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Suitable for self study Use real examples and real data sets that will be familiar to the audience Introduction to the bootstrap is included – this is a modern method missing in many other books
Distills key concepts from linear algebra, geometry, matrices, calculus, optimization, probability and statistics that are used in machine learning.
Apply the principles of probability and statistics to realistic engineering problems The easiest and most effective way to learn the principles of probabilistic modeling and statistical inference is to apply those principles to a variety of applications. That's why Ang and Tang's Second Edition of Probability Concepts in Engineering (previously titled Probability Concepts in Engineering Planning and Design) explains concepts and methods using a wide range of problems related to engineering and the physical sciences, particularly civil and environmental engineering. Now extensively revised with new illustrative problems and new and expanded topics, this Second Edition will help you develop a thorough understanding of probability and statistics and the ability to formulate and solve real-world problems in engineering. The authors present each basic principle using different examples, and give you the opportunity to enhance your understanding with practice problems. The text is ideally suited for students, as well as those wishing to learn and apply the principles and tools of statistics and probability through self-study. Key Features in this 2nd Edition: A new chapter (Chapter 5) covers Computer-Based Numerical and Simulation Methods in Probability, to extend and expand the analytical methods to more complex engineering problems. New and expanded coverage includes distribution of extreme values (Chapter 3), the Anderson-Darling method for goodness-of-fit test (Chapter 6), hypothesis testing (Chapter 6), the determination of confidence intervals in linear regression (Chapter 8), and Bayesian regression and correlation analyses (Chapter 9). Many new exercise problems in each chapter help you develop a working knowledge of concepts and methods. Provides a wide variety of examples, including many new to this edition, to help you learn and understand specific concepts. Illustrates the formulation and solution of engineering-type probabilistic problems through computer-based methods, including developing computer codes using commercial software such as MATLAB and MATHCAD. Introduces and develops analytical probabilistic models and shows how to formulate engineering problems under uncertainty, and provides the fundamentals for quantitative risk assessment.
This comprehensive introduction to probability and statistics will give you the solid grounding you need no matter what your engineering specialty. Through the use of lively and realistic examples, the author helps you go beyond simply learning about statistics to actually putting the statistical methods to use. Rather than focus on rigorous mathematical development and potentially overwhelming derivations, the book emphasizes concepts, models, methodology, and applications that facilitate your understanding.

This book provides a mathematically rigorous introduction to the fundamental ideas of modern statistics for readers without a calculus background.
Engineering Uncertainty and Risk Analysis offers an integrated coverage of the subjects of probability, statistics, Monte Carlo simulation, descriptive and inferential statistics, design of experiments, systems reliability, fitting random data to models, analysis of variance (ANOVA), stochastic processes, and stochastic differential equations. The author for first time presents an introduction to the broad field of engineering uncertainty analysis in one comprehensive, friendly, coverage. The focus is on engineering applications, rather than theoretical or mathematical considerations. Each concept is illustrated with several examples (177 solved examples) of relevance in engineering applications (no cards, colored balls, or dice). This second edition includes many new research advances in nonlinear stochastic equations; new simple methods to solve and graph boundary-value problems in several dimensions without the need of perturbation, or complex traditional analytical or numerical techniques; 478 pages; 177 solved examples; 147 proposed problems; 174 illustrations, 69 short computer programs; and 51 data and statistical tables
Reliability analysis is concerned with the analysis of devices and systems whose individual components are prone to failure. This textbook presents an introduction to reliability analysis of repairable and non-repairable systems. It is based on courses given to both undergraduate and graduate students of engineering and statistics as well as in workshops for professional engineers and scientists. As aresult, the book concentrates on the methodology of the subject and on understanding theoreti-

