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A First Course in Mathematical Modeling May 17 2021 Offering a solid introduction to the entire modeling process, A FIRST COURSE IN MATHEMATICAL MODELING, 5th Edition delivers an excellent balance of theory and practice, and gives you relevant, hands-on experience developing and sharpening your modeling skills. Throughout, the book emphasizes key facets of modeling, including creative and empirical model construction, model analysis, and model research, and provides myriad opportunities for practice. The authors apply a proven six-step problem-solving process to enhance your problem-solving capabilities -- whatever your level. In addition, rather than simply emphasizing the calculation step, the authors first help you learn how to identify problems, construct or select models, and figure out what data needs to be collected. By involving you in the mathematical process as early as possible -- beginning with short projects -- this text facilitates your progressive development and confidence in mathematics and modeling. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

A First Course in Machine Learning Nov 03 2022 "A First Course in Machine Learning by Simon Rogers and Mark Girolami is the best introductory book for ML currently available. It combines rigor and precision with accessibility, starts from a detailed explanation of the basic foundations of Bayesian analysis in the simplest of settings, and goes all the way to the frontiers of the subject such as infinite mixture models, GPs, and MCMC." —Devdatt Dubhashi, Professor, Department of Computer Science and Engineering, Chalmers University, Sweden "This textbook manages to be easier to read than other comparable books in the subject while retaining all the rigorous treatment needed. The new chapters put it at the forefront of the field by covering topics that have become mainstream in machine learning over the last decade." —Daniel Barbara, George Mason University, Fairfax, Virginia, USA "The new edition of A First Course in Machine Learning by Rogers and Girolami is an excellent introduction to the use of statistical methods in machine learning. The book introduces concepts such as mathematical modeling, inference, and prediction, providing ‘just in time’ the essential background on linear algebra, calculus, and probability theory that the reader needs to understand these concepts." —Daniel Ortiz-Arroyo, Associate Professor, Aalborg University Esbjerg, Denmark "I was impressed by how closely the material aligns with the needs of an introductory course on machine learning, which is its greatest strength...Overall, this is a pragmatic and helpful book, which is well-aligned to the needs of an introductory course and one that I will be looking at for my own students in coming months." —David Clifton, University of Oxford, UK "The first edition of this book was already an excellent introductory text on machine learning for an advanced undergraduate or taught masters level course, or indeed for anybody who wants to learn about an interesting and important field of computer science. The additional chapters of advanced material on Gaussian process, MCMC and mixture modeling provide an ideal basis for practical projects, without disturbing the very clear and readable exposition of the basics contained in the first part of the book." —Gavin Cawley, Senior Lecturer, School of Computing Sciences, University of East Anglia, UK "This book could be used for junior/senior undergraduate students or first-year graduate students, as well as individuals who want to explore the field of machine learning...The book introduces not only the concepts but the underlying ideas on algorithm implementation from a critical thinking perspective." —Guangzhi Qu, Oakland University, Rochester, Michigan, USA

A First Course in Statistical Programming with R Dec 24 2021 This is the only introduction you'll need to start programming in R, the open-source language that is free to download, and lets you adapt the source code for your own requirements. Co-written by one of the R Core Development Team, and by an established R author, this book comes with real R code that complies with the standards of the language. Unlike other introductory books on the ground-breaking R system, this book emphasizes programming, including the principles that apply to most computing languages, and techniques used to develop more complex projects. Learning the language is made easier by the frequent exercises and end-of-chapter reviews that help you progress confidently through the book. Solutions, datasets and any errata will be available from the book's web site. The many examples, all from real applications, make it particularly useful for anyone working in practical data analysis.

A First Course in Quantitative Finance Oct 02 2022 Using stereoscopic images and other novel pedagogical features, this book offers a comprehensive introduction to quantitative finance.

