Schaums Series For Functional Analysis

The textbook, Introduction to Wavelet Transforms provides basics of wavelet transforms in a self-contained manner. Applications of wavelet transform theory permeate our daily lives. Therefore it is imperative to have a strong foundation for this subject. Features No prior knowledge of the subject is assumed. Sufficient mathematical background is provided to complete the discussion of different topics. Different topics have been properly segmented for easy learning. This makes the textbook pedagogical and unique. Notation is generally introduced in the definitions. Relatively easy consequences of the definitions are listed as observations, and important results are stated as theorems. Examples are provided for clarity and to enhance reader's understanding of the subject. Each chapter also has a problem section. A majority of the problems are provided with sufficient hints. The textbook can be used either in an upper-level undergraduate or first-year graduate class in electrical engineering, or computer science, or applied mathematics. It can also be used by professionals and researchers in the field who would like a quick review of the basics of the subject. About the Author: Nirdosh Bhatnagar works in both academia and industry in Silicon Valley, California. He is also the author of a comprehensive two-volume work: Mathematical Principles of the Internet, published by the CRC Press in the year 2019. Nirdosh earned M.S. in Operations Research, and M.S. and Ph.D. in electrical engineering, all from Stanford University, Stanford, California. .
This two-volume set on Mathematical Principles of the Internet provides a comprehensive overview of the mathematical principles of Internet engineering. The books do not aim to

provide all of the mathematical foundations upon which the Internet is based. Instead, these cover only a partial panorama and the key principles. Volume 1 explores Internet engineering, while the supporting mathematics is covered in Volume 2. The chapters on mathematics complement those on the engineering episodes, and an effort has been made to make this work succinct, yet self-contained. Elements of information theory, algebraic coding theory, cryptography, Internet traffic, dynamics and control of Internet congestion, and queueing theory are discussed. In addition, stochastic networks, graph-theoretic algorithms, application of game theory to the Internet, Internet economics, data mining and knowledge discovery, and quantum computation, communication, and cryptography are also discussed. In order to study the structure and function of the Internet, only a basic knowledge of number theory, abstract algebra, matrices and determinants, graph theory, geometry, analysis, optimization theory, probability theory, and stochastic processes, is required. These mathematical disciplines are defined and developed in the books to the extent that is needed to develop and justify their application to Internet engineering.

Considers topics in finite element analysis, such as one-dimensional finite elements; two-dimensional finite elements; beam and frame finite elements; variational principles; Galerkin approximation and partial differential equations; and isoparametric finite elements.

Designed for engineering graduate students, this book connects basic mathematics to a variety of methods used in engineering problems.

Advanced Calculus explores the theory of calculus and highlights the connections between calculus and real analysis – providing a mathematically sophisticated introduction to functional analytical concepts. The text is interesting to read and includes many illustrative worked-out

examples and instructive exercises, and precise historical notes to aid in further exploration of calculus. It covers exponential function, and the development of trigonometric functions from the integral. The text is designed for a one-semester advanced calculus course for advanced undergraduates or graduate students. Appropriate rigor for a one-semester advanced calculus course Presents modern materials and nontraditional ways of stating and proving some results Includes precise historical notes throughout the book outstanding feature is the collection of exercises in each chapter Provides coverage of exponential function, and the development of trigonometric functions from the integral

This book is an introduction to numerical analysis and intends to strike a balance between analytical rigor and the treatment of particular methods for engineering problems Emphasizes the earlier stages of numerical analysis for engineers with real-life problem-solving solutions applied to computing and engineering Includes MATLAB oriented examples An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

Praise for the Second Edition "This book is an excellent introduction to the wide field of boundary value problems."—Journal of Engineering Mathematics "No doubt this textbook will be useful for both students and research workers."—Mathematical Reviews A new edition of the highly-acclaimed guide to boundary value problems, now featuring modern computational methods and approximation theory Green's Functions and Boundary Value Problems, Third Edition continues the tradition of the two prior editions by providing mathematical techniques for the use of differential and integral equations to tackle important problems in applied mathematics, the physical sciences, and engineering. This new edition presents mathematical

