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Operator Methods in Quantum Mechanics - O. L. De Lange 1991

Quantum mechanical problems capable of exact solution are traditionally solved in a few instances only (such as the harmonic oscillator and angular momentum) by operator methods, but mainly by means of Schrodinger's wave mechanics. The present volume shows that a large range of one- and three- dimensional problems, including certain relativistic ones, are solvable by algebraic, representation-independent methods using commutation relations, shift operators, the viral, hyperviral, and Hellman-Feynman theorems. Applications of these operator methods to the calculation of eigenvalues, matrix elements, and wavefunctions are discussed in detail. This volume provides an outstanding introduction to the use of operator methods in quantum mechanics, and also serves as a reference work on this topic. As such it is an excellent complement to senior and graduate courses in quantum mechanics. Although primarily a book on applications of operator methods, the presentation is made self-contained by the inclusion of an introductory chapter on the formalism of quantum mechanics. Additional background material supplements the volume at various points in the text. Although there has been much research on operator methods to solve quantum mechanical problems, until now many of these results have remained scattered throughout the literature. Nonspecialists, as well as graduate and upper division students in physics will find this accessible volume to be essential reading in theoretical physics.

Electromagnetic Scattering by Particles and Particle Groups -

Michael I. Mishchenko 2014-04-24

A self-contained, accessible introduction to the basic concepts, formalism and recent advances in electromagnetic scattering, for researchers and graduate students.

Problems And Solutions On Quantum Mechanics - Yung Kuo Lim
1998-09-28

The material for these volumes has been selected from the past twenty years' examination questions for graduate students at the University of California at Berkeley, Columbia University, the University of Chicago, MIT, the State University of New York at Buffalo, Princeton University and the University of Wisconsin.

Ray Tracing and Beyond - E. R. Tracy 2014-02-27

This complete introduction to the use of modern ray tracing techniques in plasma physics describes the powerful mathematical methods generally applicable to vector wave equations in non-uniform media, and clearly demonstrates the application of these methods to simplify and solve important problems in plasma wave theory. Key analytical concepts are carefully introduced as needed, encouraging the development of a visual intuition for the underlying methodology, with more advanced mathematical concepts succinctly explained in the appendices, and supporting Matlab and Raycon code available online. Covering variational principles, covariant formulations, caustics, tunnelling, mode conversion, weak dissipation, wave emission from coherent sources, incoherent wave fields, and collective wave absorption and emission, all within an accessible framework using standard plasma physics notation, this is an invaluable resource for graduate students and researchers in plasma physics.

Quantum Mechanics - Albert Messiah 1961

Subjects include formalism and its interpretation, analysis of simple systems, symmetries and invariance, methods of approximation, elements of relativistic quantum mechanics, much more. "Strongly recommended." -- "American Journal of Physics."

Fundamentals of Spin Exchange - Kev M. Salikhov 2019-11-11

This book is a comprehensive summary of 50 years of research from theoretical predictions to experimental confirmation of the manifestation of spin exchange in EPR spectroscopy. The author unfolds the details of comprehensive state of the art of theoretical calculations, which have been proven to become the core of the paradigm shift in spin exchange and set the direction for the future of spin exchange research. The book

refers to important experimental data that confirms the theory. It describes the modern protocol for determining the bi-molecular spin exchange rate from the EPR spectra, which will be especially interesting for experimentalists. Given its scope, the book will benefit all researchers engaged in theory and experiments in the area of spin exchange and its manifestations in EPR spectroscopy, where many remarkable applications of the spin probe have been developed.

Quantum Mechanics - Jean-Louis Basdevant 2006-05-16

Gives a fresh and modern approach to the field. It is a textbook on the principles of the theory, its mathematical framework and its first applications. It constantly refers to modern and practical developments, tunneling microscopy, quantum information, Bell inequalities, quantum cryptography, Bose-Einstein condensation and quantum astrophysics. The book also contains 92 exercises with their solutions.