A First Course in Network Theory Feb 23 2022 The study of network theory is a highly interdisciplinary field, which has emerged as a major topic of interest in various disciplines ranging from physics and mathematics, to biology and sociology. This book promotes the diverse nature of the study of complex networks by balancing the needs of students from very different backgrounds. It references the most commonly used concepts in network theory, provides examples of their applications in solving practical problems, and clear indications on how to analyse their results. In the first part of the book, students and researchers will discover the quantitative and analytical tools necessary to work with complex networks, including the most basic concepts in network and graph theory, linear and matrix algebra, as well as the physical concepts most frequently used for studying networks. They will also find instruction on some key skills such as how to proof analytic results and how to manipulate empirical network data. The bulk of the text is focused on instructing readers on the most useful tools for modern practitioners of network theory. These include degree distributions, random networks, network fragments, centrality measures, clusters and communities, communicability, and local and global properties of networks. The combination of theory, example and method that are presented in this text, should ready the student to conduct their own analysis of networks with confidence and allow teachers to select appropriate examples and problems to teach this subject in the classroom.

A First Course in Fluid Dynamics Sep 20 2021 This book introduces the subject of fluid dynamics from the first principles.

A First Course in Complex Analysis with Applications Jan 13 2021 The new Second Edition of A First Course in Complex Analysis with Applications is a truly accessible introduction to the fundamental principles and applications of complex analysis. Designed for the undergraduate student with a calculus background but no prior experience with complex variables, this text discusses theory of the most relevant mathematical topics in a student-friendly manor. With Zill's clear and straightforward writing style, concepts are introduced through numerous examples and clear illustrations. Students are guided and supported through numerous proofs providing them with a higher level of mathematical insight and maturity. Each chapter contains a separate section on the applications of complex variables, providing students with the opportunity to develop a practical and clear understanding of complex analysis.

A First Course in Graph Theory Aug 27 2019 Written by two prominent figures in the field, this comprehensive text provides a remarkably student-friendly approach. Its sound yet accessible treatment emphasizes the history of graph theory and offers unique examples and lucid proofs. 2004 edition.

A First Course in Mathematical Physics Jan 01 2020 The book assumes next to no prior knowledge of the topic. The first part introduces the core mathematics, always in conjunction with the physical context. In the second part of the book, a series of examples showcases some of the more conceptually advanced areas of physics, the presentation of which draws on the developments in the first part. A large number of problems helps students to hone their skills in using the presented mathematical methods. Solutions to the problems are available to instructors on an associated password-protected website for lecturers.

First Course in Applied Behavior Analysis Jul 27 2019 With an emphasis on practical solutions to behavior problems, Chance offers an unparalleled approach to behavior analysis. Creating a simulated classroom, course content is presented by "Dr. Cee"--a fictitious instructor who interacts with equally fictitious students. Through Dr. Cee, Chance teaches the language of behavior theory and analysis as well as the most important procedures for changing behavior and the principles that underlay those procedures. The dialogue between Dr. Cee and the students is realistic; the students ask questions, giving readers a chance to see if they know the answer to the questions raised. Effective and engaging, Chance's Socratic approach is very readable, yet does not sacrifice accuracy and specificity.

First Course in Algorithms Through Puzzles Jun 05 2020 This textbook introduces basic algorithms and explains their analytical methods. All algorithms and methods introduced in this book are well known and frequently used in real programs. Intended to be self-contained, the contents start with the basic models, and no prerequisite knowledge is required. This book is appropriate for undergraduate students in computer science, mathematics, and engineering as a textbook, and is also appropriate for self-study by beginners who are interested in the fascinating field of algorithms. More than 40 exercises are distributed throughout the text, and their difficulty levels are indicated. Solutions and comments for all the exercises are provided in the last chapter. These detailed solutions will enable readers to follow the author's steps to solve problems and to gain a better understanding of the contents. Although details of the proofs and the analyses of algorithms are also provided, the mathematical descriptions in this book are not beyond the range of high school mathematics. Some famous real puzzles are also used to describe the algorithms. These puzzles are quite suitable for explaining the basic techniques of algorithms, which show how to solve these puzzles.

A First Course in Digital Communications Aug 20 2021 A concise introduction to the core concepts in digital communication, providing clarity and depth through examples, problems and MATLAB exercises. Its simple structure maps a logical route to understand the most basic principles in digital communication, and also leads students through more in-depth treatment with examples and step-by-step instructions.

