



Mathematics and Statistics

Springer and Palgrave Essential Textbooks

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Computer Science



ISBN: 978-0-387-84857-0

Hastie, T., Tibshirani, R., Friedman, J., Stanford University Dept. of Statistics, Stanford, CA, USA

The Elements of Statistical Learning

Data Mining, Inference, and Prediction, Second Edition

 The many topics include neural networks, support vector machines, classification trees and boosting - the first comprehensive treatment of this topic in any book
 Includes over 200 pages of four-color graphics

This book describes the important ideas in a variety of fields such as medicine, biology, finance, and marketing in a common conceptual framework. While the approach is statistical, the emphasis is on concepts rather than mathematics. Many examples are given, with a liberal use of colour graphics. It is a valuable resource for statisticians and anyone interested in data mining in science or industry. The book's coverage is broad, from supervised learning (prediction) to unsupervised learning. The many topics include neural networks, support vector machines, classification trees and boosting---the first comprehensive treatment of this topic ...

Contents

Overview of Supervised Learning.- Linear Methods for Regression.- Linear Methods for Classification.- Basis Expansions and Regularization.- Kernel Smoothing Methods.-Model Assessment and Selection.- Model Inference and Averaging.- Additive Models, Trees, and Related Methods.- Boosting and Additive Trees.- Neural Networks.- Support Vector Machines and Flexible Discriminants.-Prototype Methods and Nearest-Neighbors.-Unsupervised Learning.- Random Forests.-Ensemble Learning.- Undirected Graphical Models.- High-Dimensional Problems: p ? N.

Fields of Interest

Artificial Intelligence; Data Mining and Knowledge Discovery; Probability Theory and Stochastic Processes; Statistical Theory and Methods; Computational Biology/ Bioinformatics; Computer Appl. in Life Sciences

Content Level Research

Product category Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2009,XXII, 745 p. 658 illus.(Springer Series in Statistics) Hardcover

Medium Type

Book

Imprint Springer





ISBN: 978-1-4939-2711-1

Abbott, Stephen, Middlebury College Department of Mathematics, Middlebury, VT, USA

Understanding Analysis

Provides a polished and tuned-up version of the same core text that has proved successful with students and instructors for 15 years
Includes around 150 new exercises, in addition to around 200 of the best exercises from the first edition, and an accompanying solutions manual for instructors
Presents three new self-guided projects exploring Euler's sum, the factorial function and the Weierstrass Approximation Theorem

This lively introductory text exposes the student to the rewards of a rigorous study of functions of a real variable. In each chapter, informal discussions of questions that give analysis its inherent fascination are followed by precise, but not overly formal, developments of the techniques needed to make sense of them. By focusing on the unifying themes of approximation and the resolution of paradoxes that arise in the transition from the finite to the infinite, the text turns what could be a daunting cascade of definitions and theorems into a coherent and engaging progression of ideas. Acutely aware of the need for rigor, the student is ...

Contents

Preface.- 1 The Real Numbers.- 2 Sequences and Series.- 3 Basic Topology of R.- 4 Functional Limits and Continuity.- 5 The Derivative.- 6 Sequences and Series of Functions.- 7 The Riemann Integral.- 8 Additional Topics.- Bibliography.- Index.

Fields of Interest Analysis

Content Level

Lower undergraduate

Product category

Undergraduate textbook

Available

Bibliography

2nd ed. 2015,XII, 312 p. 36 illus. in color. (Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-1-4419-7287-3

Bak, Joseph, Newman, Donald J., City College of New York, New York, NY, USA

Complex Analysis

• The solution of the cubic equation and Newton's method for approximating the zeroes of any polynomial

Expanded treatments of the Schwarz

reflection principle and of the mapping properties of analytic functions on closed domains

• An introduction to Schwarz–Christoffel transformations and to Dirichlet series

Beginning with the ?rst edition of Complex Analysis, we have attempted to present the classical and beautiful theory of complex variables in the clearest and most intuitive form possible. The changes inthisedition, which include additions to ten of the nineteen chapters, are intended to provide the additional insights that can be obtainedby seeing a little more of the "bigpicture". This includes additional related results and occasional generalizations that place the results inaslightly broader context. The Fundamental Theorem of Algebra is enhanced by three related results. Section 1.3 offers a detailed look at the solution of the cubic ...

Contents

The Complex Numbers.- Functions of the Complex Variable z.- Analytic Functions.- Line Integrals and Entire Functions.- Properties of Entire Functions.- Properties of Analytic Functions.- Further Properties of Analytic Functions.- Simply Connected Domains.-Isolated Singularities of an Analytic Function.-The Residue Theorem.- Applications of the Residue Theorem to the Evaluation of Integrals and Sums.- Further Contour Integral Techniques.- to Conformal Mapping.- The Riemann Mapping Theorem.- Maximum-Modulus Theorems for Unbounded Domains.- Harmonic Functions.- Different Forms of Analytic Functions.- Analytic Continuation; The Gamma and Zeta ...