Ray Tracing and Beyond - E. R. Tracy 2014-02-27

This complete introduction to the use of modern ray tracing techniques in plasma physics describes the powerful mathematical methods generally applicable to vector wave equations in non-uniform media, and clearly demonstrates the application of these methods to simplify and solve important problems in plasma wave theory. Key analytical concepts are carefully introduced as needed, encouraging the development of a visual intuition for the underlying methodology, with more advanced mathematical concepts succinctly explained in the appendices, and supporting Matlab and Raycon code available online. Covering variational principles, covariant formulations, caustics, tunnelling, mode conversion, weak dissipation, wave emission from coherent sources, incoherent wave fields, and collective wave absorption and emission, all within an accessible framework using standard plasma physics notation, this is an invaluable resource for graduate students and researchers in plasma physics.

Advances in Atomic Physics - Claude Cohen-Tannoudji 2011

This book presents a comprehensive overview of the spectacular advances seen in atomic physics during the last 50 years. The authors explain how such progress was possible by highlighting connections between developments that occurred at different times. They discuss the new perspectives and the new research fields that look promising. The emphasis is placed, not on detailed calculations, but rather on physical ideas. Combining both theoretical and experimental considerations, the book will be of interest to a wide range of students, teachers and researchers in quantum and atomic physics.

Irreversible Quantum Dynamics - Fabio Benatti 2003-07-28

The idea of editing the present volume in the Lecture Notes in Physics series

arose while organizing the "Conference on Irreversible Quantum Dynamics" that took place at The Abdus Salam International Center for Theoretical Physics, Trieste, Italy, from July 29 to August 2, 2002. The aim of the Conference was to bring together different groups of researchers whose interests and pursuits involve irreversibility and time asymmetry in quantum mechanics. The Conference promoted open and in-depth exchanges of different points of view, concerning both the content and character of quantum irreversibility and the methodologies used to study it. The following main themes were addressed: • Theoretical Aspects of Quantum Irreversible Dynamics • Open Quantum Systems and Applications • Foundational Aspects of Irreversible Quantum Dynamics • Asymmetric Time Evolution and Resonances Each theme was reviewed by an expert in the field, accompanied by more specific, research-like shorter talks. The whole topic of quantum irreversibility in all its manifold aspects has always raised a lot of interest, starting with the description of unstable systems in quantum mechanics and the issue of quantum measurement. Further, in recent years a boost of activity concerning noise, dissipation and open systems has been prompted by the fast developing field of quantum communication and information theory. These considerations motivated the editors to put together a

volume that tries to summarize the present day status of the research in the field, with the aim of providing the reader with an accessible and exhaustive introduction to it.

Resonant Tunneling in Semiconductors - L.L. Chang 2012-12-06

This book contains the proceedings of the NATO Advanced Research Workshop on "Resonant Tunneling in Semiconductors: Physics and Applications", held at Escorial, Spain, on May 14-18, 1990. The tremendous growth in the past two decades in the field of resonant tunneling in semiconductor heterostructures has followed, if not outpaced, the expansion witnessed in quantum structures in general. Resonant tunneling shares also the multi-disciplinary nature of that broad area, with an emphasis on the underlying physics but with a coverage of material systems on the one end and device applications on the other. Indeed, that resonant tunneling provides great flexibility in terms of materials and configurations and that it is inherently a fast process with obvious device implications by the presence of a negative differential resistance have contributed to the unrelenting interest in this field. These proceedings consist of 49 refereed articles; they correspond to both invited and contributed talks at the workshop. Because of the intertwining nature of the subject matter, it has been difficult to subdivide them in well-defined sections. Instead, they are arranged in several broad categories, meant to serve only as guidelines of emphasis on different topics and aspects. The book starts with an introduction to resonant tunneling by providing a perspective of the field in the first article. This is followed by discussions of different material systems with various band-structure effects.