A First Course in Ordinary Differential Equations Jul 07 2020 This book presents a modern introduction to analytical and numerical techniques for solving ordinary differential equations (ODEs). Contrary to the traditional format—the theorem-and-proof format—the book is focusing on analytical and numerical methods. The book supplies a variety of problems and examples, ranging from the elementary to the advanced level, to introduce and study the mathematics of ODEs. The analytical part of the book deals with solution techniques for scalar first-order and second-order linear ODEs, and systems of linear ODEs—with a special focus on the Laplace transform, operator techniques and power series solutions. In the numerical part, theoretical and practical aspects of Runge-Kutta methods for solving initial-value problems and shooting methods for linear two-point boundary-value problems are considered. The book is intended as a primary text for courses on the theory of ODEs and numerical treatment of ODEs for advanced undergraduate and early graduate students. It is assumed that the reader has a basic grasp of elementary calculus, in particular methods of integration, and of numerical analysis. Physicists, chemists, biologists, computer scientists and engineers whose work involves solving ODEs will also find the book useful as a reference work and tool for independent study. The book has been prepared within the framework of a German–Iranian research project on mathematical methods for ODEs, which was started in early 2012.

A First Course in String Theory Dec 12 2020 String theory made understandable. Barton Zwiebach is once again faithful to his goal of making string theory accessible to undergraduates. He presents the main concepts of string theory in a concrete and physical way to develop intuition before formalism, often through simplified and illustrative examples. Complete and thorough in its coverage, this new edition now includes AdS/CFT correspondence and introduces superstrings. It is perfectly suited to introductory courses in string theory for students with a background in mathematics and physics. New sections cover strings on orbifolds, cosmic strings, moduli stabilization, and the string theory landscape. Now with almost 300 problems and exercises, with password-protected solutions for instructors at www.cambridge.org/zwiebach.

A First Course in Mechanics Nov 10 2020 This textbook provides a simple introduction to mechanics for students coming to the subject for the first time. The text is based on courses given to first and second year undergraduates and has been written with this audience in mind. Prerequisites are only a basic familiarity with vectors, matrices, and elementary calculus. The author's aim is to provide an understanding of Newtonian mechanics using the tools of modern algebra. The text is illustrated throughout with many worked examples, and numerous exercises (some with solutions) are provided.

A First Course in Database Systems Mar 03 2020 Provides in-depth coverage of databases from the point of view of the database designer, user, and application programmer, leaving implementation for later courses. It covers the latest database standards: SQL: 1999, SQL/PSM, SQL/CLI, JDBC, ODL, and XML.

A First Course in Analysis Aug 08 2020 This text on advanced calculus discusses such topics as number systems, the extreme value problem, continuous functions, differentiation, integration and infinite series. The reader will find the focus of attention shifted from the learning and applying of computational techniques to careful reasoning from hypothesis to conclusion. The book is intended both for a terminal course and as preparation for more advanced studies in mathematics, science, engineering and computation.

A First Course in Analysis Nov 22 2021 This book is an introductory text on real analysis for undergraduate students. The prerequisite for this book is a solid background in freshman calculus in one variable. The intended audience of this book includes undergraduate mathematics majors and students from other disciplines who use real analysis. Since this book is aimed at students who do not have much prior experience with proofs, the pace is slower in earlier chapters than in later chapters. There are hundreds of exercises, and hints for some of them are included.