Fields of Interest

Analysis

Content Level Lower undergraduate Product category

Undergraduate textbook

Available

Bibliography

3rd ed. 2010,XII, 328 p. 77 illus. (Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-0-387-97894-9

Braun, Martin

Differential Equations and Their Applications

An Introduction to Applied Mathematics

There are two major changes in the Fourth Edition of Differential Equations and Their Applications. The first concerns the computer programs in this text. In keeping with recent trends in computer science, we have replaced all the APL programs with Pascal and C programs. The Pascal programs appear in the text in place of the APL programs, where they are followed by the Fortran programs, while the C programs appear in Appendix C. Mathematics is playing an ever more important role in the physical and biological sciences, provoking a blurring of boundaries between scientific disciplines and a resurgence of interest in the modern as well as the ...

Contents

Chapter 1 First-order differential equations * Chapter 2 Second-order linear differential equations * Chapter 3 Systems of differential equations * Chapter 4 Qualitative theory of differential equations * Chapter 5 Separation of variables and Fourier series * Chapter 6 Sturm -Liouville boundary value problems * Appendix A Some simple facts concerning functions of several variables * Appendix B Sequences and series * Appendix C C Programs * Answers to odd-numbered exercises * Index

Fields of Interest Analysis

Content Level Lower undergraduate

Product category Undergraduate textbook

Available

Bibliography

4th ed. 1993,XVI, 578 p.(Texts in Applied Mathematics, Volume 11) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-1-4939-2765-4

Laczkovich, Miklós, Sós, Vera T., Eötvös Loránd University, Budapest, Hungary

Real Analysis

Foundations and Functions of One Variable

Includes insightful historical remarks regarding real analysis

Presents core ideas of analysis "as a way of thinking" as opposed to "a body of facts"
Explains how and why ideas arise, then how they evolve to the mature notions of real analysis

Based on courses given at Eötvös Loránd University (Hungary) over the past 30 years, this introductory textbook develops the central concepts of the analysis of functions of one variable — systematically, with many examples and illustrations, and in a manner that builds upon, and sharpens, the student's mathematical intuition. The book provides a solid grounding in the basics of logic and proofs, sets, and real numbers, in preparation for a study of the main topics: limits, continuity, rational functions and transcendental functions, differentiation, and integration. Numerous applications to other areas of mathematics, and to physics, are ...

Contents

A Short Historical Introduction.- Basic Concepts.- Real Numbers.- Infinite Sequences I.- Infinite Sequences II.- Infinite Sequences III.- Rudiments of Infinite Series.- Countable Sets.- Real Valued Functions of One Variable.-Continuity and Limits of Functions.- Various Important Classes of Functions (Elementary Functions).- Differentiation.- Applications of Differentiation.- The Definite Integral.-Integration.- Applications of Integration.-Functions of Bounded Variation.- The Stieltjes Integral.- The Improper Integral.

Fields of Interest

Analysis

Content Level

Upper undergraduate

Product category

Undergraduate textbook

Available

Bibliography

1st ed. 2015,X, 483 p. 94 illus.(Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-1-4614-6270-5

Ross, Kenneth A., Eugene, OR, USA

Elementary Analysis

The Theory of Calculus

Revised and updated second edition with
 new material

Text for a transition course between calculus and more advanced analysis courses
Contains new material on topics such as irrationality of pi, the Baire category theorem, Newton's method and the secant method, and continuous nowhere-differentiable functions

For over three decades, this best-selling classic has been used by thousands of students in the United States and abroad as a must-have textbook for a transitional course from calculus to analysis. It has proven to be very useful for mathematics majors who have no previous experience with rigorous proofs. Its friendly style unlocks the mystery of writing proofs, while carefully examining the theoretical basis for calculus. Proofs are given in full, and the large number of well-chosen examples and exercises range from routine to challenging. The second edition preserves the book's clear and concise style, illuminating discussions, and simple, ...

Contents

Preface.- 1 Introduction.- 2 Sequences.- 3 Continuity.- 4 Sequences and Series of Functions.- 5 Differentiation.- 6 Integration.- 7 Capstone.- Appendix on Set Notation.-Selected Hints and Answers.- References.-Index.

Fields of Interest Analysis; Real Functions

Content Level Lower undergraduate

Product category Undergraduate textbook

Available

Bibliography 2nd ed. 2013,XII, 412 p.(Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-1-4614-7945-1

Lax, Peter D., Terrell, Maria Shea, New York University Department of Mathematics, New York, NY, USA

Calculus With Applications

· New edition extensively revised and

updated, including many new problems • Features early treatment of sequences and series relates calculus to calculation and approximation

• Offers explanations of all the important theorems to help students understand their meaning

Burstein, and Lax's Calculus with Applications and Computing offers meaningful explanations of the important theorems of single variable calculus. Written with students in mathematics, the physical sciences, and engineering in mind, and revised with their help, it shows that the themes of calculation, approximation, and modeling are central to mathematics and the main ideas of single variable calculus. This edition brings the innovation of the first edition to a new generation of students. New sections in this book use simple, elementary examples to show that when applying calculus concepts to approximations of functions, uniform convergence ...