cal results rather than on its theoretical development. An intrinsic aspect of reliability analysis is that the failure of components is best modelled using techniques drawn from probability and statistics. Professor Zacks covers all the basic concepts required from these subjects and covers the main modern reliability analysis techniques thoroughly. These include: the graphical analysis of life data, maximum likelihood estimation and bayesian likelihood estimation. Throughout the emphasis is on the practicalities of the subject with numerous examples drawn from industrial and engineering settings. Integrating computers into mathematical statistics courses allows students to simulate experiments and visualize their results, handle larger data sets, analyze data more quickly, and compare the results of classical methods of data analysis with those using alternative techniques. This text presents a concise introduction to the concepts of probability theory and mathematical statistics. The accompanying in-class and take-home computer laboratory activities reinforce the techniques introduced in the text and are accessible to students with little or no experience with Mathematica. These laboratory materials present applications in a variety of real-world settings, with data from epidemiology, environmental sciences, medicine, social sciences, physical sciences, manufacturing, engineering, marketing, and sports. Mathematica Laboratories for Mathematical Statistics: Emphasizing Simulation and Computer Intensive Methods includes parametric, nonparametric, permutation, bootstrap and diagnostic methods. Chapters on permutation and bootstrap techniques follow the formal inference chapters and precede the chapters on intermediate-level topics. Permutation and bootstrap methods are discussed side by side with classical methods in the later chapters.

Data Analysis for Scientists and Engineers is a modern, graduate-level text on data analysis techniques for physical science and engineering students as well as working scientists and engineers. Edward Robinson emphasizes the principles behind various techniques so that practitioners can adapt them to their own problems, or develop new techniques when necessary. Robinson divides the book into three sections. The first section covers basic concepts in probability and includes a chapter on Monte Carlo methods with an extended discussion of Markov chain Monte Carlo sampling. The second section introduces statistics and then develops tools for fitting models to data, comparing and contrasting techniques from both frequentist and Bayesian perspectives. The final section is devoted to methods for analyzing sequences of data, such as correlation functions, periodograms, and image reconstruction. While it goes beyond elementary statistics, the text is self-contained and accessible to readers from a wide variety of backgrounds. Specialized mathematical topics are included in an appendix. Based on a graduate course on data analysis that the author has taught for many years, and couched in the looser, workaday language of scientists and engineers who wrestle directly with data, this book is ideal for courses on data analysis and a valuable resource for students, instructors, and practitioners in the physical sciences and engineering. In-depth discussion of data analysis for scientists and engineers Coverage of both frequentist and Bayesian approaches to data analysis Extensive look at analysis techniques for time-series data and images Detailed exploration of linear and nonlinear modeling of data Emphasis on error analysis Instructor's manual (available only to professors)
Science, engineering, and technology permeate nearly every facet of modern life and hold the key to solving many of humanity's most pressing current and future challenges. The United States' position in the global economy is declining, in part because U.S. workers lack fundamental knowledge in these fields. To address the critical issues of U.S. competitiveness and to better prepare the workforce, A Framework for K-12 Science Education proposes a new approach to K-12 science education that will capture students' interest and provide them with the necessary foundational knowledge in the field. A Framework for K-12 Science Education outlines a broad set of expectations for students in science and engineering in grades K-12. These expectations will inform the development of new standards for K-12 science education and, subsequently, revisions to curriculum, instruction, assessment, and professional development for educators. This book identifies three dimensions that convey the core ideas and practices around which science and engineering education in these grades should be built. These three dimensions are: crosscutting concepts that unify the study of science through their common application across science and engineering; scientific and engineering practices; and disciplinary core ideas in the physical sciences, life sciences, and earth and space sciences and for engineering, technology, and the applications of science. The overarching goal is for all high school graduates to have sufficient knowledge of science and engineering to engage in public discussions on science-related issues, be careful consumers of scientific and technical information, and enter the careers of their choice. A Framework for K-12 Science Education is the first step in a process that can inform state-level decisions and achieve a research-grounded basis for improving science instruction and learning across the country. The book will guide standards developers, teachers, curriculum designers, assessment developers, state and district science administrators, and educators who teach science in informal environments.
Introduction to Probability Models, Tenth Edition, provides an introduction to elementary probability theory and stochastic processes. There are two approaches to the study of probability theory. One is heuristic and nonrigorous, and attempts to develop in students an intuitive feel for the subject that enables him or her to think probabilistically. The other approach attempts a rigorous development of probability by using the tools of measure theory. The first approach is employed in this text. The book begins by introducing basic concepts of probability theory, such as the random variable, conditional probability, and conditional expectation. This is followed by discussions of stochastic processes, including Markov chains and Poison processes. The remaining chapters cover queuing, reliability theory, Brownian motion, and simulation. Many examples are worked out throughout the text, along with exercises to be solved by students. This book will be particularly useful to those interested in learning how probability theory can be applied to the study of phenomena in fields such as engineering, computer science, management science, the physical and social sciences, and operations research. Ideally, this text would be used in a one-year course in probability models, or a one-semester course in introductory probability theory or a course in elementary stochastic processes. New to this Edition: 65% new chapter material including coverage of finite capacity queues, insurance risk models and Markov chains Contains compulsory material for new Exam 3 of the Society of Actuaries containing several sections in the new exams Updated data, and a list of commonly used notations and equations, a robust ancillary package, including a ISM, SSM, and test bank Includes SPSS PASW Modeler and SAS JMP software packages which are widely used in the field Hallmark features: Superior writing style Excellent exercises and examples covering the wide breadth of coverage of probability topics Real-world applications in engineering, science, business and economics
The emphasis in this book is placed on general models (Markov chains, random fields, random graph-