A First Course in Group Theory Sep 28 2019

A First Course in Turbulence Oct 10 2020 This is the first book specifically designed to offer the student a smooth transitional course between elementary fluid dynamics (which gives only last-minute attention to turbulence) and the professional literature on turbulent flow, where an advanced viewpoint is assumed. The subject of turbulence, the most forbidding in fluid dynamics, has usually proved treacherous to the beginner, caught in the whirls and eddies of its nonlinearities and statistical imponderables. This is the first book specifically designed to offer the student a smooth transitional course between elementary fluid dynamics (which gives only last-minute attention to turbulence) and the professional literature on turbulent flow, where an advanced viewpoint is assumed. Moreover, the text has been developed for students, engineers, and scientists with different technical backgrounds and interests. Almost all flows, natural and man-made, are turbulent. Thus the subject is the concern of geophysical and environmental scientists (in dealing with atmospheric jet streams, ocean currents, and the flow of rivers, for example), of astrophysicists (in studying the photospheres of the sun and stars or mapping gaseous nebulae), and of engineers (in calculating pipe flows, jets, or wakes). Many such examples are discussed in the book. The approach taken avoids the difficulties of advanced mathematical development on the one side and the morass of experimental detail and empirical data on the other. As a result of following its midstream course, the text gives the student a physical understanding of the subject and deepens his intuitive insight into those problems that cannot now be rigorously solved. In particular, dimensional analysis is used extensively in dealing with those problems whose exact solution is mathematically elusive. Dimensional reasoning, scale arguments, and similarity rules are introduced at the beginning and are applied throughout. A discussion of Reynolds stress and the kinetic theory of gases provides the contrast needed to put mixing-length theory into proper perspective: the authors present a thorough comparison between the mixing-length models and dimensional analysis of shear flows. This is followed by an extensive treatment of vorticity dynamics, including vortex stretching and vorticity budgets. Two chapters are devoted to boundary-free shear flows and well-bounded turbulent shear flows. The examples presented include wakes, jets, shear layers, thermal plumes, atmospheric boundary layers, pipe and channel flow, and boundary layers in pressure gradients. The spatial structure of turbulent flow has been the subject of analysis in the book up to this point, at which a compact but thorough introduction to statistical methods is given. This prepares the reader to understand the stochastic and spectral structure of turbulence. The remainder of the book consists of applications of the statistical approach to the study of turbulent transport (including diffusion and mixing) and turbulent spectra.

A First Course in Network Science Jul 31 2022 A practical introduction to network science for students across business, cognitive science, neuroscience, sociology, biology, engineering and other disciplines.

A Practical Guide to Laboratory Optics Mar 15 2021 Learn the essential skills of laboratory optics and its underlying theoretical framework with seven key experiments.

A First Course in Coding Theory Mar 27 2022 Algebraic coding theory is a new and rapidly developing subject, popular for its many practical applications and for its fascinatingly rich mathematical structure. This book provides an elementary yet rigorous introduction to the theory of error-correcting codes. Based on courses given by the author over several years to advanced undergraduates and first-year graduated students, this guide includes a large number of exercises, all with solutions, making the book highly suitable for individual study.

A First Course in Algebraic Topology May 05 2020 This self-contained introduction to algebraic topology is suitable for a number of topology courses. It consists of about one quarter 'general topology' (without its usual pathologies) and three quarters 'algebraic topology' (centred around the fundamental group, a readily grasped topic which gives a good idea of what algebraic topology is). The book has emerged from courses given at the University of Newcastle-upon-Tyne to senior undergraduates and beginning postgraduates. It has been written at a level which will enable the reader to use it for self-study as well as a course book. The approach is leisurely and a geometric flavour is evident throughout. The many illustrations and over 350 exercises will prove invaluable as a teaching aid. This account will be welcomed by advanced students of pure mathematics at colleges and universities.

A First Course in Optimization May 29 2022 Give Your Students the Proper Groundwork for Future Studies in Optimization A First Course in Optimization is designed for a one-semester course in optimization taken by advanced undergraduate and beginning graduate students in the mathematical sciences and engineering. It teaches students the basics of continuous optimization and helps them better understand the mathematics from previous courses. The book focuses on general problems and the underlying theory. It introduces all the necessary mathematical tools and results. The text covers the fundamental problems of constrained and unconstrained optimization as well as linear and convex programming. It also presents basic iterative solution algorithms (such as gradient methods and the Newton–Raphson algorithm and its variants) and more general iterative optimization methods. This text builds the foundation to understand continuous optimization. It prepares students to study advanced topics found in the author's companion book, *Iterative Optimization in Inverse Problems*, including sequential unconstrained iterative optimization methods.