Contents

1 Numbers and Limits.- 2 Functions and Continuity.- 3 The Derivative and Differentiation.- 4 The Theory of Differentiable Functions.- 5 Applications of the Derivative.- 6 Integration.- 7 Methods for Integration.- 8 Approximation of Integrals.- 9 Complex Numbers.- 10 Differential Equations.- 11 Probability.- Answers to Selected Problems.- Index.

Fields of Interest Calculus

Content Level Lower undergraduate

Product category Undergraduate textbook

Available

Bibliography 2nd ed. 2014,XII, 503 p. 220 illus. (Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity

Mathematics



ISBN: 978-0-387-95584-1

Lovász, L., Pelikán, J., Vesztergombi, K., Microsoft Research, Redmond, WA, USA

Discrete Mathematics

Elementary and Beyond

Discrete mathematics is quickly becoming one of the most important areas of mathematical research, with applications to cryptography, linear programming, coding theory and the theory of computing. This book is aimed at undergraduate mathematics and computer science students interested in developing a feeling for what mathematics is all about, where mathematics can be helpful, and what kinds of questions mathematicians work on. The authors discuss a number of selected results and methods of discrete mathematics, mostly from the areas of combinatorics and graph theory, with a little number theory, probability, and combinatorial geometry. ...

Contents

Let's Count!.- Combinatorial Tools.- Binomial Coefficients and Pascal's Triangle.- Fibonacci Numbers.- Combinatorial Probability.-Integers, Divisors, and Primes.- Graphs.-Trees.- Finding the Optimum.- Matchings in Graphs.- Combinatorics in Geometry.- Euler's Formula.- Coloring Maps and Graphs.- Finite Geometries, Codes, Latin Squares, and Other Pretty Creatures.- A Glimpse of Complexity and Cryptography.- Answers to Exercises.

Fields of Interest

Combinatorics; Number Theory

Content Level Lower undergraduate

Product category Undergraduate textbook

Available

Bibliography

2003, IX, 284 p. (Undergraduate Texts in Mathematics) Hardcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-0-387-40272-7

Wasserman, Larry, Carnegie Mellon University Dept. Statistics, Pittsburgh, PA, USA

All of Statistics

A Concise Course in Statistical Inference

• Provides a concise introduction to a larger number of topics than are usually included in a graduate-level mathematical statistics class

Taken literally, the title "All of Statistics" is an exaggeration. But in spirit, the title is apt, as the book does cover a much broader range of topics than a typical introductory book on mathematical statistics. This book is for people who want to learn probability and statistics quickly. It is suitable for graduate or advanced undergraduate students in computer science, mathematics, statistics, and related disciplines. The book includes modern topics like non-parametric curve estimation, bootstrapping, and classification, topics that are usually relegated to follow-up courses. The reader is presumed to know calculus and a little linear ...

Contents

Probability.- Random Variables.- Expectation.-Inequalities.- Convergence of Random Variables.- Models, Statistical Inference and Learning.- Estimating the CDF and Statistical Functionals.- The Bootstrap.- Parametric Inference.- Hypothesis Testing and p-values.-Bayesian Inference.- Statistical Decision Theory.- Linear and Logistic Regression.-Multivariate Models.- Inference about Independence.- Causal Inference.- Directed Graphs and Conditional Independence.-Undirected Graphs.- Loglinear Models.-Nonparametric Curve Estimation.- Smoothing Using Orthogonal Functions.- Classification.- Probability Redux: Stochastic Processes.-Simulation ...

Fields of Interest

Computational Mathematics and Numerical Analysis; Probability Theory and Stochastic Processes; Complex Systems; Statistical Theory and Methods; Probability and Statistics in Computer Science; Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences

Content Level

Research

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2004,XX, 442 p.(Springer Texts in Statistics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-3-662-49886-6

Langtangen, Hans Petter, Simula Research Laboratory Center for Biomedical Computing, Fornebu

A Primer on Scientific Programming with Python

Example-oriented text with all applications taken from science and engineering
Aimed at newcomers to programming and Python, but proved to be useful for professionals too

• All examples are accompanied by complete program codes, which can be modified to the reader's needs

The book serves as a first introduction to

computer programming of scientific applications, using the high-level Python language. The exposition is example and problem-oriented, where the applications are taken from mathematics, numerical calculus, statistics, physics, biology and finance. The book teaches "Matlab-style" and procedural programming as well as object-oriented programming. High school mathematics is a required background and it is advantageous to study classical and numerical one-variable calculus in parallel with reading this book. Besides learning how to program computers, the reader will also learn how to solve mathematical ...

Contents

Preface.- Computing with Formulas.- Loops and Lists.- Functions and Branching.- User Input and Error Handling.- Array Computing and Curve Plotting.- Dictionaries and Strings.-Introduction to Classes.- Random Numbers and Simple Games.- Object-Oriented Programming.- Sequences and Difference Equations.- Introduction to Discrete Calculus.-Introduction to Differential Equations.- A Complete Differential Equation Project.-Programming of Differential Equations.-Debugging.- Migrating Python to Compiled Code.- Technical Topics.- References.- Index.