concepts and quantitative tools that are essential for effective use of modern computational methods that play a key role in the practical solution of boundary value problems. With a careful blend of theory and applications, the authors successfully bridge the gap between real analysis, functional analysis, nonlinear analysis, nonlinear partial differential equations, integral equations, approximation theory, and numerical analysis to provide a comprehensive foundation for understanding and analyzing core mathematical and computational modeling problems. Thoroughly updated and revised to reflect recent developments, the book includes an extensive new chapter on the modern tools of computational mathematics for boundary value problems. The Third Edition features numerous new topics, including: Nonlinear analysis tools for Banach spaces Finite element and related discretizations Best and near-best approximation in Banach spaces Iterative methods for discretized equations Overview of Sobolev and Besov space linear Methods for nonlinear equations Applications to nonlinear elliptic equations In addition, various topics have been substantially expanded, and new material on weak derivatives and Sobolev spaces, the Hahn-Banach theorem, reflexive Banach spaces, the Banach Schauder and Banach-Steinhaus theorems, and the Lax-Milgram theorem has been incorporated into the book. New and revised exercises found throughout allow readers to develop their own problem-solving skills, and the updated bibliographies in each chapter provide an extensive resource for new and emerging research and applications. With its careful balance of mathematics and meaningful applications, Green's Functions and Boundary Value Problems, Third Edition is an excellent book for courses on applied analysis and boundary value problems in partial differential equations at the graduate level. It is also a valuable reference for mathematicians, physicists, engineers, and scientists who use applied

mathematics in their everyday work.

The ideal review for your tensor calculus course More than 40 million students have trusted Schaum's Outlines for their expert knowledge and helpful solved problems. Written by renowned experts in their respective fields, Schaum's Outlines cover everything from math to science, nursing to language. The main feature for all these books is the solved problems. Step-by-step, authors walk readers through coming up with solutions to exercises in their topic of choice. 300 solved problems Coverage of all course fundamentals Effective problem-solving techniques Complements or supplements the major logic textbooks Supports all the major textbooks for tensor calculus courses

The original edition of this book has been out of print for some years. The appear ance of the present second edition owes much to the initiative of Yves Nievergelt at Eastern Washington University, and the support of Ann Kostant, Mathematics Editor at Birkhauser. Since the book was first published, several people have remarked on the absence of exercises and expressed the opinion that the book would have been more useful had exercises been included. In 1997, Yves Nievergelt informed me that, for a decade, he had regularly taught a course at Eastern Washington based on the book, and that he had systematically compiled exercises for his course. He kindly put his work at my disposal. Thus, the present edition appears in two parts. The first is essentially just a reprint of the original edition. I have corrected the misprints of which I have become aware (including those pointed out to me by others), and have made a small number of other minor changes.

During the past 20 years, there has been enormous productivity in theoretical as well as computational integration. Some attempts have been made to find an optimal or best numerical

method and related computer code to put to rest the problem of numerical integration, but the research is continuously ongoing, as this problem is still very much open-ended. The importance of numerical integration in so many areas of science and technology has made a practical, up-to-date reference on this subject long overdue. The Handbook of Computational Methods for Integration discusses quadrature rules for finite and infinite range integrals and their applications in differential and integral equations, Fourier integrals and transforms, Hartley transforms, fast Fourier and Hartley transforms, Laplace transforms and wavelets. The practical, applied perspective of this book makes it unique among the many theoretical books on numerical integration and quadrature. It will be a welcomed addition to the libraries of applied mathematicians, scientists, and engineers in virtually every discipline. Traditional quantum theory has a very rigid structure, making it difficult to accommodate new properties emerging from novel systems. This book presents a flexible and unified theory for physical systems, from micro and macro quantum to classical. This is achieved by incorporating superselection rules and maximal symmetric operators into the theory. The resulting theory is applicable to classical, microscopic quantum and non-orthodox mixed quantum systems of which macroscopic quantum systems are examples. A unified formalism also greatly facilitates the discussion of interactions between these systems. A scheme of quantization by parts is introduced, based on the mathematics of selfadjoint and maximal symmetric extensions of symmetric operators, to describe point interactions. The results are applied to treat superconducting quantum circuits in various configurations. This book also discusses various topics of interest such as the asymptotic treatment of quantum state preparation and quantum measurement, local observables and local values, Schrödinger's cat