A First Course in Stochastic Calculus Jun 25 2019 A First Course in Stochastic Calculus is a complete guide for advanced undergraduate students to take the next step in exploring probability theory and for master's students in mathematical finance who would like to build an intuitive and theoretical understanding of stochastic processes. This book is also an essential tool for finance professionals who wish to sharpen their knowledge and intuition about stochastic calculus. Louis-Pierre Arguin offers an exceptionally clear introduction to Brownian motion and to random processes governed by the principles of stochastic calculus. The beauty and power of the subject are made accessible to readers with a basic knowledge of probability, linear algebra, and multivariable calculus. This is achieved by emphasizing numerical experiments using elementary Python coding to build intuition and adhering to a rigorous geometric point of view on the space of random variables. This unique approach is used to elucidate the properties of Gaussian processes, martingales, and diffusions. One of the book's highlights is a detailed and self-contained account of stochastic calculus applications to option pricing in finance. Louis-Pierre Arguin's masterly introduction to stochastic calculus seduces the reader with its quietly conversational style; even rigorous proofs seem natural and easy. Full of insights and intuition, reinforced with many examples, numerical projects, and exercises, this book by a prize-winning mathematician and great teacher fully lives up to the author's reputation. I give it my strongest possible recommendation. —Jim Gatheral, Baruch College I happen to be of a different persuasion, about how stochastic processes should be taught to undergraduate and MA students. But I have long been thinking to go against my own grain at some point and try to teach the subject at this level—together with its applications to finance—in one semester. Louis-Pierre Arguin's excellent and artfully designed text will give me the ideal vehicle to do so. —Ioannis Karatzas, Columbia University, New York

A First Course in Modular Forms Jul 19 2021 This book introduces the theory of modular forms, from which all rational elliptic curves arise, with an eye toward the Modularity Theorem. Discussion covers elliptic curves as complex tori and as algebraic curves; modular curves as Riemann surfaces and as algebraic curves; Hecke operators and Atkin-Lehner theory; Hecke eigenforms and their arithmetic properties; the Jacobians of modular curves and the Abelian varieties associated to Hecke eigenforms. As it presents these ideas, the book states the Modularity Theorem in various forms, relating them to each other and touching on their applications to number theory. The authors assume no background in algebraic number theory and algebraic geometry. Exercises are included.

Introduction to MATLAB with Applications for Chemical and Mechanical Engineers Apr 15 2021 Introduction to MATLAB with Applications for Chemical and Mechanical Engineers provides applications from chemical engineering and biotechnology, such as

thermodynamics, heat transfer, fluid mechanics, and mass transfer. The book features a section on input, output, and storage of data as well as a section on data analysis and parameter estimation that contains statistical analysis, curve fitting optimization, and error analysis. Many applied case studies are included from the engineering disciplines. It also offers instruction on the use of the MATLAB® optimization toolbox. With a CD-ROM of MATLAB programs, this text is essential for chemical engineers, mechanical engineers, applied mathematicians, and students.

A First Course in Abstract Algebra Nov 30 2019 Considered a classic by many, *A First Course in Abstract Algebra* is an in-depth, introductory text which gives students a firm foundation for more specialized work by emphasizing an understanding of the nature of algebraic structures. The Sixth Edition continues its tradition of teaching in a classical manner, while integrating field theory and new exercises.

A First Course in Analysis Sep 01 2022 This concise text clearly presents the material needed for year-long analysis courses for advanced undergraduates or beginning graduates.

A First Course in Psychology Jan 25 2022 This text provides the perfect introduction to psychology. It is suitable for a wide range of courses including GCSE, A-Level, BTEC and the psychology components of social care, nursing, policing and other applied subjects. It is also a useful general text for anyone embarking on a specialised psychology degree.

A First Course in General Relativity Apr 27 2022 Second edition of a widely-used textbook providing the first step into general relativity for undergraduate students with minimal mathematical background.

A First Course in Logic Feb 11 2021 The ability to reason and think in a logical manner forms the basis of learning for most mathematics, computer science, philosophy and logic students. Based on the author's teaching notes at the University of Maryland and aimed at a broad audience, this text covers the fundamental topics in classical logic in an extremely clear, thorough and accurate style that is accessible to all the above. Covering propositional logic, first-order logic, and second-order logic, as well as proof theory, computability theory, and model theory, the text also contains numerous carefully graded exercises and is ideal for a first or refresher course.

