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Brownian Motion, Martingales, and Stochastic Calculus Mar 15 2021 This book offers a rigorous and self-contained presentation of stochastic integration and stochastic calculus within the general framework of continuous semimartingales. The main tools of stochastic calculus, including Itô's formula, the optional stopping theorem and Girsanov's theorem, are treated in detail alongside many illustrative examples. The book also contains an introduction to Markov processes, with applications to solutions of stochastic differential equations and to connections between Brownian motion and partial differential equations. The theory of local times of semimartingales is discussed in the last chapter. Since its invention by Itô, stochastic calculus has proven to be one of the most important techniques of modern probability theory, and has been used in the most recent theoretical advances as well as in applications to other fields such as mathematical finance. Brownian Motion, Martingales, and Stochastic Calculus provides a strong theoretical background to the reader interested in such developments. Beginning graduate or advanced undergraduate students will benefit from this detailed approach to an essential area of probability theory. The emphasis is on concise and efficient presentation, without any concession to mathematical rigor. The material has been taught by the author for several years in graduate courses at two of the most prestigious French universities. The fact that proofs are given with full details makes the book particularly suitable for self-study. The numerous exercises help the reader to get acquainted with the tools of stochastic calculus.
Topics in Contemporary Probability and Its Applications May 17 2021 Probability theory has grown from a modest study of simple games of change to a subject with application in almost every branch of knowledge and science. In this exciting book, a number of distinguished probabilists discuss their current work and applications in an easily understood manner. Chapters show that new directions in probability have been suggested by the application of probability to other fields and other disciplines of mathematics. The study of polymer chains in chemistry led to the study of self-avoiding random walks; the study of the Ising model in physics and models for epidemics in biology led to the study of the probability theory of interacting particle systems. The stochastic calculus has allowed probabilists to solve problems in classical analysis, in theory of investment, and in engineering. The mathematical formulation of game theory has led to new insights into decisions under uncertainty. These new developments in probability are vividly illustrated throughout the book.
The Senior Cohousing Handbook-2nd Edition Oct 29 2019 How to make your senior years healthy, safe, social, and stimulating. "Architect and author Chuck Durrett's recently released book Senior Cohousing Handbook comes at a time of high interest in greening, sustainable housing and affordable living concerns. Durrett's new book is a comprehensive guide for baby boomers wishing to continue vibrant, active lifestyles." - EPR Real Estate News "Make your senior years safe and socially fun with the idea of senior cohousing and a book on the topic that shows how seniors can custom-build their neighborhood to fit their needs. This is housing built by seniors, not for them, and emphasizes independence and social networking. Any library strong in gerontology or social science and many a general lending library needs this. - James A. Cox, The Midwest Book Review "As a Baby Boomer, I've joked for a few years that we'll all end up living communally again because Social Security will be broke...This is one of the better ways to envision it."--Sacramento Bee No matter how rich life is in youth and middle age, the elder years can bring on increasing isolation and loneliness as social connections lessen, especially if friends and family members move away. Senior cohousing fills a niche for this demographic—the healthy, educated, and proactive adults who want to live in a social and environmentally vibrant community. These seniors are already wanting to ward off the aging process, so they are unlikely to want to live in assisted housing. Senior cohousing revolves around custom-built neighborhoods organized by the seniors themselves in order to fit in with their real needs, wants, and aspirations for health, longevity, and quality of life. Senior Cohousing is a comprehensive guide to joining or creating a cohousing project, written by the US leader in the field. The author deals with all the psychological and logistical aspects of senior cohousing and addresses common concerns, fears, and misunderstandings. He emphasizes the many positive benefits of cohousing, including: Better physical, mental, emotional, and spiritual health Friendships and accessible social contact Safety and security Affordability Shared resources Successful aging requires control of one's life, and today's generation of seniors—the baby boomers—will find that this book holds a compelling vision for their future. Charles Durrett is a principal at McCamant & Durrett in Nevada City, California, a firm that specializes in affordable cohousing. He co-authored the groundbreaking Cohousing with his wife and business partner, Kathryn McCamant.
Eigenvalues, Inequalities, and Ergodic Theory Feb 11 2021 The first and only book to make this research available in the West Concise and accessible: proofs and other technical matters are kept to a minimum to help the non-specialist Each chapter is self-contained to make the book easy-to-use
Stochastic Processes Nov 22 2021 This definitive textbook provides a solid introduction to discrete and continuous stochastic processes, tackling a complex field in a way that instils a deep understanding of the relevant mathematical principles, and develops an intuitive grasp of the way these principles can be applied to modelling real-world systems. It includes a careful review of elementary probability and detailed coverage of Poisson, Gaussian and Markov processes with richly varied queuing applications. The theory and applications of inference, hypothesis testing, estimation, random walks, large deviations, martingales and investments are developed. Written by one of the world's leading information theorists, evolving over