A Treatise on the Magnetic Vector Potential - Kristján Óttar Klausen 2020-08-25

The connection between the electric and magnetic fields is fundamental to our understanding of light as electromagnetic waves. The magnetic vector potential lies at the heart of this relation. The idea emerged in the early days of research in electromagnetism but was dismissed for more than half a century until the formulation of quantum electrodynamics. The magnetic vector potential is a pivotal concept with ties to many aspects of physics and mathematics. This book unravels the nature of the magnetic vector potential, highlights its connection to quantum mechanics and superconductivity, and explores the analogy with hydrodynamics.

Sub-seasonal to Seasonal Prediction - Andrew Robertson 2018-10-19

The Gap Between Weather and Climate Forecasting: Sub-seasonal to Seasonal Prediction is an ideal reference for researchers and practitioners across the range of disciplines involved in the science, modeling, forecasting and application of this new frontier in sub-seasonal to seasonal (S2S) prediction. It provides an accessible, yet rigorous, introduction to the scientific principles and sources of predictability through the unique challenges of numerical simulation and forecasting with state-of-science modeling codes and supercomputers. Additional coverage includes the prospects for developing applications to trigger early action decisions to lessen weather catastrophes, minimize costly damage, and optimize operator decisions. The book consists of a set of contributed chapters solicited from experts and leaders in the fields of S2S predictability science, numerical modeling, operational forecasting, and developing application sectors. The introduction and conclusion, written by the co-editors, provides historical perspective, unique synthesis and prospects, and emerging opportunities in this exciting, complex and interdisciplinary field. Contains contributed chapters from leaders and experts in sub-seasonal to seasonal science, forecasting and applications Provides a one-stop shop for graduate students, academic and applied researchers, and practitioners in an emerging and interdisciplinary field Offers a synthesis of the state of S2S science through the use of concrete examples, enabling potential users of S2S forecasts to quickly grasp the potential for application in their own decision-making Includes a broad set of topics, illustrated with graphic examples, that highlight interdisciplinary linkages

Spin-lattice Relaxation of Dilute Solutions of Polarized He3 in Liquid He4 in Low Magnetic Fields at 4 K - Michael A. Taber 1978

Statistical Mechanics of Elasticity - J.H. Weiner 2012-02-10

Advanced, self-contained treatment illustrates general principles and elastic behavior of solids. Topics include thermoelastic behavior of crystalline and polymeric solids, interatomic force laws, behavior of solids, and thermally activated processes. 1983 edition.

Quantum Computation and Quantum Information - Michael A. Nielsen 2010-12-09

One of the most cited books in physics of all time, Quantum Computation

and Quantum Information remains the best textbook in this exciting field of science. This 10th anniversary edition includes an introduction from the authors setting the work in context. This comprehensive textbook describes such remarkable effects as fast quantum algorithms, quantum teleportation, quantum cryptography and quantum error-correction. Quantum mechanics and computer science are introduced before moving on to describe what a quantum computer is, how it can be used to solve problems faster than 'classical' computers and its real-world implementation. It concludes with an in-depth treatment of quantum information. Containing a wealth of figures and exercises, this well-known textbook is ideal for courses on the subject, and will interest beginning graduate students and researchers in physics, computer science, mathematics, and electrical engineering.

The Physics of Atoms and Quanta - Hermann P. J. Haken 2000

The Physics of Atoms and Quanta is a thorough introduction to experiments and theory in this field. Every classical and modern aspect is covered and discussed in detail. The sixth edition includes new developments, as well as new experiments in quantum entanglement, Schrodinger's cat, the quantum computer, quantum information, the atom laser, and much more. A wealth of experiments and problems are included. As this reference ends with the fundamentals of classical bonding, it leads into the authors' more advanced book Molecular Physics and Elements of Quantum Chemistry.

Lectures on Quantum Mechanics - Steven Weinberg 2013

"Ideally suited to a one-year graduate course, this textbook is also a useful reference for researchers. Readers are introduced to the subject through a review of the history of quantum mechanics and an account of classic solutions of the Schr.