states in superconducting systems, and a path space formulation of quantum mechanics. This self-contained book is complete with a review of relevant geometric and operator theories, for example, vector fields and operators, symmetric operators and their maximal symmetric extensions, direct integrals of Hilbert spaces and operators. Contents:Aspects of Geometric and Operator Theories:Manifolds and Dynamical SystemsOperators and Their Direct IntegralsOrthodox and Generalized Quantum Mechanics:Orthodox Quantum MechanicsPhysical Theory in Hilbert SpaceGeneralized Quantum MechanicsPoint Interactions, Macroscopic Quantum Systems and Superselection Rules:Point InteractionsMacroscopic Quantum SystemsAsymptotic Disjointness, Asymptotic Separability, Quantum Mechanics on Path Space and Superselection Rules:Separability and DecoherenceQuantum Mechanics on Path Space Readership: Theoretical and mathematical physicists, applied and pure mathematicians, physicists and philosophers of science (with an interest in quantum theory). Key Features:Rigorous formulation of a unified theory in a form directly applicable to physical systemsIntroduction of a quantization-by-part scheme to treat point interactionsSystematic and explicit treatment of quantum circuits in terms of point interactionsDistinctive selection of materials rarely discussed elsewhere, including a large number of examples and contemporary topicsDiscussions on the interplay of mathematics and physicsKeywords:Quantum Mechanics;Quantization;Macroscopic Quantum Systems;Superconducting Circuits;Point Contact InteractionsReviews:"Numerous sections of the book can be studied (and are really worth studying) like a textbook and without the necessity of going through the rest of the volume … certainly, everyone who works through the book will be rewarded by an enhanced comprehension of orthodox quantum theory … there are

many solid reasons for recommending this book to the whole community of physicists and mathematicians — from graduate students to researchers — interested in a fresh description of the microscopic and macroscopic quantum worlds."Mathematical Reviews

If you want top grades and thorough understanding of numerical analysis, this powerful study tool is the best tutor you can have! It takes you step-by-step through the subject and gives you accompanying related problems with fully worked solutions. You also get additional problems to solve on your own, working at your own speed. (Answers at the back show you how you're doing.) Famous for their clarity, wealth of illustrations and examples—and lack of dreary minutiae—Schaum's Outlines have sold more than 30 million copies worldwide. This guide will show you why!

The fundamental mathematical tools needed to understand machine learning include linear algebra, analytic geometry, matrix decompositions, vector calculus, optimization, probability and statistics. These topics are traditionally taught in disparate courses, making it hard for data science or computer science students, or professionals, to efficiently learn the mathematics. This self-contained textbook bridges the gap between mathematical and machine learning texts, introducing the mathematical concepts with a minimum of prerequisites. It uses these concepts to derive four central machine learning methods: linear regression, principal component analysis, Gaussian mixture models and support vector machines. For students and others with a mathematical background, these derivations provide a starting point to machine learning texts. For those learning the mathematics for the first time, the methods help build intuition and practical experience with applying mathematical concepts. Every chapter includes worked examples and exercises to test understanding. Programming tutorials are offered on

the book's web site.

Matrix Algebra is the first volume of the Econometric Exercises Series. It contains exercises relating to course material in matrix algebra that students are expected to know while enrolled in an (advanced) undergraduate or a postgraduate course in econometrics or statistics. The book contains a comprehensive collection of exercises, all with full answers. But the book is not just a collection of exercises; in fact, it is a textbook, though one that is organized in a completely different manner than the usual textbook. The volume can be used either as a self-contained course in matrix algebra or as a supplementary text.

Education is an admirable thing, but it is well to remember from time to time that nothing worth knowing can be taught. Oscar Wilde, "The Critic as Artist," 1890. Analysis is a profound subject; it is neither easy to understand nor summarize. However, Real Analysis can be discovered by solving problems. This book aims to give independent students the opportunity to discover Real Analysis by themselves through problem solving. ThedepthandcomplexityofthetheoryofAnalysiscanbeappreciatedbytakingaglimpseatits developmental history. Although Analysis was conceived in the 17th century during the Scienti?c Revolution, it has taken nearly two hundred years to establish its theoretical basis. Kepler, Galileo, Descartes, Fermat, Newton and Leibniz were among those who contributed to its genesis. Deep conceptual changes in Analysis were brought about in the 19th century by Cauchy and Weierstrass. Furthermore, modern concepts such as open and closed sets were introduced in the 1900s. Today nearly every undergraduate mathematics program requires at least one semester of Real Analysis. Often, students consider this course to be the most challenging or even intimidating of all their mathematics major requirements. The primary goal

of this book is to alleviate those concerns by systematically solving the problems related to the core concepts of most analysis courses. In doing so, we hope that learning analysis becomes less taxing and thereby more satisfying.