twenty years of graduate classroom teaching and enriched by over 300 exercises, this is an exceptional resource for anyone looking to develop their understanding of stochastic processes.

Essentials of Stochastic Processes Jul 31 2022 Building upon the previous editions, this textbook is a first course in stochastic processes taken by undergraduate and graduate students (MS and PhD students from math, statistics, economics, computer science, engineering, and finance departments) who have had a course in probability theory. It covers Markov chains in discrete and continuous time, Poisson processes, renewal processes, martingales, and option pricing. One can only learn a subject by seeing it in action, so there are a large number of examples and more than 300 carefully chosen exercises to deepen the reader's understanding. Drawing from teaching experience and student feedback, there are many new examples and problems with solutions that use TI-83 to eliminate the tedious details of solving linear equations by hand, and the collection of exercises is much improved, with many more biological examples. Originally included in previous editions, material too advanced for this first course in stochastic processes has been eliminated while treatment of other topics useful for applications has been expanded. In addition, the ordering of topics has been improved; for example, the difficult subject of martingales is delayed until its usefulness can be applied in the treatment of mathematical finance.

Probability Models for DNA Sequence Evolution Sep 28 2019 "What underlying forces are responsible for the observed patterns of variability, given a collection of DNA sequences?" In approaching this question a number of probability models are introduced and anyalyzed.Throughout the book, the theory is developed in close connection with data from more than 60 experimental studies that illustrate the use of these results.

Probability with STEM Applications Jul 27 2019 Probability with STEM Applications, Third Edition, is an accessible and well-balanced introduction to post-calculus applied probability. Integrating foundational mathematical theory and the application of probability in the real world, this leading textbook engages students with unique problem scenarios and more than 1100 exercises of varying levels of difficulty. The text uses a hands-on, software-oriented approach to the subject of probability. MATLAB and R examples and exercises — complemented by computer code that enables students to create their own simulations — demonstrate the importance of software to solve problems that cannot be obtained analytically. Revised and updated throughout, the textbook covers basic properties of probability, random variables and their probability distributions, a brief introduction to statistical inference, Markov chains, stochastic processes, and signal processing. This new edition is the perfect text for a one-semester course and contains enough additional material for an entire academic year. The blending of theory and application will appeal not only to mathematics and statistics majors but also to engineering students, and quantitative business and social science majors. New to this Edition: Offered as a traditional textbook and in enhanced ePub format, containing problems with show/hide solutions and interactive applets and illustrations Revised and expanded chapters on conditional probability and independence, families of continuous distributions, and Markov chains New problems and updated problem sets throughout Features: Introduces basic theoretical knowledge in the first seven chapters, serving as a self-contained textbook of roughly 650 problems Provides numerous up-to-date examples and problems in R and MATLAB Discusses examples from recent journal articles, classic problems, and various practical applications Includes a chapter specifically designed for electrical and computer engineers, suitable for a one-term class on random signals and noise Contains appendices of statistical tables, background mathematics, and important probability distributions

Probability: A Graduate Course Jan 25 2022 This textbook on the theory of probability starts from the premise that rather than being a purely mathematical discipline, probability theory is an intimate companion of statistics. The book starts with the basic tools, and goes on to cover a number of subjects in detail, including chapters on inequalities, characteristic functions and convergence. This is followed by explanations of the three main subjects in probability: the law of large numbers, the central limit theorem, and the law of the iterated logarithm. After a discussion of generalizations and extensions, the book concludes with an extensive chapter on martingales.