Atom-Photon Interactions - Claude Cohen-Tannoudji 1998-03-23

Atom-Photon Interactions: Basic Processes and Applications allows the reader to master various aspects of the physics of the interaction between light and matter. It is devoted to the study of the interactions between photons and atoms in atomic and molecular physics, quantum optics, and laser physics. The elementary processes in which photons are emitted, absorbed, scattered, or exchanged between atoms are treated in detail and described using diagrammatic representation. The book presents different theoretical approaches, including: Perturbative methods The resolvent method Use of the master equation The Langevin equation The optical Bloch equations The dressed-atom approach Each method is presented in a self-contained manner so that it may be studied independently. Many applications of these approaches to simple and important physical phenomena are given to illustrate the potential and limitations of each method.

Introduction to Quantum Optics - Gilbert Grynberg 2010-09-02

Covering a number of important subjects in quantum optics, this textbook is an excellent introduction for advanced undergraduate and beginning graduate students, familiarizing readers with the basic concepts and formalism as well as the most recent advances. The first part of the textbook covers the semi-classical approach where matter is quantized, but light is not. It describes significant phenomena in quantum optics, including the principles of lasers. The second part is devoted to the full quantum description of light and its interaction with matter, covering topics such as spontaneous emission, and classical and non-classical states of light. An overview of photon entanglement and applications to quantum information is also given. In the third part, non-linear optics and laser cooling of atoms are presented, where using both approaches allows for a comprehensive description. Each chapter describes basic concepts in detail, and more specific concepts and phenomena are presented in 'complements'.

Capture and Relaxation in Self-Assembled Semiconductor Quantum Dots - Robson Ferreira 2016-02-23

This is an overview of different models and mechanisms developed to describe the capture and relaxation of carriers in quantum-dot systems. Despite their undisputed importance, the mechanisms leading to population and energy exchanges between a quantum dot and its environment are not yet fully understood. The authors develop a first-order approach to such effects, using elementary quantum mechanics and an introduction to the physics of semiconductors. The book results from a series of lectures given by the authors at the Master's level.

Introduction to Nonlinear Laser Spectroscopy - Marc Levenson 2012-12-02

Introduction to Nonlinear Laser Spectroscopy focuses on the principles of nonlinear laser spectroscopy. This book discusses the experimental techniques of nonlinear optics and spectroscopy. Comprised of seven chapters, this book starts with an overview of the stimulated Raman

effect and coherent anti-Stokes Raman spectroscopy, which can be used in a varied way to generate radiation in the ultraviolet and vacuum-ultraviolet areas. This text then explains the simplest quantum-mechanical system consisting of an isolated entity with energy eigenstates $|b\rangle$ and $|a\rangle$ having energies E_b and E_a ($E_b > E_a$), respectively. Other chapters examine the exciting possibilities started by saturated absorption and related techniques, including improved spectroscopic precision, studies of collisional dynamics, and better measurements of fundamental constants and of basic units. The final chapter deals with the method of infrared spectrophotography, which combines efficient detection, time resolution, and coherent infrared. Spectroscopists and graduate students will find this book extremely useful.

Topics in Modern Physics - Paolo Amore 2014-09-11

Our understanding of the physical world was revolutionized in the twentieth century — the era of “modern physics”. Two books by the second author entitled *Introduction to Modern Physics: Theoretical Foundations* and *Advanced Modern Physics: Theoretical Foundations*, aimed at the very best students, present the foundations and frontiers of today's physics. Many problems are included in these texts. A previous book by the current authors provides solutions to the over 175 problems in the first volume. A third volume *Topics in Modern Physics: Theoretical Foundations* has recently appeared, which covers several subjects omitted in the essentially linear progression in the previous two. This book has three parts: part 1 is on quantum mechanics, part 2 is on applications of quantum mechanics, and part 3 covers some selected topics in relativistic quantum field theory. Parts 1 and 2 follow naturally from the initial volume. The present book provides solutions to the over 135 problems in this third volume. The three volumes in this series, together with the solutions manuals, provide a clear, logical, self-contained, and comprehensive base from which students can learn modern physics. When finished, readers should have an elementary working knowledge in the principal areas of theoretical physics of the twentieth century. Request Inspection Copy