Fields of Interest

Computational Science and Engineering; Programming Techniques; Mathematics of Computing; Numerical and Computational Physics, Simulation

Content Level

Upper undergraduate

Product category

Undergraduate textbook

Available

Bibliography

5th ed. 2016,XXXI, 922 p. 88 illus., 20 illus. in color.(Texts in Computational Science and Engineering, Volume 6) Hardcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-1-4419-9981-8

Lee, John, University of Washington, Seattle, WA, USA

Introduction to Smooth Manifolds

• New edition extensively revised and clarified, and topics have been substantially rearranged

• Introduces the two most important analytic tools, the rank theorem and the fundamental theorem on flows, much earlier in the text • Added topics include Sard's theorem and transversality, a proof that infinitesimal Lie group actions generate global group actions, a more thorough study of first-order partial differential equations, a brief treatment of degree theory for smooth maps between compact manifolds, and an introduction to contact structures

This book is an introductory graduate-level textbook on the theory of smooth manifolds. Its goal is to familiarize students with the tools they will need in order to use manifolds in mathematical or scientific research---smooth structures, tangent vectors and covectors, vector bundles, immersed and embedded submanifolds, tensors, differential forms, de Rham cohomology, vector fields, flows, foliations, Lie derivatives, Lie groups, Lie algebras, and more. The approach is as concrete as possible, with pictures and intuitive discussions of how one should think geometrically about the abstract concepts, while making full use of the powerful ...

Contents

Preface.- 1 Smooth Manifolds.- 2 Smooth Maps.- 3 Tangent Vectors.- 4 Submersions, Immersions, and Embeddings.- 5 Submanifolds.- 6 Sard's Theorem.- 7 Lie Groups.- 8 Vector Fields.- 9 Integral Curves and Flows.- 10 Vector Bundles.- 11 The Cotangent Bundle.- 12 Tensors.- 13 Riemannian Metrics.- 14 Differential Forms.-15 Orientations.- 16 Integration on Manifolds. - 17 De Rham Cohomology.- 18 The de Rham Theorem.- 19 Distributions and Foliations.- 20 The Exponential Map.- 21 Quotient Manifolds. - 22 Symplectic Manifolds.- Appendix A: Review of Topology.- Appendix B: Review of Linear Algebra.- Appendix C: Review of

springer.com

Calculus.- Appendix D: Review ...

Fields of Interest Differential Geometry

Content Level Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography 2nd ed. 2013,XVI, 708 p.(Graduate Texts in Mathematics, Volume 218) Hardcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-1-4939-1193-6

Grafakos, Loukas, University of Missouri, Columbia, MO, USA

Classical Fourier Analysis

New edition extensively revised and updated, including 1000 different corrections and improvements in the existing text
Includes a new chapter, "Topics on Fourier series", including sections on Gibbs phenomenon, summability methods and Jackson's theorem, Tauberian theorems, spherical Fourier inversion, and Fourier transforms on the line

• Provides motivation for the reader with more examples and applications, new and more relevant hints for the existing exercises, and about 20-30 new exercises in the existing chapters

The main goal of this text is to present the theoretical foundation of the field of Fourier analysis on Euclidean spaces. It covers classical topics such as interpolation, Fourier series, the Fourier transform, maximal functions, singular integrals, and Littlewood–Paley theory. The primary readership is intended to be graduate students in mathematics with the prerequisite including satisfactory completion of courses in real and complex variables. The coverage of topics and exposition style are designed to leave no gaps in understanding and stimulate further study. This third edition includes new Sections 3.5, 4.4, 4.5 as well as a new ...

Contents

Preface.- 1. Lp Spaces and Interpolation.- 2. Maximal Functions, Fourier Transform, and Distributions.- 3. Fourier Series.- 4. Topics on Fourier Series.- 5. Singular Integrals of Convolution Type.- 6. Littlewood-Paley Theory and Multipliers.- 7. Weighted Inequalities.- A. Gamma and Beta Functions.-B. Bessel Functions.- C. Rademacher Functions.- D. Spherical Coordinates.- E. Some Trigonometric Identities and Inequalities.- F. Summation by Parts.- G. Basic Functional Analysis.- H. The Minimax Lemma.- I. Taylor's and Mean Value Theorem in Several Variables.- J. The Whitney Decomposition of Open Sets in Rn.- Glossary.- References.-Index.

Fields of Interest

Fourier Analysis; Abstract Harmonic Analysis; Functional Analysis

Content Level

Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

3rd ed. 2014,XVII, 638 p. 14 illus., 2 illus. in color.(Graduate Texts in Mathematics, Volume 249) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-3-319-77648-4

Lee, Gregory T., Lakehead University, Thunder Bay, ON, Canada

Abstract Algebra

An Introductory Course

Provides a gentle, yet thorough, introduction to abstract algebra
Includes careful proofs of theorems and numerous worked examples
Written in an informal, readable style

This carefully written textbook offers a thorough introduction to abstract algebra, covering the fundamentals of groups, rings and fields. The first two chapters present preliminary topics such as properties of the integers and equivalence relations. The author then explores the first major algebraic structure, the group, progressing as far as the Sylow theorems and the classification of finite abelian groups. An introduction to ring theory follows, leading to a discussion of fields and polynomials that includes sections on splitting fields and the construction of finite fields. The final part contains applications to public key cryptography ...