A First Course in Logic Jan 31 2020 *A First Course in Logic* is an introduction to first-order logic suitable for first and second year mathematicians and computer scientists. There are three components to this course: propositional logic; Boolean algebras; and predicate/first-order, logic. Logic is the basis of proofs in mathematics — how do we know what we say is true? — and also of computer science — how do I know this program will do what I think it will? Surprisingly little mathematics is needed to learn and understand logic (this course doesn't involve any calculus). The real mathematical prerequisite is an ability to manipulate symbols: in other words, basic algebra. Anyone who can write programs should have this ability.

The Book of R Oct 22 2021 *The Book of R* is a comprehensive, beginner-friendly guide to R, the world's most popular programming language for statistical analysis. Even if you have no programming experience and little more than a grounding in the basics of mathematics, you'll find everything you need to begin using R effectively for statistical analysis. You'll start with the basics, like how to handle data and write simple programs, before moving on to more advanced topics, like producing statistical summaries of your data and performing statistical tests and modeling. You'll even learn how to create impressive data visualizations with R's basic graphics tools and contributed packages, like ggplot2 and gvis, as well as interactive 3D visualizations using the rgl package. Dozens of hands-on exercises (with downloadable solutions) take you from theory to practice, as you learn: –The fundamentals of programming in R, including how to write data frames, create functions, and use variables, statements, and loops –Statistical concepts like exploratory data analysis, probabilities, hypothesis tests, and regression modeling, and how to execute them in R –How to access R's thousands of functions, libraries, and data sets –How to draw valid and useful conclusions from your data –How to create publication-quality graphics of your results Combining detailed explanations with real-world examples and exercises, this book will provide you with a solid understanding of both statistics and the depth of R's functionality. Make *The Book of R* your doorway into the growing world of data analysis.

A First Course in Functional Analysis Sep 08 2020 Designed for undergraduate mathematics majors, this self-contained exposition of Gelfand's proof of Wiener's theorem explores set theoretic preliminaries, normed linear spaces and algebras, functions on Banach spaces, homomorphisms on normed linear spaces, and more. 1966 edition.

A First Course in Database Systems Apr 03 2020 For Database Systems and Database Design and Application courses offered at the junior, senior, and graduate levels in Computer Science departments. Written by well-known computer scientists, this accessible and succinct introduction to database systems focuses on database design and use. The authors provide in-depth coverage of databases from the point of view of the database designer, user, and application programmer, leaving implementation for later courses. It is the first database systems text to cover such topics as UML, algorithms for manipulating dependencies in relations, extended relational algebra, PHP, 3-tier architectures, data cubes, XML, XPATH, XQuery, XSLT. The full text downloaded to your computer With eBooks you can: search for key concepts, words and phrases make highlights and notes as you study share your notes with friends eBooks are downloaded to your computer and accessible either offline through the Bookshelf (available as a free download), available online and also via the iPad and Android apps. Upon purchase, you'll gain instant access to this eBook. Time limit The eBooks products do not have an expiry date. You will continue to access your digital ebook products whilst you have your Bookshelf installed.

A First Course in Probability Jun 17 2021

A First Course in Calculus Jun 29 2022 This fifth edition of Lang's book covers all the topics traditionally taught in the first-year calculus sequence. Divided into five parts, each section of *A FIRST COURSE IN CALCULUS* contains examples and applications relating to the topic covered. In addition, the rear of the book contains detailed solutions to a large number of the exercises, allowing them to be used as worked-out examples -- one of the main improvements over previous editions.

A First Course in Topology Oct 29 2019 Students must prove all of the theorems in this undergraduate-level text, which features extensive outlines to assist in study and comprehension. Thorough and well-written, the treatment provides sufficient material for a one-year undergraduate course. The logical presentation anticipates students' questions, and complete definitions and expositions of topics relate new concepts to previously discussed subjects. Most of the material focuses on point-set topology with the exception of the last chapter. Topics include sets and functions, infinite sets and transfinite numbers, topological spaces and basic concepts, product spaces, connectivity, and compactness. Additional subjects include separation axioms, complete spaces, and homotopy and the fundamental group. Numerous hints and figures illuminate the text. Dover (2014) republication of the edition originally published by The Williams & Wilkins Company, Baltimore, 1975. See every Dover book in print at www.doverpublications.com