Excitons in Low-Dimensional Semiconductors - Stephan Glutsch 2013-04-17

The author develops the effective-mass theory of excitons in low-dimensional semiconductors and describes numerical methods for calculating the optical absorption including Coulomb interaction, geometry, and external fields. The theory is applied to Fano resonances in low-dimensional semiconductors and the Zener breakdown in superlattices. Comparing theoretical results with experiments, the book is essentially self-contained; it is a hands-on approach with detailed derivations, worked examples, illustrative figures, and computer programs. The book is clearly structured and will be valuable as an advanced-level self-study or course book for graduate students, lecturers, and researchers.

Quantum Mechanics - Robert Joseph Scherrer 2006

"Quantum Mechanics : An Accessible Introduction brings quantum mechanics to undergraduates in a thorough and uniquely approachable way. Designed from the ground up to address the changing needs of today's students, author Robert Scherrer carefully develops a solid foundation before developing more advanced topics. Introductory chapters explain the historic experimental evidence that motivated the emergence of quantum mechanics, and explain its central role in today's science and technology. Intuitive explanations of a quantum phenomenon provide clear physical motivation for the discussion that follow. Unique Math Interlude chapters ensure that the student has all the mathematical skills required to master quantum mechanics."--Page 4 de la couverture.

Quantum Mechanics I - David DeBruyne 2018-11-05

The very best book about how to do quantum mechanics explained in simple English. Ideal for self study or for understanding your professor and his traditional textbook.

Principles of Laser Spectroscopy and Quantum Optics - Paul R. Berman 2011

Principles of Laser Spectroscopy and Quantum Optics is an essential textbook for graduate students studying the interaction of optical fields with atoms. It also serves as an ideal reference text for researchers working in the fields of laser spectroscopy and quantum optics. The book provides a rigorous introduction to the prototypical problems of radiation fields interacting with two- and three-level atomic systems. It examines the interaction of radiation with both atomic vapors and condensed matter systems, the density matrix and the Bloch vector, and applications involving linear absorption and saturation spectroscopy. Other topics include hole burning, dark states, slow light, and coherent transient

spectroscopy, as well as atom optics and atom interferometry. In the second half of the text, the authors consider applications in which the radiation field is quantized. Topics include spontaneous decay, optical pumping, sub-Doppler laser cooling, the Heisenberg equations of motion for atomic and field operators, and light scattering by atoms in both weak and strong external fields. The concluding chapter offers methods for creating entangled and spin-squeezed states of matter. Instructors can create a one-semester course based on this book by combining the introductory chapters with a selection of the more advanced material. A solutions manual is available to teachers. Rigorous introduction to the interaction of optical fields with atoms Applications include linear and nonlinear spectroscopy, dark states, and slow light Extensive chapter on atom optics and atom interferometry Conclusion explores entangled and spin-squeezed states of matter Solutions manual (available only to teachers)