Contents

Part I Preliminaries.- 1 Relations and Functions.- 2 The Integers and Modular Arithmetic.- Part II Groups.- 3 Introduction to Groups.- 4 Factor Groups and Homomorphisms.- 5 Direct Products and the Classification of Finite Abelian Groups.- 6 Symmetric and Alternating Groups.-7 The Sylow Theorems.- Part III Rings.- 8 Introduction to Rings.- 9 Ideals, Factor Rings and Homomorphisms.- 10 Special Types of Domains.- Part IV Fields and Polynomials.- 11 Irreducible Polynomials.- 12 Vector Spaces and Field Extensions.- Part V Applications.- 13 Public Key Cryptography.- 14 Straightedge and Compass Constructions.- A The Complex Numbers.- B Matrix ...

Fields of Interest

Group Theory and Generalizations; Associative Rings and Algebras; Field Theory and Polynomials

Content Level

Lower undergraduate

Product category Undergraduate textbook

Available

Bibliography

1st ed. 2018,XI, 301 p. 7 illus.(Springer Undergraduate Mathematics Series) Softcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN:978-3-319-11079-0

Axler, Sheldon, San Francisco State University, San Francisco, CA, USA

Linear Algebra Done Right

Complete solutions manual available; instructors must contact the author directly by email to obtain the solutions
New edition extensively revised and updated

• Covers new topics such as product spaces, quotient spaces, and dual spaces

This best-selling textbook for a second course in linear algebra is aimed at undergrad math majors and graduate students. The novel approach taken here banishes determinants to the end of the book. The text focuses on the central goal of linear algebra: understanding the structure of linear operators on finite-dimensional vector spaces. The author has taken unusual care to motivate concepts and to simplify proofs. A variety of interesting exercises in each chapter helps students understand and manipulate the objects of linear algebra. The third edition contains major improvements and revisions throughout the book. More than 300 new exercises ...

Contents

-Preface for the Instructor-Preface for the Student-Acknowledgments-1. Vector Spaces-2. Finite-Dimensional Vector Spaces- 3. Linear Maps- 4. Polynomials- 5. Eigenvalues, Eigenvectors, and Invariant Subspaces- 6. Inner Product Spaces- 7. Operators on Inner Product Spaces- 8. Operators on Complex Vector Spaces- 9. Operators on Real Vector Spaces- 10. Trace and Determinant-Photo Credits-Symbol Index-Index.

Fields of Interest

Linear and Multilinear Algebras, Matrix Theory

Content Level

Upper undergraduate

Product category

Undergraduate textbook

Available

Bibliography

3rd ed. 2015,XVII, 340 p. 26 illus. in color. (Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint

Springer

Order Quantity



ISBN: 978-3-319-24344-3

Liesen, Jörg, Mehrmann, Volker, Technical University of Berlin, Berlin, Germany

Linear Algebra

 Provides a matrix-oriented approach to the theory of linear algebra including all details and proofs

• Improves intuition for students in their first contact with abstract concepts

Analyzes detailed examples from

application, contains 'MATLAB-Minutes' and

special topics from applied linear algebra

This self-contained textbook takes a matrixoriented approach to linear algebra and presents a complete theory, including all details and proofs, culminating in the Jordan canonical form and its proof. Throughout the development, the applicability of the results is highlighted. Additionally, the book presents special topics from applied linear algebra including matrix functions, the singular value decomposition, the Kronecker product and linear matrix equations. The matrix-oriented approach to linear algebra leads to a better intuition and a deeper understanding of the abstract concepts, and therefore simplifies their use in real world ...

Contents

Linear Algebra in every day life.- Basic mathematical concepts.- Algebraic structures.- Matrices.- The echelon form and the rank of matrices.- Linear systems of equations.- Determinants of matrices.- The characteristic polynomial and eigenvalues of matrices.- Vector spaces.- Linear maps.- Linear forms and bilinear forms.- Euclidean and unitary vector spaces.- Adjoints of linear maps.- Eigenvalues of endomorphisms.-Polynomials and the Fundamental Theorem of Algebra.- Cyclic subspaces, duality and the Jordan canonical form.- Matrix functions and systems of differential equations.- Special classes of endomorphisms.- The singular value ...

Fields of Interest

Linear and Multilinear Algebras, Matrix Theory

Content Level

Lower undergraduate

Product category

Undergraduate textbook

Available

Bibliography

1st ed. 2015,XI, 324 p. 22 illus.(Springer Undergraduate Mathematics Series) Softcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-3-319-91040-6

Olver, Peter J., Shakiban, Chehrzad, University of Minnesota, Minneapolis, MN, USA

Applied Linear Algebra

• Develops a strong conceptual grounding for applying linear algebra in numerous modern applications

Weaves the theory of linear algebra with applications across engineering, science, computing, data analysis, and beyond
Provides an ideal preparation for future study in applied differential equations

This textbook develops the essential tools of linear algebra, with the goal of imparting technique alongside contextual understanding. Applications go hand-in-hand with theory, each reinforcing and explaining the other. This approach encourages students to develop not only the technical proficiency needed to go on to further study, but an appreciation for when, why, and how the tools of linear algebra can be used across modern applied mathematics. Providing an extensive treatment of essential topics such as Gaussian elimination, inner products and norms, and eigenvalues and singular values, this text can be used for an in-depth first course....