s), universal methods (the probabilistic method, the coupling method, the Stein-Chen method, martingale methods, the method of types) and versatile tools (Chernoff's bound, Hoeffding's inequality, Holley's inequality) whose domain of application extends far beyond the present text. Although the examples treated in the book relate to the possible applications, in the communication and computing sciences, in operations research and in physics, this book is in the first instance concerned with theory. The level of the book is that of a beginning graduate course. It is self-contained, the prerequisites consisting merely of basic calculus (series) and basic linear algebra (matrices). The reader is not assumed to be trained in probability since the first chapters give in considerable detail the background necessary to understand the rest of the book.

Modern Power System Analysis Turan Gonen The first book on electrical power systems to deal exclusively with the design, structure, and analysis of the transmission system itself. Serves as a self-study guide or as a classroom text and describes, step-by-step, all the tools and procedures needed to analyze today's electrical power systems. It covers power system planning, steady-state performance of transmission lines, disturbance of the normal operating conditions and other problems, as well as symmetrical components and sequence impedances. The book also analyzes balanced and unbalanced faults, land flow, and system protection, detailing criteria for protective systems and several types of relays. 1988 (0 471-85903-6) 560 pp. Least-Cost Electric Utility Planning Harry G. Stoll Presents all the key elements and tools necessary to plan and operate efficient electric utility power systems. Its seven sections address: economics, finance, and regulation; industrial power economics; load demand and management; reliability of the generation system; cost of production in the generation system; capacity planning; and transmission planning. Each section addresses power system theory and principles and applies them to realistic utility examples. Results from solved examples are expanded to illustrate the sensitivity and direction of key parameters. 1989 (0 471-63614-2) 782 pp.

Comprehensive and thorough development of both probability andstatistics for serious computer scientists; goal-oriented: "topresent the mathematical analysis underlying probabilityresults" Special emphases on simulation and discrete decision theory Mathematically-rich, but self-contained text, at a gentlepace Review of calculus and linear algebra in an appendix Mathematical interludes (in each chapter) which examinemathematical techniques in the context of probabilistic orstatistical importance Numerous section exercises, summaries, historical notes, andFurther Readings for reinforcement of content

While helping students to develop their problem-solving skills, the author motivates students with practical applications from various areas of ECE that demonstrate the relevance of probability theory to engineering practice.

This book provides a panoramic view of theory and applications of Ageing and Dependence in the use of mathematical methods in reliability and survival analysis. Ageing and dependence are important characteristics in reliability and survival analysis. They affect decisions with regard to maintenance, repair/replacement, price setting, warranties, medical studies, and other areas. Most of the works containing the topics covered here are theoretical in nature. However, this book offers applications, exercises, and examples. It serves as a reference for professors and researchers involved in reliability and survival analysis.

This text presents notions and ideas at the foundations of a statistical treatment of risks. The focus is on statistical applications within the field of engineering risk and safety analysis. Coverage includes Bayesian methods. Such knowledge facilitates the understanding of the influence of random phenomena and gives a deeper understanding of the role of probability in risk analysis. The text is written for students who have studied elementary undergraduate courses in engineering mathematics, perhaps including a minor course in statistics. This book differs from typical textbooks in its verbal approach to many explanations and examples.