Probability Models for DNA Sequence Evolution Jan 01 2020 Our basic question is: Given a collection of DNA sequences, what underlying forces are responsible for the observed patterns of variability? To approach this question we introduce and analyze a number of probability models: the Wright-Fisher model, the coalescent, the infinite alleles model, and the infinite sites model. We study the complications that come from nonconstant population size, recombination, population subdivision, and three forms of natural selection: directional selection, balancing selection, and background selection. These theoretical results set the stage for the investigation of various statistical tests to detect departures from "neutral evolution." The final chapter studies the evolution of whole genomes by chromosomal inversions, reciprocal translocations, and genome duplication.Throughout the book, the theory is developed in close connection with data from more than 60 experimental studies from the biology literature that illustrate the use of these results. This book is written for mathematicians and for biologists alike. We assume no previous knowledge of concepts from biology and only a basic knowledge of probability: a one semester undergraduate course and some familiarity with Markov chains and Poisson processes.Rick Durrett received his Ph.D. in operations research from Stanford University in 1976. He taught in the UCLA mathematics department before coming to Cornell in 1985. He is the author of six books and 125 research papers, and is the academic father of more than 30 Ph.D. students. His current interests are the use of probability models in genetics and ecology, and decreasing the mean and variance of his golf score.

High-Dimensional Probability Jun 17 2021 High-dimensional probability offers insight into the behavior of random vectors, random matrices, random subspaces, and objects used to quantify uncertainty in high dimensions. Drawing on ideas from probability, analysis, and geometry, it lends itself to applications in mathematics, statistics, theoretical computer science, signal processing, optimization, and more. It is the first to integrate theory, key tools, and modern applications of high-dimensional probability. Concentration inequalities form the core, and it covers both classical results such as Hoeffding's and Chernoff's inequalities and modern developments such as the matrix Bernstein's inequality. It then introduces the powerful methods based on stochastic processes, including such tools as Slepian's, Sudakov's, and Dudley's inequalities, as well as generic chaining and bounds based on VC dimension. A broad range of illustrations is embedded throughout, including classical and modern results for covariance estimation, clustering, networks, semidefinite programming, coding, dimension reduction, matrix completion, machine learning, compressed sensing, and sparse regression.

Understanding Probability Jan 31 2020 In this fully revised second edition of Understanding Probability, the reader can learn about the world of probability in an informal way. The author demystifies the law of large numbers, betting systems, random walks, the bootstrap, rare events, the central limit theorem, the Bayesian approach and more. This second edition has wider coverage, more explanations and examples and exercises, and a new chapter introducing Markov chains, making it a great choice for a first probability course. But its easy-going style makes it just as valuable if you want to learn about the subject on your own, and high school algebra is really all the mathematical background you need.

Stochastic Calculus and Applications Jan 13 2021 Completely revised and greatly expanded, the new edition of this text takes readers who have been exposed to only basic courses in analysis through the modern general theory of random processes and stochastic integrals as used by systems theorists, electronic engineers and, more recently, those working in quantitative and mathematical finance. Building upon the original release of this title, this text will be of great interest to research mathematicians and graduate students working in those fields, as well as quants in the finance industry. New features of this edition include: End of chapter exercises; New chapters on basic measure theory and Backward SDEs; Reworked proofs, examples and explanatory material; Increased focus on motivating the mathematics; Extensive topical index. "Such a self-contained and complete exposition of stochastic calculus and applications fills an existing gap in the literature. The book can be recommended for first-year graduate studies. It will be useful for all who intend to work with stochastic calculus as well as with its applications."–Zentralblatt (from review of the First Edition)

Applied Probability May 05 2020 Despite the fears of university mathematics departments, mathematics educat,ion is growing rather than declining. But the truth of the matter is that the increases are occurring outside departments of mathematics. Engineers, computer scientists, physicists, chemists, economists, statis- cians, biologists, and even philosophers teach and learn a great deal of mathematics. The teaching is not always terribly rigorous, but it tends to be better motivated and better adapted to the needs of students. In my own experience teaching students of biostatistics and mathematical bi- ogy, I attempt to convey both the beauty and utility of probability. This is a tall order, partially because probability theory has its own vocabulary and habits of thought. The axiomatic presentation of advanced probability typically proceeds via measure theory. This approach has the advantage of rigor, but it inwitably misses most of the interesting applications, and many applied scientists rebel against the onslaught of technicalities. In the current book, I endeavor to achieve a balance between theory and app- cations in a rather short compass. While the combination of brevity apd balance sacrifices many of the proofs of a rigorous course, it is still cons- tent with supplying students with many of the relevant theoretical tools. In my opinion, it better to present the mathematical facts without proof rather than omit them altogether.