Contents

Preface.- 1. Linear Algebraic Systems.- 2. Vector Spaces and Bases.- 3. Inner Products and Norms.- 4. Minimization and Least Squares Approximation.- 5. Orthogonality.- 6. Equilibrium.- 7. Linearity.- 8. Eigenvalues.- 9. Linear Dynamical Systems.- 10. Iteration of Linear Systems.- 11. Boundary Value Problems in One Dimension.- References.-Index.

Fields of Interest

Linear and Multilinear Algebras, Matrix Theory; Mathematical Applications in the Physical Sciences

Content Level Upper undergraduate

Product category Undergraduate textbook

Available

Bibliography

2nd ed. 2018,XXV, 679 p. 130 illus., 88 illus. in color.(Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint

Springer





ISBN: 978-1-4419-9478-3

Daepp, Ulrich, Gorkin, Pamela, Bucknell University College Arts and Science, Lewisburg, PA, USA

Reading, Writing, and Proving

A Closer Look at Mathematics

New to the second edition:

A useful appendix of formal definitions that can be used as a quick reference
Second edition includes new exercises, problems, and student projects

This book, which is based on Pólya's method of problem solving, aids students in their transition from calculus (or precalculus) to higher-level mathematics. The book begins by providing a great deal of guidance on how to approach definitions, examples, and theorems in mathematics and ends with suggested projects for independent study. Students will follow Pólya's four step approach: analyzing the problem, devising a plan to solve the problem, carrying out that plan, and then determining the implication of the result. In addition to the Pólya approach to proofs, this book places special emphasis on reading proofs carefully and writing them

Contents

-Preface. -1. The How, When, and Why of Mathematics.- 2. Logically Speaking.-3.Introducing the Contrapositive and Converse.- 4. Set Notation and Quantifiers.- 5. Proof Techniques.- 6. Sets.- 7. Operations on Sets.- 8. More on Operations on Sets.- 9. The Power Set and the Cartesian Product.- 10. Relations.- 11. Partitions.- 12. Order in the Reals.- 13. Consequences of the Completeness of (\Bbb R).- 14. Functions, Domain, and Range.- 15. Functions, One-to-One, and Onto.- 16. Inverses.- 17. Images and Inverse Images.- 18. Mathematical Induction.-19. Sequences.- 20. Convergence of Sequences of Real Numbers.- 21. Equivalent Sets.- 22. Finite ...

Fields of Interest

Mathematical Logic and Foundations; Analysis; Number Theory

Content Level

Lower undergraduate

Product category

Undergraduate textbook

Available

Bibliography

2nd ed. 2011, XIV, 378 p. (Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint Springer





ISBN: 978-1-4614-7115-8

Hall, Brian C., University of Notre Dame, Notre Dame, IN, USA

Quantum Theory for Mathematicians

• Explains physical ideas in the language of mathematics

• Provides a self-contained treatment of the necessary mathematics, including spectral theory and Lie theory

· Contains many exercises that will appeal to

graduate students

Although ideas from quantum physics play an important role in many parts of modern mathematics, there are few books about quantum mechanics aimed at mathematicians. This book introduces the main ideas of quantum mechanics in language familiar to mathematicians. Readers with little prior exposure to physics will enjoy the book's conversational tone as they delve into such topics as the Hilbert space approach to quantum theory; the Schrödinger equation in one space dimension; the Spectral Theorem for bounded and unbounded self-adjoint operators; the Stone-von Neumann Theorem; the Wentzel-Kramers-Brillouin approximation; the role of Lie groups ...

Contents

1 The Experimental Origins of Quantum Mechanics.- 2 A First Approach to Classical Mechanics.- 3 A First Approach to Quantum Mechanics.- 4 The Free Schrödinger Equation.- 5 A Particle in a Square Well.- 6 Perspectives on the Spectral Theorem.-7 The Spectral Theorem for Bounded Self-Adjoint **Operators: Statements.- 8 The Spectral** Theorem for Bounded Sef-Adjoint Operators: Proofs.- 9 Unbounded Self-Adjoint Operators.- 10 The Spectral Theorem for Unbounded Self-Adjoint Operators.- 11 The Harmonic Oscillator.- 12 The Uncertainty Principle.- 13 Quantization Schemes for Euclidean Space -- 14 The Stone-von Neumann Theorem.- 15 The WKB Approximation.- ...