An easily accessible, real-world approach to probability and stochastic processes Introduction to Probability and Stochastic Processes with Applications presents a clear, easy-to-understand treatment of probability and stochastic processes, providing readers with a solid foundation they can build upon throughout their careers. With an emphasis on applications in engineering, applied sciences, business and finance, statistics, mathematics, and operations research, the book features numerous real-world examples that illustrate how random phenomena occur in nature and how to use probabilistic techniques to accurately model these phenomena. The authors discuss a broad range of topics, from the basic concepts of probability to advanced topics for further study, including Itô integrals, martingales, and sigma algebras. Additional topical coverage includes: Distributions of discrete and continuous random variables frequently used in applications Random vectors, conditional probability, expectation, and multivariate normal distributions The laws of large numbers, limit theorems, and convergence of sequences of random variables Stochastic processes and related applications, particularly in queueing systems Financial mathematics, including pricing methods such as risk-neutral valuation and the Black-Scholes formula Extensive appendices containing a review of the requisite mathematics and tables of standard distributions for use in applications are provided, and plentiful exercises, problems, and solutions are found throughout. Also, a related website features additional exercises with solutions and supplementary material for classroom use. Introduction to Probability and Stochastic Processes with Applications is an ideal book for probability courses at the upper-undergraduate level. The book is also a valuable reference for researchers and practitioners in the fields of engineering, operations research, and computer science who conduct data analysis to make decisions in their everyday work.

Engineers are expected to design structures and machines that can operate in challenging and volatile environments, while allowing for variation in materials and noise in measurements and signals. Statistics in Engineering, Second Edition: With Examples in MATLAB and R covers the fundamentals of probability and statistics and explains how to use these basic techniques to estimate and model random variation in the context of engineering analysis and design in all types of environments. The first eight chapters cover probability and probability distributions, graphical displays of data and descriptive statistics, combinations of random variables and propagation of error, statistical inference, bivariate distributions and correlation, linear regression on a single predictor variable, and the measurement error model. This leads to chapters including multiple regression; comparisons of several means and split-plot designs together with analysis of variance; probability models; and sampling strategies. Distinctive features include: All examples based on work in industry, consulting to industry, and research for industry Examples and case studies include all engineering disciplines Emphasis on probabilistic modeling including decision trees, Markov chains and processes, and structure functions Intuitive explanations are followed by succinct mathematical justifications Emphasis on random number generation that is used for stochastic simulations of engineering systems, demonstration of key concepts, and implementation of bootstrap methods for inference Use of MATLAB and the open source software R, both of which have an extensive range of statistical functions for standard analyses and also enable programing of specific applications Use of multiple regression for times series models and analysis of factorial and central composite designs Inclusion of topics such as Weibull analysis of failure times and split-plot designs that are commonly used in industry but are not usually included in introductory textbooks Experiments designed to show fundamental concepts that have been tested with large classes working in small groups Website with additional materials that is regularly updated Andrew Metcalfe, David Green, Andrew Smith, and Jonathan Tuke have taught probability and statistics to students of engineering at the University of Adelaide for many years and have substantial industry experience. Their current research includes applications to water resources engineering, mining, and telecommunications. Mahayaudin Mansor worked in banking and insurance before teaching statistics and business mathematics at the Universiti Tun Abdul Razak Malaysia and is currently a researcher specializing in data analytics and quantitative research in the Health Economics and Social Policy Research Group at the Australian Centre for Precision Health, University of South Australia. Tony Greenfield, formerly Head of Process Computing and Statistics at the British Iron and Steel Research Association, is a statistical consultant. He has been awarded the Chambers Medal for outstanding services to the Royal Statistical Society; the George Box Medal by the European Network for Business and Industrial Statistics for Outstanding Contributions to Industrial Statistics; and the William G. Hunter Award by the American Society for Quality.

The long-awaited revision of Fundamentals of Applied Probability and Random Processes expands on the central components that made the first edition a classic. The title is based on the premise that engineers use probability as a modeling tool, and that probability can be applied to the solution of engineering problems. Engineers and students studying probability and random processes also need to analyze data, and thus need some knowledge of statistics. This book is designed to provide students with a thorough grounding in probability and stochastic processes, demonstrate their applicability to real-world problems, and introduce the basics of statistics. The book's clear writing style and homework problems make it ideal for the classroom or for self-study. Demonstrates concepts with more than 100 illustrations, including 2 dozen new drawings Expands readers’ understanding of disruptive statistics in a new chapter (chapter 8) Provides new chapter on Introduction to Random Processes with 14 new illustrations and tables explaining key concepts. Includes two chapters devoted to the two branches of statistics, namely descriptive statistics (chapter 8) and inferential (or inductive) statistics (chapter 9).