Quantum Mechanics, Volume 1 - Claude Cohen-Tannoudji 2019-12-04

This new edition of the unrivalled textbook introduces the fundamental concepts of quantum mechanics such as waves, particles and probability before explaining the postulates of quantum mechanics in detail. In the proven didactic manner, the textbook then covers the classical scope of introductory quantum mechanics, namely simple two-level systems, the one-dimensional harmonic oscillator, the quantized angular momentum and particles in a central potential. The entire book has been revised to take into account new developments in quantum mechanics curricula. The textbook retains its typical style also in the new edition: it explains the fundamental concepts in chapters which are elaborated in accompanying complements that provide more detailed discussions, examples and applications. * The quantum mechanics classic in a new edition: written by 1997 Nobel laureate Claude Cohen-Tannoudji and his colleagues Bernard Diu and Franck Laloë * As easily comprehensible as possible: all steps of the physical background and its mathematical representation are spelled out explicitly * Comprehensive: in addition to the fundamentals themselves, the book contains more than 350 worked examples plus exercises Claude Cohen-Tannoudji was a researcher at the Kastler-Brossel laboratory of the Ecole Normale Supérieure in Paris where he also studied and received his PhD in 1962. In 1973 he became Professor of atomic and molecular physics at the Collège des France. His main research interests were optical pumping, quantum optics and atom-photon interactions. In 1997, Claude Cohen-Tannoudji, together with Steven Chu and William D. Phillips, was awarded the Nobel Prize in Physics for his research on laser cooling and trapping of neutral atoms. Bernard Diu was Professor at the Denis Diderot University (Paris VII). He was engaged in research at the Laboratory of Theoretical Physics and High Energy where his focus was on strong interactions physics and statistical mechanics. Franck Laloë was a researcher at the Kastler-Brossel laboratory of the Ecole Normale Supérieure in Paris. His first assignment was with the University of Paris VI before he was appointed to the CNRS, the French National Research Center. His research was focused on optical pumping, statistical mechanics of quantum gases, musical acoustics and the foundations of quantum mechanics.

Trapped Charged Particles - Martina Knoop 2016-04-15

At Les Houches in January 2015, experts in the field of charged particle trapping came together for the Second Winter School on Physics with Trapped Charged Particles. This textbook collates the lectures delivered there, covering the fundamental physics of particle traps and the different types of applications of these devices. Taken as a whole, the book gives an overview of why traps for charged particles are important, how they work, their special features and limitations, and their application in areas such as precision measurements, mass spectrometry, optical clocks, plasma physics, antihydrogen creation, quantum simulation and quantum information processing. Chapters from various world experts include those on the basic properties of Penning traps and RF traps, as well as those covering important practical aspects such as vacuum systems, detection techniques, and different types of particle cooling, including laser cooling. Each individual chapter provides information and guidance on the application of the above methods. Additionally, each chapter is complemented by fully worked problems and solutions, making *Trapped Charged Particles* perfect for advanced undergraduate and postgraduate students new to this topic.

Contents: Penning Traps Radiofrequency Traps The Guiding Center Approximation Toroidal Systems Ultrahigh Vacuum for Trapped Ions Laser Cooling Techniques Applicable to Trapped Ions Non-Laser Cooling Techniques Numerical Simulations of Ion Cloud Dynamics Plasmas in Penning Traps Plasma Modes Rotating Wall Technique and Centrifugal Separation Correlations in Trapped Plasma Autoresonance Antihydrogen

Physics Ion Coulomb Crystals and Their Applications Cold Molecular Ions in Traps Precise Tests of Fundamental Symmetries with Trapped Ions Trapped-Ion Optical Frequency Standards Readership: Advanced undergraduate and postgraduate students studying the field of trapped charged particles.

Physics and Finance - Volker Ziemann 2021-01-18

This book introduces physics students to concepts and methods of finance. Despite being perceived as quite distant from physics, finance shares a number of common methods and ideas, usually related to noise and uncertainties. Juxtaposing the key methods to applications in both physics and finance articulates both differences and common features, this gives students a deeper understanding of the underlying ideas. Moreover, they acquire a number of useful mathematical and computational tools, such as stochastic differential equations, path integrals, Monte-Carlo methods, and basic cryptology. Each chapter ends with a set of carefully designed exercises enabling readers to test their comprehension.

Computational Chemistry - Claude Le Bris 2003-05-30

Aiming to provide the reader with a general overview of the mathematical and numerical techniques used for the simulation of matter at the microscopic scale, this book lays the emphasis on the numerics, but modelling aspects are also addressed. The contributors come from different scientific communities: physics, theoretical chemistry, mathematical analysis, stochastic analysis, numerical analysis, and the text should be suitable for graduate students in mathematics, sciences and engineering and technology.