Fields of Interest

Mathematical Physics; Mathematical Applications in the Physical Sciences; Quantum Physics; Functional Analysis; Topological Groups, Lie Groups; Mathematical Methods in Physics

Content Level

Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2013,XVI, 554 p. 30 illus., 2 illus. in color. (Graduate Texts in Mathematics, Volume 267) Hardcover

Medium Type

Book

Imprint

Springer

Order Quantity

Mathematics



ISBN: 978-3-319-59730-0

Garfinkel, A., Shevtsov, J., Guo, Y., University of California Los Angeles, Los Angeles, CA, USA

Modeling Life

The Mathematics of Biological Systems

 Tackles highly relevant material across the life sciences, using tools best-suited to the field

Driven by real-world examples drawn from biology, ecology, medicine, and beyond
Builds effective mathematical modeling skills from beginning to end

This book develops the mathematical tools essential for students in the life sciences to describe interacting systems and predict their behavior. From predator-prey populations in an ecosystem, to hormone regulation within the body, the natural world abounds in dynamical systems that affect us profoundly. Complex feedback relations and counterintuitive responses are common in nature; this book develops the quantitative skills needed to explore these interactions. Differential equations are the natural mathematical tool for quantifying change, and are the driving force throughout this book. The use of Euler's method makes nonlinear examples ...

Contents

1. Modeling, Change, and Simulation.- 2. Derivatives and Integrals.- 3. Equilibrium Behavior.- 4. Non-Equilibrium Dynamics: Oscillation.- 5. Chaos.- 6. Linear Algebra.- 7. Multivariable Systems.- Bibliography.- Index.

Fields of Interest

Mathematical and Computational Biology; Mathematical Modeling and Industrial Mathematics; Ordinary Differential Equations

Content Level Lower undergraduate

Product category Undergraduate textbook

Available

Bibliography

1st ed. 2017,XV, 445 p. 353 illus., 299 illus. in color. Hardcover

Medium Type Book

Imprint Springer





ISBN: 978-1-4471-6418-0

Dineen, Seán, University College Dublin, Dublin, Ireland

Multivariate Calculus and Geometry

• Places the differential and integral calculus of several variables in its natural geometric environment

- Presents interesting non-trivial applications
- of the differential calculus

• Shows how the differential calculus and classical geometry evolved into differential geometry

Multivariate calculus can be understood best by combining geometric insight, intuitive arguments, detailed explanations and mathematical reasoning. This textbook not only follows this programme, but additionally provides a solid description of the basic concepts, via familiar examples, which are then tested in technically demanding situations. In this new edition the introductory chapter and two of the chapters on the geometry of surfaces have been revised. Some exercises have been replaced and others provided with expanded solutions. Familiarity with partial derivatives and a course in linear algebra are essential prerequisites for readers ...

Contents

Introduction to Differentiable Functions.-Level Sets and Tangent Spaces.- Lagrange Multipliers.- Maxima and Minima on Open Sets.- Curves in Rn.- Line Integrals.- The Frenet–Serret Equations.- Geometry of Curves in R3.- Double Integration.- Parametrized Surfaces in R3.- Surface Area.- Surface Integrals.- Stokes' Theorem.- Triple Integrals.-The Divergence Theorem.- Geometry of Surfaces in R3.- Gaussian Curvature.-Geodesic Curvature.

Fields of Interest

Mathematics, general

Content Level

Upper undergraduate

Product category

Undergraduate textbook

Available

Bibliography

3rd ed. 2014,XIV, 257 p. 103 illus.(Springer Undergraduate Mathematics Series) Softcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-3-662-57264-1

Aigner, Martin, Ziegler, Günter M., Freie Universität Berlin, Berlin, Germany

Proofs from THE BOOK

Revised and enlarged sixth edition
New chapter on Van der Waerden's permanent conjecture

• New sections on the asymptotics for the number of Latin squares

This revised and enlarged sixth edition of Proofs from THE BOOK features an entirely new chapter on Van der Waerden's permanent conjecture, as well as additional, highly original and delightful proofs in other chapters. From the citation on the occasion of the 2018 "Steele Prize for Mathematical Exposition" "... It is almost impossible to write a mathematics book that can be read and enjoyed by people of all levels and backgrounds, yet Aigner and Ziegler accomplish this feat of exposition with virtuoso style. [...] This book does an invaluable service to mathematics, by illustrating for non-mathematicians what it is that mathematicians mean when ...

Contents

Number Theory: 1. Six proofs of the infinity of primes.- 2. Bertrand's postulate.- 3. Binomial coefficients are (almost) never powers.- 4. Representing numbers as sums of two squares.- 5. The law of quadratic reciprocity.-6. Every finite division ring is a field.-7. The spectral theorem and Hadamard's determinant problem.- 8. Some irrational numbers.- 9. Three times $\pi 2/6$.- Geometry: 10. Hilbert's third problem: decomposing polyhedral.- 11. Lines in the plane and decompositions of graphs.- 12. The slope problem.- 13. Three applications of Euler's formula.- 14. Cauchy's rigidity theorem.- 15. The Borromean rings don't exist.- 16. Touching ...