Probability with Martingales Aug 20 2021 Probability theory is nowadays applied in a huge variety of fields including physics, engineering, biology, economics and the social sciences. This book is a modern, lively and rigorous account which has Doob's theory of martingales in discrete time as its main theme. It proves important results such as Kolmogorov's Strong Law of Large Numbers and the Three-Series Theorem by martingale techniques, and the Central Limit Theorem via the use of characteristic functions. A distinguishing feature is its determination to keep the probability flowing at a nice tempo. It achieves this by being selective rather than encyclopaedic, presenting only what is essential to understand the fundamentals; and it assumes certain key results from measure theory in the main text. These measure-theoretic results are proved in full in appendices, so that the book is completely self-contained. The book is written for students, not for researchers, and has evolved through several years of class testing. Exercises play a vital rôle. Interesting and challenging problems, some with hints, consolidate what has already been learnt, and provide motivation to discover more of the subject than can be covered in a single introduction.

Brownian Motion and Martingales in Analysis Jul 19 2021

Probability Jun 29 2022 This book is an introduction to probability theory covering laws of large numbers, central limit theorems, random walks, martingales, Markov chains, ergodic theorems, and Brownian motion. It is a comprehensive treatment concentrating on the results that are the most useful for applications. Its philosophy is that the best way to learn probability is to see it in action, so there are 200 examples and 450 problems.

A Probability Path Jun 05 2020

A Modern Approach to Probability Theory Apr 15 2021 Students and teachers of mathematics and related fields will find this book a comprehensive and modern approach to probability theory, providing the background and techniques to go from the beginning graduate level to the point of specialization in research areas of current interest. The book is designed for a two- or three-semester course, assuming only courses in undergraduate real analysis or rigorous advanced calculus, and some elementary linear algebra. A variety of applications—Bayesian statistics, financial mathematics, information theory, tomography, and signal processing—appear as threads to both enhance the understanding of the relevant mathematics and motivate students whose main interests are outside of pure areas.

Basic Probability Theory Nov 10 2020 This introduction to more advanced courses in probability and real analysis emphasizes the probabilistic way of thinking, rather than measure-theoretic concepts. Geared toward advanced undergraduates and graduate students, its sole prerequisite is calculus. Taking statistics as its major field of application, the text opens with a review of basic concepts, advancing to surveys of random variables, the properties of expectation, conditional probability and expectation, and characteristic functions. Subsequent topics include infinite sequences of random variables, Markov chains, and an introduction to statistics. Complete solutions to some of the problems appear at the end of the book.

White Noise Distribution Theory Feb 23 2022 Learn the basics of white noise theory with White Noise Distribution Theory. This book covers the mathematical foundation and key applications of white noise theory without requiring advanced knowledge in this area. This instructive text specifically focuses on relevant application topics such as integral kernel operators, Fourier transforms, Laplacian operators, white noise integration, Feynman integrals, and positive generalized functions. Extremely well-written by one of the field's leading researchers, White Noise Distribution Theory is destined to become the definitive introductory resource on this challenging topic.

Thinking Probabilistically Sep 08 2020 An introductory text providing the reader with a thorough background to the rich world of applications of stochastic processes.

Viscosity Solutions and Applications Mar 03 2020 The volume comprises five extended surveys on the recent theory of viscosity solutions of fully nonlinear partial differential equations, and some of its most relevant applications to optimal control theory for deterministic and stochastic systems, front propagation, geometric motions and mathematical finance. The volume forms a state-of-the-art reference on the subject of viscosity solutions, and the authors are among the most prominent specialists. Potential readers are researchers in nonlinear PDE's, systems theory, stochastic processes.