Classical Mechanics Illustrated by Modern Physics - David Gu[ry-Odelin 2010

In many fields of modern physics, classical mechanics plays a key role. This book provides an illustration of classical mechanics in the form of problems (at the bachelor level) inspired - for most of them - by contemporary research in physics, and resulting from the teaching and research experience of the authors.

Electronic and Optical Properties of Conjugated Polymers - William Barford 2005-06-30

This book describes and explains the electronic and optical properties of conjugated polymers by developing theoretical models to understand the key electronic states.

Quantum Mechanics - Claude Cohen-Tannoudji 1977

This didactically unrivalled textbook and timeless reference by Nobel Prize Laureate Claude Cohen-Tannoudji separates essential underlying principles of quantum mechanics from specific applications and practical examples and deals with each of them in a different section. Chapters emphasize principles; complementary sections supply applications. The book provides a qualitative introduction to quantum mechanical ideas; a systematic, complete and elaborate presentation of all the mathematical tools and postulates needed, including a discussion of their physical content and applications. The book is recommended on a regular basis by lecturers of undergraduate courses.

Electromagnetic Waves - Carlo G. Someda 2017-12-19

Adapted from a successful and thoroughly field-tested Italian text, the first edition of *Electromagnetic Waves* was very well received. Its broad, integrated coverage of electromagnetic waves and their applications forms the cornerstone on which the author based this second edition. Working from Maxwell's equations to applications in optical communications and photonics, *Electromagnetic Waves, Second Edition* forges a link between basic physics and real-life problems in wave propagation and radiation. Accomplished researcher and educator Carlo G. Someda uses a modern approach to the subject. Unlike other books in the field, it surveys all major areas of electromagnetic waves in a single treatment. The book begins with a detailed treatment of the mathematics of Maxwell's equations. It follows with a discussion of polarization, delves into propagation in various media, devotes four chapters to guided propagation, links the concepts to practical applications, and concludes with radiation, diffraction, coherence, and radiation statistics. This edition features many new and reworked problems, updated references and suggestions for further reading, a completely revised appendix on Bessel functions, and new definitions such as antenna effective height. Illustrating the concepts with examples in every chapter, *Electromagnetic Waves, Second Edition* is an ideal introduction for those new to the field as well as a convenient reference for seasoned professionals.

Variational Methods for the Numerical Solution of Nonlinear Elliptic Problem - Roland Glowinski 2015-11-04

Variational Methods for the Numerical Solution of Nonlinear Elliptic

Problems addresses computational methods that have proven efficient for the solution of a large variety of nonlinear elliptic problems. These methods can be applied to many problems in science and engineering, but this book focuses on their application to problems in continuum mechanics and physics. This book differs from others on the topic by presenting examples of the power and versatility of operator-splitting methods; providing a detailed introduction to alternating direction methods of multipliers and their applicability to the solution of nonlinear (possibly nonsmooth) problems from science and engineering; and showing that nonlinear least-squares methods, combined with operator-splitting and conjugate gradient algorithms, provide efficient tools for the solution of highly nonlinear problems. The book provides useful insights suitable for advanced graduate students, faculty, and researchers in applied and computational mathematics as well as research engineers, mathematical physicists, and systems engineers.