Tough Test Questions? Missed Lectures? Not Enough Time? Fortunately, there's Schaum's. This all-in-one-package includes more than 500 fully solved problems, examples, and practice exercises to sharpen your problem-solving skills. Plus, you will have access to 25 detailed videos featuring math instructors who explain how to solve the most commonly tested problems--it's just like having your own virtual tutor! You'll find everything you need to build confidence, skills, and knowledge for the highest score possible. More than 40 million students have trusted Schaum's to help them succeed in the classroom and on exams. Schaum's is the key to faster learning and higher grades in every subject. Each Outline presents all the essential course information in an easy-to-follow, topic-by-topic format. Helpful tables and illustrations increase your understanding of the subject at hand. This Schaum's Outline gives you 508 fully solved problems Information on frequency distribution, elementary probability theory, elementary sampling theory, statistical decision theory, and analysis of variance Concise explanation of all course concepts Fully compatible with your classroom text, Schaum's highlights all the important facts you need to know. Use Schaum's to shorten your study time--and get your best test scores! Schaum's Outlines--Problem Solved.

For use as supplement or as textbook.

This introductory text examines applications of functional analysis to mechanics, fluid mechanics, diffusive growth, and approximation. Covers distribution theory,

Banach spaces, Hilbert space, spectral theory, Frechet calculus, Sobolev spaces, more. 1985 edition.

Functional analysis owes its OrIgms to the discovery of certain striking analogies between apparently distinct disciplines of mathematics such as analysis, algebra, and geometry. At the turn of the nineteenth century, a number of observations, made sporadically over the preceding years, began to inspire systematic investigations into the common features of these three disciplines, which have developed rather independently of each other for so long. It was found that many concepts of this triad-analysis, algebra, geometry-could be incorporated into a single, but considerably more abstract, new discipline which came to be called functional analysis. In this way, many aspects of analysis and algebra acquired unexpected and pro found geometric meaning, while geometric methods inspired new lines of approach in analysis and algebra. A first significant step toward the unification and generalization of algebra, analysis, and geometry was taken by Hilbert in 1906, who studied the collection, later called 1 , composed of infinite sequences x = Xb X 2, ... , 2 X , ... , of numbers satisfying the condition that the sum Ik"= 1 X 2 converges. k k The collection 12 became a prototype of the class of collections known today as Hilbert spaces.

Complex Function Theory is a concise and rigorous introduction to the theory of

functions of a complex variable. Written in a classical style, it is in the spirit of the books by Ahlfors and by Saks and Zygmund. Being designed for a one-semester course, it is much shorter than many of the standard texts. Sarason covers the basic material through Cauchy's theorem and applications, plus the Riemann mapping theorem. It is suitable for either an introductory graduate course or an undergraduate course for students with adequate preparation. The first edition was published with the title Notes on Complex Function Theory.

The book offers a good introduction to topology through solved exercises. It is mainly intended for undergraduate students. Most exercises are given with detailed solutions. In the second edition, some significant changes have been made, other than the additional exercises. There are also additional proofs (as exercises) of many results in the old section "What You Need To Know", which has been improved and renamed in the new edition as "Essential Background". Indeed, it has been considerably beefed up as it now includes more remarks and results for readers' convenience. The interesting sections "True or False" and "Tests" have remained as they were, apart from a very few changes.

This is a graduate text introducing the fundamentals of measure theory and integration theory, which is the foundation of modern real analysis. The text focuses first on the concrete setting of Lebesgue measure and the Lebesgue

integral (which in turn is motivated by the more classical concepts of Jordan measure and the Riemann integral), before moving on to abstract measure and integration theory, including the standard convergence theorems, Fubini's theorem, and the Carathéodory extension theorem. Classical differentiation theorems, such as the Lebesgue and Rademacher differentiation theorems, are also covered, as are connections with probability theory. The material is intended to cover a quarter or semester's worth of material for a first graduate course in real analysis. There is an emphasis in the text on tying together the abstract and the concrete sides of the subject, using the latter to illustrate and motivate the former. The central role of key principles (such as Littlewood's three principles) as providing guiding intuition to the subject is also emphasized. There are a large number of exercises throughout that develop key aspects of the theory, and are thus an integral component of the text. As a supplementary section, a discussion of general problem-solving strategies in analysis is also given. The last three sections discuss optional topics related to the main matter of the book. Elliptic Boundary Value Problems With Indefinite Weights presents a unified approach to the methodologies dealing with eigenvalue problems involving indefinite weights. The principal eigenvalue for such problems is characterized for various boundary conditions. Such characterizations are used, in particular, to

formulate criteria for the persistence and extinctions of populations, and applications of the formulations obtained can be quite extensive.