An introductory text providing the reader with a thorough background to the rich world of applications of stochastic processes.

Introducing the tools of statistics and probability from the ground up An understanding of statistical tools is essential for engineers and scientists who often need to deal with data analysis over the course of their work. Statistics and Probability with Applications for Engineers and Scientists walks readers through a wide range of popular statistical techniques, explaining step-by-step how to generate, analyze, and interpret data for diverse applications in engineering and the natural sciences. Unique among books of this kind, Statistics and Probability with Applications for Engineers and Scientists covers descriptive statistics first, then goes on to discuss the fundamentals of probability theory. Along with case studies, examples, and real-world data sets, the book incorporates clear instructions on how to use the statistical packages Minitab® and Microsoft® Office Excel® to analyze various data sets. The book also features: • Detailed discussions on sampling distributions, statistical estimation of population parameters, hypothesis testing, reliability theory, statistical quality control including Phase I and Phase II control charts, and process capability indices • A clear presentation of nonparametric methods and simple and multiple linear regression methods, as well as a brief discussion on logistic regression method • Comprehensive guidance on the design of experiments, including randomized block designs, one- and two-way layout designs, Latin square designs, random effects and mixed effects models, factorial and fractional factorial designs, and response surface methodology • A companion website containing data sets for Minitab and Microsoft Office Excel, as well as JMP ® routines and results Assuming no background in probability and statistics, Statistics and Probability with Applications for Engineers and Scientists features a unique, yet tried-and-true, approach that is ideal for all undergraduate students as well as statistical practitioners who analyze and illustrate real-world data in engineering and the natural sciences.

The material in this book was first presented as a one-semester course in Relia bility Theory and Preventive Maintenance for M.Sc. students of the Industrial Engineering Department of Ben Gurion University in the 1997/98 and 1998/99 academic years. Engineering students are mainly interested in the applied part of this theory. The value of preventive maintenance theory lies in the possibility of its imple mentation, which crucially depends on how we handle statistical reliability data. The very nature of the object of reliability theory - system lifetime - makes it extremely difficult to collect large amounts of data. The data available are usu ally incomplete, e.g. heavily censored. Thus, the desire to make the course material more applicable led me to include in the course topics such as mod eling system lifetime distributions (Chaps. 1,2) and the maximum likelihood techniques for lifetime data processing (Chap. 3). A course in the theory of statistics is aprerequisite for these lectures. Stan dard courses usually pay very little attention to the techniques needed for our purpose. A short summary of them is given in Chap. 3, including widely used probability plotting. Chapter 4 describes the most useful and popular models of preventive main tenance and replacement. Some practical aspects of applying these models are addressed, such as treating uncertainty in the data, the role of data contamina tion and the opportunistic scheduling of maintenance activities.

Mathematics for Electrical Engineering and Computing embraces many applications of modern mathematics, such as Boolean Algebra and Sets and Functions, and also teaches both discrete and continuous systems - particularly vital for Digital Signal Processing (DSP). In addition, as most modern engineers are required to study software, material suitable for Software Engineering - set theory, predicate and prepositional calculus, language and graph theory - is fully integrated into the book. Excessive technical detail and language are avoided, recognising that the real requirement for practising engineers is the need to understand the applications of mathematics in everyday engineering contexts. Emphasis is given to an appreciation of the fundamental concepts behind the mathematics, for problem solving and undertaking critical analysis of results, whether using a calculator or a computer. The text is backed up by numerous exercises and worked examples throughout, firmly rooted in engineering practice, ensuring that all mathematical theory introduced is directly relevant to real-world engineering. The book includes introductions to advanced topics such as Fourier analysis, vector calculus and random processes, also making this a suitable introductory text for second year undergraduates of electrical, electronic and computer engineering, undertaking engineering mathematics courses. Dr Attenborough is a former Senior Lecturer in the School of Electrical, Electronic and Information Engineering at South Bank University. She is currently Technical Director of The Webbery - Internet development company, Co. Donegal, Ireland. Fundamental principles of mathematics introduced and applied in engineering practice, reinforced through over 300 examples directly relevant to real-world engineering

This text is designed for an introductory probability course at the university level for sophomores, juniors, and seniors in mathematics, physical and social sciences, engineering, and computer science. It presents a thorough treatment of ideas and techniques necessary for a firm understanding of the subject.