Acyltransferases: Advances in Research and Application: 2011 Edition Apr 03 2020 Acyltransferases: Advances in Research and Application: 2011 Edition is a ScholarlyBrief™ that delivers timely, authoritative, comprehensive, and specialized information about Acyltransferases in a concise format. The editors have built Acyltransferases: Advances in Research and Application: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Acyltransferases in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Acyltransferases: Advances in Research and Application: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

Random Media Oct 10 2020 This IMA Volume in Mathematics and its Applications RANDOM MEDIA represents the proceedings of a workshop which was an integral part of the 1984-85 IMA program on STOCHASTIC DIFFERENTIAL EQUATIONS AND THEIR APPLICATIONS We are grateful to the Scientific Committee: Daniel Stroock (Chairman) \~ende 11 Fl emi ng Theodore Harris Pierre-Louis Lions Steven Orey George Papanicolaou for planning and implementing an exciting and stimulating year-long program. We especi ally thank George Papani col aOIJ for organi zi ng a workshop which produced fruitful interactions between mathematicians and scientists from both academia and industry. George R. Sell Hans I~ei nherger PREFACE During September 1985 a workshop on random media was held at the Institute for Mathematics and its Applications at the University of Minnesota. This was part of the program for the year on Probability and Stochastic Processes at IMA. The main objective of the workshop was to bring together researchers who work in a broad area including applications and mathematical methodology. The papers in this volume give an idea of what went on and they also represent a cross section of problems and methods that are currently of interest.

Branching Process Models of Cancer Apr 27 2022 This volume develops results on continuous time branching processes and applies them to study rate of tumor growth, extending classic work on the Luria-Delbruck distribution. As a consequence, the author calculate the probability that mutations that confer resistance to treatment are present at detection and quantify the extent of tumor heterogeneity. As applications, the author evaluate ovarian cancer screening strategies and give rigorous proofs for results of Heano and Michor concerning tumor metastasis. These notes should be accessible to students who are familiar with Poisson processes and continuous time Markov chains. Richard Durrett is a mathematics professor at Duke University, USA. He is the author of 8 books, over 200 journal articles, and has supervised more than 40 Ph.D students. Most of his current research concerns the applications of probability to biology: ecology, genetics and most recently cancer.

Stochastic Calculus and Financial Applications Jul 07 2020 Stochastic calculus has important applications to mathematical finance. This book will appeal to practitioners and students who want an elementary introduction to these areas. From the reviews: "As the preface says, 'This is a text with an attitude, and it is designed to reflect, wherever possible and appropriate, a prejudice for the concrete over the abstract'. This is also reflected in the style of writing which is unusually lively for a mathematics book." --ZENTRALBLATT MATH

Probability Nov 03 2022 This classic introduction to probability theory for beginning graduate students covers laws of large numbers, central limit theorems, random walks, martingales, Markov chains, ergodic theorems, and Brownian motion. It is a comprehensive treatment concentrating on the results that are the most useful for applications. Its philosophy is that the best way to learn probability is to see it in action, so there are 200 examples and 450 problems. The fourth edition begins with a short chapter on measure theory to orient readers new to the subject.

Stochastic Calculus Mar 27 2022 This compact yet thorough text zeros in on the parts of the theory that are particularly relevant to applications . It begins with a description of Brownian motion and the associated stochastic calculus, including their relationship to partial differential equations. It solves stochastic differential equations by a variety of methods and studies in detail the one-dimensional case. The book concludes with a treatment of semigroups and generators, applying the theory of Harris chains to diffusions, and presenting a quick course in weak convergence of Markov chains to diffusions. The presentation is unparalleled in its clarity and simplicity. Whether your students are interested in probability, analysis, differential geometry or applications in operations research, physics, finance, or the many other areas to which the subject applies, you'll find that this text brings together the material you need to effectively and efficiently impart the practical background they need.

Probability Theory and Applications Dec 12 2020 The volume gives a balanced overview of the current status of probability theory. An extensive bibliography for further study and research is included. This unique collection presents several important areas of current research and a valuable survey reflecting the diversity of the field.

The Essentials of Probability Aug 27 2019 Offering a clear treatment of probability focused on problem solving, Richard Durrett presents only the essentials of probability, allowing instructors to cover this entire book in one semester. Each topic moves from the specific to the general, beginning with one or more examples that lead to theoretical results. A large number of examples and exercises relate applications to everyday life.

Probability and Phase Transition Aug 08 2020 This volume describes the current state of knowledge of random spatial processes, particularly those arising in physics. The emphasis is on survey articles which describe areas of current interest to probabilists and physicists working on the probability theory of phase transition. Special attention is given to topics deserving further research. The principal contributions by leading researchers concern the mathematical theory of random walk, interacting particle systems, percolation, Ising and Potts models, spin glasses, cellular automata, quantum spin systems, and metastability. The level of presentation and review is particularly suitable for postgraduate and postdoctoral workers in mathematics and physics, and for advanced specialists in the probability theory of spatial disorder and phase transition.