Providing an introduction to functional analysis, this text treats in detail its application to boundary-value problems and finite elements, and is distinguished by the fact that abstract concepts are motivated and illustrated wherever possible. It is intended for use by senior undergraduates and graduates in mathematics, the physical sciences and engineering, who may not have been exposed to the conventional prerequisites for a course in functional analysis, such as real analysis. Mature researchers wishing to learn the basic ideas of functional analysis will equally find this useful. Offers a good grounding in those aspects of functional analysis which are most relevant to a proper understanding and appreciation of the mathematical aspects of boundary-value problems and the finite element method.

The guide that helps students study faster, learn better, and get top grades More than 40 million students have trusted Schaum's to help them study faster, learn better, and get top grades. Now Schaum's is better than ever-with a new look, a new format with hundreds of practice problems, and completely updated information to conform to the latest developments in every field of study. Fully compatible with your classroom text, Schaum's highlights all the important facts

you need to know. Use Schaum's to shorten your study time-and get your best test scores! Schaum's Outlines-Problem Solved.

An effective text must be well balanced and thorough in its approach to a topic as expansive as vibration, and Mechanical Vibration is just such a textbook. Written for both senior undergraduate and graduate course levels, this updated and expanded second edition integrates uncertainty and control into the discussion of vibration, outlining basic concepts before delving into the mathematical rigors of modeling and analysis. Mechanical Vibration: Analysis, Uncertainties, and Control, Second Edition provides example problems, end-of-chapter exercises, and an up-to-date set of mini-projects to enhance students' computational abilities and includes abundant references for further study or more in-depth information. The author provides a MATLAB® primer on an accompanying CD-ROM, which contains original programs that can be used to solve complex problems and test solutions. The book is self-contained, covering both basic and more advanced topics such as stochastic processes and variational approaches. It concludes with a completely new chapter on nonlinear vibration and stability. Professors will find that the logical sequence of material is ideal for tailoring individualized syllabi, and students will benefit from the abundance of problems and MATLAB programs provided in the text and on the accompanying CD-ROM,

respectively. A solutions manual is also available with qualifying course adoptions.

This book is about harmonic functions in Euclidean space. This new edition contains a completely rewritten chapter on spherical harmonics, a new section on extensions of Bochers Theorem, new exercises and proofs, as well as revisions throughout to improve the text. A unique software package supplements the text for readers who wish to explore harmonic function theory on a computer. Nearly 200 problems, each with a detailed, worked-out solution, deal with the properties and applications of the gamma and beta functions, Legendre polynomials, and Bessel functions. 1971 edition. This two-volume set on Mathematical Principles of the Internet provides a comprehensive overview of the mathematical principles of Internet engineering. The books do not aim to provide all of the mathematical foundations upon which the Internet is based. Instead, they cover a partial panorama and the key principles. Volume 1 explores Internet engineering, while the supporting mathematics is covered in Volume 2. The chapters on mathematics complement those on the engineering episodes, and an effort has been made to make this work succinct, yet self-contained. Elements of information theory, algebraic coding theory, cryptography, Internet traffic, dynamics and control of Internet

congestion, and queueing theory are discussed. In addition, stochastic networks, graph-theoretic algorithms, application of game theory to the Internet, Internet economics, data mining and knowledge discovery, and quantum computation, communication, and cryptography are also discussed. In order to study the structure and function of the Internet, only a basic knowledge of number theory, abstract algebra, matrices and determinants, graph theory, geometry, analysis, optimization theory, probability theory, and stochastic processes, is required. These mathematical disciplines are defined and developed in the books to the extent that is needed to develop and justify their application to Internet engineering.

Complex analysis can be a difficult subject and many introductory texts are just too ambitious for today's students. This book takes a lower starting point than is traditional and concentrates on explaining the key ideas through worked examples and informal explanations, rather than through "dry" theory.

Tough Test Questions? Missed Lectures? Not Enough Time? Fortunately for you, there's Schaum's Outlines. More than 40 million students have trusted Schaum's to help them succeed in the classroom and on exams. Schaum's is the key to faster learning and higher grades in every subject. Each Outline presents all the essential course information in an easy-to-follow, topic-by-topic format. You also

get hundreds of examples, solved problems, and practice exercises to test your skills. This Schaum's Outline gives you Practice problems with full explanations that reinforce knowledge Coverage of the most up-to-date developments in your course field In-depth review of practices and applications Fully compatible with your classroom text, Schaum's highlights all the important facts you need to know. Use Schaum's to shorten your study time-and get your best test scores! Schaum's Outlines-Problem Solved.