Theories of Probability: An Examination of Foundations reviews the theoretical foundations of probability, with emphasis on concepts that are important for the modeling of random phenomena and the design of information processing systems. Topics covered range from axiomatic comparative and quantitative probability to the role of relative frequency in the measurement of probability. Computational complexity and random sequences are also discussed. Comprised of nine chapters, this book begins with an introduction to different types of probability theories, followed by a detailed account of axiomatic formalizations of comparative and quantitative probability and the relations between them. Subsequent chapters focus on the Kolmogorov formalization of quantitative probability; the common interpretation of probability as a limit of the relative frequency of the number of occurrences of an event in repeated, unlinked trials of a random experiment; an improved theory for repeated random experiments; and the classical theory of probability. The book also examines the origin of subjective probability as a by-product of the development of individual judgments into decisions. Finally, it suggests that none of the known theories of probability covers the whole domain of engineering and scientific practice. This monograph will appeal to students and practitioners in the fields of mathematics and statistics as well as engineering and the physical and social sciences.

This updated and revised first-course textbook in applied probability provides a contemporary and lively post-calculus introduction to the subject of probability. The exposition reflects a desirable balance between fundamental theory and many applications involving a broad range of real problem scenarios. It is intended to appeal to a wide audience, including mathematics and statistics majors, prospective engineers and scientists, and those business and social science majors interested in the quantitative aspects of their disciplines. The textbook contains enough material for a year-long course, though many instructors will use it for a single term (one semester or one quarter). As such, three course syllabi with expanded course outlines are now available for download on the book's page on the Springer website. A one-term course would cover material in the core chapters (1-4), supplemented by selections from one or more of the remaining chapters on statistical inference (Ch. 5), Markov chains (Ch. 6), stochastic processes (Ch. 7), and signal processing (Ch. 8—available exclusively online and specifically designed for electrical and computer engineers, making the book suitable for a one-term class on random signals and noise). For a year-long course, core chapters (1-4) are accessible to those who have taken a year of univariate differential and integral calculus; matrix algebra, multivariate calculus, and engineering mathematics are needed for the latter, more advanced chapters. At the heart of the textbook's pedagogy are 1,100 applied exercises, ranging from straightforward to reasonably challenging, roughly 700 exercises in the first four "core" chapters alone—a self-contained textbook of problems introducing basic theoretical knowledge necessary for solving problems and illustrating how to solve the problems at hand – in R and MATLAB, including code so that students can create simulations. New to this edition • Updated and re-worked Recommended Coverage for instructors, detailing which courses should use the textbook and how to utilize different sections for various objectives and time constraints • Extended and revised instructions and solutions to problem sets • Overhaul of Section 7.7 on continuous-time Markov chains • Supplementary materials include three sample syllabi and updated solutions manuals for both instructors and students

This open access textbook provides the background needed to correctly use, interpret and understand statistics and statistical data in diverse settings. Part I makes key concepts in statistics readily clear. Parts I and II give an overview of the most common tests (t-test, ANOVA, correlations) and work out their statistical principles. Part III provides insight into meta-statistics (statistics of statistics) and demonstrates why experiments often do not replicate. Finally, the textbook shows how complex statistics can be avoided by using clever experimental design. Both non-scientists and students in Biology, Biomedicine and Engineering will benefit from the book by learning the statistical basis of scientific claims and by discovering ways to evaluate the quality of scientific reports in academic journals and news outlets.

An integrated package of powerful probabilistic tools and key applications in modern mathematical data science.

This book offers an introduction to concepts of probability theory, probability distributions relevant in the applied sciences, as well as basics of sampling distributions, estimation and hypothesis testing. As a companion for classes for engineers and scientists, the book also covers applied topics such as model building and experiment design. Contents Random phenomena Probability Random variables Expected values Commonly used discrete distributions Commonly used density functions Joint distributions Some multivariate distributions Collection of random variables Sampling distributions Estimation Interval estimation Tests of statistical hypotheses Model building and regression Design of experiments and analysis of variance Questions and answers

From classical foundations to modern theory, this comprehensive guide to probability interweaves mathematical proofs, historical context and detailed illustrative applications.

