the leading graduate-level text in mathematical physics Provides comprehensive coverage of the mathematics necessary for advanced study in physics and engineering Focuses on problem-solving skills and offers a vast array of exercises Clearly illustrates and proves mathematical relations New in the Sixth Edition: Updated content throughout, based on users' feedback More advanced sections, including differential forms and the elegant forms of Maxwell's equations A new chapter on probability and statistics More elementary sections have been deleted

Quantum theory and computational chemistry have become integral to the fields of chemistry, chemical engineering, and materials chemistry. Concepts of chemical bonding, band structure, material properties, and interactions between light and matter at the molecular scale tend to be expressed in the framework of orbital theory, even when numerical calculations go beyond simple orbital models. Yet, the connections between these theoretical models and experimental observations are often unclear. It is important--now more than ever--that students master quantum theory if they are going to apply chemical concepts. In this book, Jochen Autschbach connects the abstract with the concrete in an elegant way, creating a guiding text for scholars and students alike. Quantum Theory for Chemical Applications covers the quantum theory of atoms, molecules, and extended periodic systems. Autschbach goes beyond standard textbooks by connecting the molecular and band structure perspectives, covering response theory, and more. The book is broken into four parts: Basic Theoretical Concepts; Atomic, Molecular, and Crystal Orbitals; Further Basic Concepts of Quantum Theory; and Advanced Topics, such as relativistic quantum chemistry and molecule-light interactions. The foresight Autschbach provides is immense, and he sets up a solid theoretical background for nearly every quantum chemistry method used in contemporary research. Because quantum theory tells us what the electrons do in atoms, molecules, and extended systems, the pages in this book are full of answers to questions both long-held and never-before considered.

Der Goldstein gehört zu den Standardwerken für die Vorlesung in Klassischer Mechanik, die Pflichtvorlesung und Teil des Theorie-Lehrplans jedes Physik-Studienganges ist. Für diese aktuelle Ausgabe haben Charles Poole und John Safko die Texte überarbeitet und neueste Themen, Anwendungen und Notationen eingearbeitet und sind damit auf moderne Trends in der Theoretischen Mechanik eingegangen. Neue numerische Übungen verhelfen den Studenten zur Fähigkeit, Computeranwendungen für die Lösung von Physikproblemen zu benutzen. Mathematische Techniken werden detailliert eingeführt, so daß der Text auch für Studenten ohne den entsprechenden Hintergrund der Theoretischen Mechanik verständlich ist.

Mathematical Methods for PhysicistsA Comprehensive GuideAcademic Press

Advanced Mathematics for Engineering Students: The Essential Toolbox provides a concise treatment for applied mathematics. Derived from two semester advanced mathematics courses at the author’s university, the book delivers the mathematical foundation needed in an engineering program of study. Other treatments typically provide a thorough but somewhat complicated presentation where students do not appreciate the application. This book focuses on the development of tools to solve most types of mathematical problems that arise in engineering – a “toolbox” for the engineer. It provides an important foundation but goes one step further and demonstrates the practical use of new technology for applied analysis with commercial software packages (e.g., algebraic, numerical and statistical). Delivers a focused and concise treatment on the underlying theory and direct application of mathematical methods so that the reader has a collection of important mathematical tools that are easily understood and ready for application as a practicing engineer The book material has been derived from class-tested courses presented over many years in applied mathematics for engineering students (all problem sets and exam questions given for the course(s) are included along with a solution manual) Provides fundamental theory for applied mathematics while also introducing the application of commercial software packages as modern tools for engineering application, including: EXCEL (statistical analysis); MAPLE (symbolic and numeric computing environment); and COMSOL (finite element solver for ordinary and partial differential equations)

This book develops and simplifies the concept of quantum mechanics based on the postulates of quantum mechanics. The text discusses the technique of disentangling the exponential of a sum of operators, closed under the operation of commutation, as the product of exponentials to simplify calculations of harmonic oscillator and angular momentum. Based on its singularity structure, the Schrödinger equation for various continuous potentials is solved in terms of the hypergeometric or the confluent hypergeometric functions. The forms of the potentials for which the one-dimensional Schrödinger equation is exactly solvable are derived in detail. The problem of identifying the states of two-level systems which have no classical analogy is addressed by going beyond Bell-like inequalities and separability. The measures of quantumness of mutual information in two two-level systems is also covered in detail.

Calculus is a subject that needs to be studied many times over, ideally with a different book in each new round. Using Ezra Pound’s analogy (in ABC of Reading), we may think of the learner as an apprentice carpenter, and of calculus as a stool or table; the learner must keep going until the piece of furniture has three legs and will stand up, or four legs and won’t tip over too easily. Most people cannot follow this plan, because life is short and the list of other demands on their time just too long. This book has been written with a view to making calculus more interesting and intelligible to those who left college, recently or a long time ago, without becoming an adept; those who are familiar with the contents of undergraduate calculus, but not altogether content with

their own grasp of the central concepts; those who are aware that the structure put together by them during their apprenticeship is too wobbly, and liable to tip over when the number of independent variables is increased from one to just two. An absurd simile? Not in the opinion of a distinguished mathematician and educator (quoted verbatim in the preface), who acknowledged that the customary definition of a differential in the theory of functions of a single variable breaks down when one extends it to functions of several variables and considers double integrals. He continued: “Students are rightly baffled when they attempt to convert such an integral to polar coordinates and are told that no longer is it permissible to [apply a straightforward extension of the relevant formula for a change of variable in a single integral]. The Jacobian must be used instead, and at this point the logical structure which was built so carefully collapses entirely. If we wish to make calculus an intellectually honest subject and not a collection of convenient tricks, it is time we made a fresh start.” Calculus Without Hocus Pocus aims to elucidate those (and only those) issues that are not treated adequately in standard textbooks. It offers more cogent explanations of the conundrums and paradoxes which have been nagging the minds of students and teachers of calculus for generations. The author, who has been using calculus as a teacher and researcher for over fifty years, has tried to produce a condensed and readable book that throws light from various directions upon the difficult parts of this very technical (and somewhat unpopular) subject; to show some of the reasons why calculus has been cast in the mould in which we find it; and to recommend some minor changes in notation and nomenclature that would remove nearly all of the hocus-pocus which almost every learner of calculus has had to endure so far.