Creating Cohousing Dec 24 2021 The cohousing ?bible” by the US originators of the concept.

Elementary Probability for Applications Oct 02 2022 Explains probability using genetics, sports, finance, current events and more.

Stochastic Differential Equations and Applications Jun 25 2019 Stochastic Differential Equations and Applications, Volume 1 covers the development of the basic theory of stochastic differential equation systems. This volume is divided into nine chapters. Chapters 1 to 5 deal with the basic theory of stochastic differential equations, including discussions of the Markov processes, Brownian motion, and the stochastic integral. Chapter 6 examines the connections between solutions of partial differential equations and stochastic differential equations, while Chapter 7 describes the Girsanov’s formula that is useful in the stochastic control theory. Chapters 8 and 9 evaluate the behavior of sample paths of the solution of a stochastic differential system, as time increases to infinity. This book is intended primarily for undergraduate and graduate mathematics students.

Random Walks, Brownian Motion, and Interacting Particle Systems Sep 20 2021 This collection of articles is dedicated to Frank Spitzer on the occasion of his 65th birthday. The articles, written by a group of his friends, colleagues, former students and coauthors, are intended to demonstrate the major influence Frank has had on probability theory for the last 30 years and most likely will have for many years to come. Frank has always liked new phenomena, clean formulations and elegant proofs. He has created or opened up several research areas and it is not surprising that many people are still working out the consequences of his inventions. By way of introduction we have reprinted some of Frank's seminal articles so that the reader can easily see for himself the point of origin for much of the research presented here. These articles of Frank's deal with properties of Brownian motion, fluctuation theory and potential theory for random walks, and, of course, interacting particle systems. The last area was started by Frank as part of the general resurgence of treating problems of statistical mechanics with rigorous probabilistic tools.

Foundations of Modern Probability Oct 22 2021 The first edition of this single volume on the theory of probability has become a highly-praised standard reference for many areas of probability theory. Chapters from the first edition have been revised and corrected, and this edition contains four new chapters. New material covered includes multivariate and ratio ergodic theorems, shift coupling, Palm distributions, Harris recurrence, invariant measures, and strong and weak ergodicity.

Random Graph Dynamics May 29 2022 The theory of random graphs began in the late 1950s in several papers by Erdos and Renyi. In the late twentieth century, the notion of six degrees of separation, meaning that any two people on the planet can be connected by a short chain of people who know each other, inspired Strogatz and Watts to define the small world random graph in which each site is connected to k close neighbors, but also has long-range connections. At a similar time, it was observed in human social and sexual networks and on the Internet that the number of neighbors of an individual or computer has a power law distribution. This inspired Barabasi and Albert to define the preferential attachment model, which has these properties. These two papers have led to an explosion of research. The purpose of this book is to use a wide variety of mathematical argument to obtain insights into the properties of these graphs. A unique feature is the interest in the dynamics of process taking place on the graph in addition to their geometric properties, such as connectedness and diameter.

The Edge of Evolution Nov 30 2019 The author of Darwin's Black Box draws on new findings in genetics to pose an argument for intelligent design that refutes Darwinian beliefs about evolution while offering alternative analyses of such factors as disease, random mutations, and the human struggle for survival. Reprint. 40,000 first printing.

Essentials of Stochastic Processes Sep 01 2022 Building upon the previous editions, this textbook is a first course in stochastic processes taken by undergraduate and graduate students (MS and PhD students from math, statistics, economics, computer science, engineering, and finance departments) who have had a course in probability theory. It covers Markov chains in discrete and continuous time, Poisson processes, renewal processes, martingales, and option pricing. One can only learn a subject by seeing it in action, so there are a large number of examples and more than 300 carefully chosen exercises to deepen the reader’s understanding. Drawing from teaching experience and student feedback, there are many new examples and problems with solutions that use TI-83 to eliminate the tedious details of solving linear equations by hand, and the collection of exercises is much improved, with many more biological examples. Originally included in previous editions, material too advanced for this first course in stochastic processes has been eliminated while treatment of other topics useful for applications has been expanded. In addition, the ordering of topics has been improved; for example, the difficult subject of martingales is delayed until its usefulness can be applied in the treatment of mathematical finance.