The tensorial nature of a quantity permits us to formulate transformation rules for its components under a change of basis. These rules are relatively simple and easily grasped by any engineering student familiar with matrix operators in linear algebra. More complex problems arise when one considers the tensor fields that describe continuum bodies. In this case general curvilinear coordinates become necessary. The principal basis of a curvilinear system is constructed as a set of vectors tangent to the coordinate lines. Another basis, called the dual basis, is also constructed in a special manner. The existence of these two bases is responsible for the mysterious covariant and contravariant terminology encountered in tensor discussions. A tensor field is a tensor-valued function of position in space. The use of tensor fields allows us to present physical laws in a clear, compact form. A byproduct is a set of simple and clear rules for the

representation of vector differential operators such as gradient, divergence, and Laplacian in curvilinear coordinate systems. This book is a clear, concise, and self-contained treatment of tensors, tensor fields, and their applications. The book contains practically all the material on tensors needed for applications. It shows how this material is applied in mechanics, covering the foundations of the linear theories of elasticity and elastic shells. The main results are all presented in the first four chapters. The remainder of the book shows how one can apply these results to differential geometry and the study of various types of objects in continuum mechanics such as elastic bodies, plates, and shells. Each chapter of this new edition is supplied with exercises and problems most with solutions, hints, or answers to help the reader progress. An extended appendix serves as a handbook-style summary of all important formulas contained in the book.

This new, revised edition covers all of the basic topics in calculus of several variables, including vectors, curves, functions of several variables, gradient, tangent plane, maxima and minima, potential functions, curve integrals, Green's theorem, multiple integrals, surface integrals, Stokes' theorem, and the inverse mapping theorem and its consequences. It includes many completely worked-out problems.

Quantum mechanics is one of the principle pillars of modern physics. It also remains a topic of great interest to mathematicians. Since its discovery it has inspired and been inspired by many topics within modern mathematics, including functional analysis and operator algebras, Lie

groups, Lie algebras and their representations, principle bundles, distribution theory, and much more. Written with beginning graduate students in mathematics in mind, this book provides a thorough treatment of (nonrelativistic) quantum mechanics in a style that is leisurely, without the usual theorem-proof grammar of pure mathematics, while remaining mathematically honest. The author takes the time to fully develop the required mathematics and employs a consistent mathematical presentation to clarify the often-confusing notation of physics texts. Along the way the reader encounters several topics requiring more advanced mathematics than found in many discussions of the subject, making for a fascinating course in how mathematics and physics interact.

Schaum's Outline of Probability and Statistics has become a vital resource for the more than 977,000 college students who enroll in related probability and statistics courses each year. Its big-picture, calculus-based approach makes it an especially authoritative reference for engineering and science majors. Now thoroughly updated, this second edition includes vital new coverage of order statistics, best critical regions, likelihood ratio tests, and other key topics.

The mathematical formalism of quantum theory in terms of vectors and operators in infinite-dimensional complex vector spaces is very abstract. The definitions of many mathematical quantities used do not seem to have an intuitive meaning, which makes it difficult to appreciate the mathematical formalism and understand quantum mechanics. This book provides intuition and motivation to the mathematics of quantum theory, introducing the mathematics in its simplest and familiar form, for instance, with three-dimensional vectors and operators, which can be readily understood. Feeling confident about and comfortable with the mathematics used

helps readers appreciate and understand the concepts and formalism of quantum mechanics. This book is divided into four parts. Part I is a brief review of the general properties of classical and quantum systems. A general discussion of probability theory is also included which aims to help in understanding the probability theories relevant to quantum mechanics. Part II is a detailed study of the mathematics for quantum mechanics. Part III presents quantum mechanics in a series of postulates. Six groups of postulates are presented to describe orthodox quantum systems. Each statement of a postulate is supplemented with a detailed discussion. To make them easier to understand, the postulates for discrete observables are presented before those for continuous observables. Part IV presents several illustrative applications, which include harmonic and isotropic oscillators, charged particle in external magnetic fields and the Aharonov–Bohm effect. For easy reference, definitions, theorems, examples, comments, properties and results are labelled with section numbers. Various symbols and notations are adopted to distinguish different quantities explicitly and to avoid misrepresentation. Self-contained both mathematically and physically, the book is accessible to a wide readership, including astrophysicists, mathematicians and philosophers of science who are interested in the foundations of quantum mechanics.

Copyright: 9087b4142bc638adaa94185bba2c906c