Nonlinear Optics - Robert W. Boyd 2020-03-30

Nonlinear Optics, Fourth Edition, is a tutorial-based introduction to nonlinear optics that is suitable for graduate-level courses in electrical and electronic engineering, and for electronic and computer engineering departments, physics departments, and as a reference for industry practitioners of nonlinear optics. It will appeal to a wide audience of optics, physics and electrical and electronic engineering students, as well as practitioners in related fields, such as materials science and chemistry. Presents an introduction to the entire field of optical physics from the perspective of nonlinear optics Combines first-rate pedagogy with a treatment of the fundamental aspects of nonlinear optics Covers all the latest topics and technology in this ever-evolving industry Contains a strong emphasis on fundamentals

A Modern Approach to Quantum Mechanics - John S. Townsend 2000

Inspired by Richard Feynman and J.J. Sakurai, *A Modern Approach to Quantum Mechanics* allows lecturers to expose their undergraduates to Feynman's approach to quantum mechanics while simultaneously giving them a textbook that is well-ordered, logical and pedagogically sound. This book covers all the topics that are typically presented in a standard upper-level course in quantum mechanics, but its teaching approach is new. Rather than organizing his book according to the historical development of the field and jumping into a mathematical discussion of wave mechanics, Townsend begins his book with the quantum mechanics of spin. Thus, the first five chapters of the book succeed in laying out the fundamentals of quantum mechanics with little or no wave mechanics, so the physics is not obscured by mathematics. Starting with spin systems it gives students straightforward examples of the structure of quantum mechanics. When wave mechanics is introduced later, students should perceive it correctly as only one aspect of quantum mechanics and not the core of the subject.

Quantum Mechanics, Volume 3 - Claude Cohen-Tannoudji 2019-12-16

This new, third volume of Cohen-Tannoudji's groundbreaking textbook covers advanced topics of quantum mechanics such as uncorrelated and correlated identical particles, the quantum theory of the electromagnetic field, absorption, emission and scattering of photons by atoms, and quantum entanglement. Written in a didactically unrivalled manner, the textbook explains the fundamental concepts in seven chapters which are elaborated in accompanying complements that provide more detailed discussions, examples and applications. * Completing the success story: the third and final volume of the quantum mechanics textbook written by 1997 Nobel laureate Claude Cohen-Tannoudji and his colleagues Bernard Diu and Franck Laloë * As easily comprehensible as possible: all steps of the physical background and its mathematical representation are spelled out explicitly * Comprehensive: in addition to the fundamentals themselves, the books comes with a wealth of elaborately explained examples and applications Claude Cohen-Tannoudji was a researcher at the Kastler-Brossel laboratory of the Ecole Normale Supérieure in Paris where he also studied and received his PhD in 1962. In 1973 he became Professor of atomic and molecular physics at the Collège des France. His main research interests were optical pumping, quantum optics and atom-photon interactions. In 1997, Claude Cohen-Tannoudji, together with Steven Chu and William D. Phillips, was awarded the Nobel Prize in Physics for his research on laser cooling and trapping of neutral atoms. Bernard Diu was Professor at the Denis Diderot University (Paris VII). He was engaged in research at the Laboratory of Theoretical Physics and High Energy where his focus was on strong interactions physics and statistical mechanics. Franck Laloë was a researcher at the Kastler-Brossel laboratory of the Ecole Normale Supérieure in Paris. His first assignment was with the University of Paris VI before he was appointed to the CNRS, the French National Research Center. His research was

focused on optical pumping, statistical mechanics of quantum gases, musical acoustics and the foundations of quantum mechanics.

Problems in Quantum Mechanics - Gordon Leslie Squires 1995-03-16

Many students find quantum mechanics conceptually difficult when they first encounter the subject. In this book, the postulates and key applications of quantum mechanics are well illustrated by means of a carefully chosen set of problems, complete with detailed, step-by-step solutions. Beginning with a chapter on orders of magnitude, a variety of

topics are then covered, including the mathematical foundations of quantum mechanics, Schrödinger's equation, angular momentum, the hydrogen atom, the harmonic oscillator, spin, time-independent and time-dependent perturbation theory, the variational method, multielectron atoms, transitions and scattering. Throughout, the physical interpretation or application of certain results is highlighted, thereby providing useful insights into a wide range of systems and phenomena. This approach will make the book invaluable to anyone taking an undergraduate course in quantum mechanics.