Providing a much-needed bridge between elementary statistics courses and advanced research methods courses, Understanding Advanced Statistical Methods helps students grasp the fundamental assumptions and machinery behind sophisticated statistical topics, such as logistic regression, maximum likelihood, bootstrapping, nonparametrics, and Bayesian methods. The book teaches students how to properly model, think critically, and design their own studies to avoid common errors. It leads them to think differently not only about math and statistics but also about general research and the scientific method. With a focus on statistical models as producers of data, the book enables students to more easily understand the machinery of advanced statistics. It also downplays the "population" interpretation of statistical models and presents Bayesian methods before frequentist ones. Requiring no prior calculus experience, the text employs a "just-in-time" approach that introduces mathematical topics, including calculus, where needed. Formulas throughout the text are used to explain why calculus and probability are essential in statistical modeling. The authors also intuitively explain the theory and logic behind real data analysis, incorporating a range of application examples from the social, economic, biological, medical, physical, and engineering sciences. Enabling your students to answer the why behind statistical methods, this text teaches them how to successfully draw conclusions when the premises are flawed. It empowers them to use advanced statistical methods with confidence and develop their own statistical recipes. Ancillary materials are available on the book's website.

The theory of probability is a powerful tool that helps electrical and computer engineers to explain, model, analyze, and design the technology they develop. The text begins at the advanced undergraduate level, assuming only a modest knowledge of probability, and progresses through more complex topics mastered at graduate level. The first five chapters cover the basics of probability and both discrete and continuous random variables. The later chapters have a more specialized coverage, including random vectors, Gaussian random vectors, random processes, Markov Chains, and convergence. Describing tools and results that are used extensively in the field, this is more than a textbook; it is also a reference for researchers working in communications, signal processing, and computer network traffic analysis. With over 300 worked examples, some 800 homework problems, and sections for exam preparation, this is an essential companion for advanced undergraduate and graduate students. Further resources for this title, including solutions (for Instructors only), are available online at www.cambridge.org/9780521864701.

This highly acclaimed text, now available in paperback, provides a thorough account of key concepts and theoretical results, with particular emphasis on viewing statistical inference as a special case of decision theory. Information-theoretic concepts play a central role in the development of the theory, which provides, in particular, a detailed discussion of the problem of specification of so-called prior ignorance . The work is written from the authors s committed Bayesian perspective, but an overview of non-Bayesian theories is also provided, and each chapter contains a wide-ranging critical re-examination of controversial issues. The level of mathematics used is such that most material is accessible to readers with knowledge of advanced calculus. In particular, no knowledge of abstract measure theory is assumed, and the emphasis throughout is on statistical concepts rather than rigorous mathematics. The book will be an ideal source for all students and researchers in statistics, mathematics, decision analysis, economic and business studies, and all branches of science and engineering, who wish to further their understanding of Bayesian statistics

Understanding Probability is a unique and stimulating approach to a first course in probability. The first part of the book demystifies probability and uses many wonderful probability applications from everyday life to help the reader develop a feel for probabilities. The second part, covering a wide range of topics, teaches clearly and simply the basics of probability. This fully revised third edition has been packed with even more exercises and examples and it includes new sections on Bayesian inference, Markov chain Monte-Carlo simulation, hitting probabilities in random walks and Brownian motion, and a new chapter on continuous-time Markov chains with applications. Here you will find all the material taught in an introductory probability course. The first part of the book, with its easy-going style, can be read by anybody with a reasonable background in high school mathematics. The second part of the book requires a basic course in calculus.

This introduction to modern concepts of applied stochastic processes is written for a broad range of applications in diverse areas of engineering and the physical sciences (unlike other books, which are written primarily for communications or electrical engineering). Emphasis is on clarifying the basic principles supporting current prediction techniques. The first eight chapters present the probability theory relevant to analysis of stochastic processes. The following nine chapters discuss principles, advanced techniques (including the procedures of spectral analysis and the development of the probability density function) and applications. Also features material found in the recent literature such as higher-order spectral analysis, the joint probability distribution of amplitudes and periods and non-Gaussian random processes. Includes numerous illustrative examples.