This textbook is intended to introduce advanced undergraduate and early-career graduate students to the field of numerical analysis. This field pertains to the design, analysis, and implementation of algorithms for the approximate solution of mathematical problems that arise in applications spanning science and engineering, and are not practical to solve using analytical techniques such as those taught in courses in calculus, linear algebra or differential equations.Topics covered include computer arithmetic, error analysis, solution of systems of linear equations, least squares problems, eigenvalue problems, nonlinear equations, optimization, polynomial interpolation and approximation, numerical differentiation and integration, ordinary differential equations, and partial differential equations. For each problem considered, the presentation includes the derivation of solution techniques, analysis of their efficiency, accuracy and robustness, and details of their implementation, illustrated through the Python programming language.This text is suitable for a year-long sequence in numerical analysis, and can also be used for a one-semester course in numerical linear algebra.

Mathematics for Physical Science and Engineering is a complete text in mathematics for physical science that includes the use of symbolic computation to illustrate the mathematical concepts and enable the solution of a broader range of practical problems. This book enables professionals to connect their knowledge of mathematics to either or both of the symbolic languages Maple and Mathematica. The book begins by introducing the reader to symbolic computation and how it can be applied to solve a broad range of practical problems. Chapters cover topics that include: infinite series; complex numbers and functions; vectors and matrices; vector analysis; tensor analysis; ordinary differential equations; general vector spaces; Fourier series; partial differential equations; complex variable theory; and probability and statistics. Each important concept is clarified to students through the use of a simple example and often an illustration. This book is an ideal reference for upper level undergraduates in physical chemistry, physics, engineering, and advanced/applied mathematics courses. It will also appeal to graduate physicists, engineers and related specialties seeking to address practical problems in physical science. Clarifies each important concept to students through the use of a simple example and often an illustration Provides quick-reference for students through multiple appendices, including an overview of terms in most commonly used applications (Mathematica, Maple) Shows how symbolic computing enables solving a broad range of practical problems

This book is the second of two volumes on random motions in Markov and semi-Markov random environments. This second volume focuses on high-dimensional random motions. This volume consists of two parts. The first expands many of the results found in Volume 1 to higher dimensions. It presents new results on the random motion of the realistic three-dimensional case, which has so far been barely mentioned in the literature, and deals with the interaction of particles in Markov and semi-Markov media, which has, in contrast, been a topic of intense study. The second part contains applications of Markov and semi-Markov motions in mathematical finance. It includes applications of telegraph processes in modeling stock price dynamics and investigates the pricing of variance, volatility, covariance and correlation swaps with Markov volatility and the same pricing swaps with semi-Markov volatilities.

Mathematical physics provides physical theories with their logical basis and the tools for drawing conclusions from hypotheses. Introduction to Mathematical Physics explains to the reader why and how mathematics is needed in the description of physical events in space. For undergraduates in physics, it is a classroom-tested textbook on vector analysis, linear operators, Fourier series and integrals, differential equations, special functions and functions of a complex variable. Strongly correlated with core undergraduate courses on classical and quantum mechanics and electromagnetism, it helps the student master these necessary mathematical skills. It contains advanced topics of interest to graduate students on relativistic square-root spaces and nonlinear systems. It contains many tables of mathematical formulas and references to useful materials on the Internet. It includes short tutorials on basic mathematical topics to help readers refresh their mathematical knowledge. An appendix on Mathematica encourages the reader to use computer-aided algebra to solve problems in mathematical physics. A free Instructor's Solutions Manual is available to instructors who order the book for course adoption.

This textbook provides lecture materials of a comprehensive course in Classical Mechanics developed by the author over many years with input from students and colleagues alike. The richly illustrated book covers all major aspects of mechanics starting from the traditional Newtonian perspective, over Lagrangian mechanics, variational principles and Hamiltonian mechanics, rigid-body, and continuum mechanics, all the way to deterministic chaos and point-particle mechanics in special relativity. Derivation steps are worked out in detail, illustrated by examples, with ample explanations.Developed by a classroom practitioner, the book provides a comprehensive overview of classical mechanics with judicious material selections that can be covered in a one-semester course thus streamlining the instructor's task of choosing materials for their course. The usefulness for instructors notwithstanding, the primary aim of the book is to help students in their understanding, with detailed derivations and explanations, and provide focused guidance for their studies by repeatedly emphasizing how various topics are tied together by common physics principles.

Classical Charged Particle Beam Optics used in the design and operation of all present-day charged particle beam devices, from low energy electron microscopes to high energy particle accelerators, is entirely based on classical mechanics. A question of curiosity is: How is classical charged particle beam optics so successful in practice though the particles of the beam, like electrons, are quantum mechanical? Quantum Mechanics of Charged Particle Beam Optics answers this question with a comprehensive formulation of ‘Quantum Charged Particle Beam Optics’ applicable to any charged particle beam device.

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