Fields of Interest

Number Theory; Geometry; Analysis; Combinatorics; Graph Theory; Mathematics of Computing

Content Level

Lower undergraduate

Product category

Undergraduate textbook

Available

Bibliography 6th ed. 2018,VIII, 326 p. Hardcover

Medium Type Book

Imprint Springer

Order Quantity



A Pythagorean Introduction to Number Theory

2 Springer

ISBN: 978-3-030-02603-5

Takloo-Bighash, Ramin, University of Illinois at Chicago, Chicago, IL, USA

A Pythagorean Introduction to Number Theory

Right Triangles, Sums of Squares, and Arithmetic

• Offers an innovative approach to elementary number theory motivated by right triangles

Inspires students to explore number theory through investigation of concrete examples
Provides historical context throughout, showing how ideas developed in the field

Right triangles are at the heart of this textbook's vibrant new approach to elementary number theory. Inspired by the familiar Pythagorean theorem, the author invites the reader to ask natural arithmetic questions about right triangles, then proceeds to develop the theory needed to respond. Throughout, students are encouraged to engage with the material by posing questions, working through exercises, using technology, and learning about the broader context in which ideas developed. Progressing from the fundamentals of number theory through to Gauss sums and quadratic reciprocity, the first part of this text presents an innovative first ...

Contents

Part I Foundational Material.- 1. Introduction.-2. Basic number theory.- 3. Integral solutions to the Pythagorean Equation.- 4. What integers are areas of right triangles?.- 5. What numbers are the edges of a right triangle?.- 6. Primes of the form 4k+1.- 7. Gauss sums, Quadratic Reciprocity, and the Jacobi symbol.- Part II Advanced Topics.- 8. Counting Pythagorean triples modulo an integer.- 9. How many lattice points are there on a circle or a sphere?.- 10. What about geometry?.- 11. Another proof of the four squares theorem.-12. Quadratic forms and sums of squares.- 13. How many Pythagorean triples are there?.-14. How are rational ...

Fields of Interest

Number Theory

Content Level

Upper undergraduate

Product category Undergraduate textbook

Available

Bibliography

1st ed. 2018,XVIII, 279 p. 24 illus., 9 illus. in color.(Undergraduate Texts in Mathematics) Hardcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-0-387-30303-1

Nocedal, Jorge, Wright, Stephen, Northwestern University Dept. Electrical &, Evanston, IL, USA

Numerical Optimization

• A comprehensive and up-to-date description of the most effective methods in continuous optimization

• Responds to the growing interest in optimization in engineering, science, and business

• Updated throughout with new chapters on nonlinear interior methods and derivative-free methods for optimization

Numerical Optimization presents a comprehensive and up-to-date description of the most effective methods in continuous optimization. It responds to the growing interest in optimization in engineering, science, and business by focusing on the methods that are best suited to practical problems. For this new edition the book has been thoroughly updated throughout. There are new chapters on nonlinear interior methods and derivative-free methods for optimization, both of which are used widely in practice and the focus of much current research. Because of the emphasis on practical methods, as well as the extensive illustrations and exercises, the ...

Contents

Fundamentals of Unconstrained Optimization.- Line Search Methods.- Trust-Region Methods.- Conjugate Gradient Methods.- Quasi-Newton Methods.- Large-Scale Unconstrained Optimization.-Calculating Derivatives.- Derivative-Free Optimization.- Least-Squares Problems.-Nonlinear Equations.- Theory of Constrained Optimization.- Linear Programming: The Simplex Method.- Linear Programming: Interior-Point Methods.- Fundamentals of Algorithms for Nonlinear Constrained Optimization.- Quadratic Programming.-Penalty and Augmented Lagrangian Methods.- Sequential Quadratic Programming.- Interior-Point Methods for Nonlinear Programming.

Fields of Interest

Optimization; Calculus of Variations and Optimal Control; Optimization; Systems Theory, Control; Computational Mathematics and Numerical Analysis; Operations Research/ Decision Theory

Content Level

Research

Product category Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2006,XXII, 664 p.(Springer Series in Operations Research and Financial Engineering) Hardcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-1-4614-3617-1

Adkins, William A., Davidson, Mark G., Louisiana State University Department of Mathematics, Baton Rouge, LA, USA

Ordinary Differential Equations

 Contains numerous helpful examples and exercises that provide motivation for the reader

Presents the Laplace transform early in the text and uses it to motivate and develop solution methods for differential equations
Takes a streamlined approach to linear systems of differential equations

Unlike most texts in differential equations, this textbook gives an early presentation of the Laplace transform, which is then used to motivate and develop many of the remaining differential equation concepts for which it is particularly well suited. For example, the standard solution methods for constant coefficient linear differential equations are immediate and simplified, and solution methods for constant coefficient systems are streamlined. By introducing the Laplace transform early in the text, students become proficient in its use while at the same time learning the standard topics in differential equations. The text also includes ...

Contents

Preface.- 1 First Order Differential Equations.-2 The Laplace Transform.- 3 Second Order Constant Coefficient Linear Differential Equations.- 4 Linear Constant Coefficient Differential Equations.- 5 Second Order Linear Differential Equations.- 6 Discontinuous Functions and the Laplace Transform.- 7 Power Series Methods.- 8 Matrices .- 9 Linear Systems of Differential Equations.- A Appendix.- B Selected Answers.- C Tables.-Symbol Index.- Index.

Fields of Interest

Ordinary Differential Equations

Content Level

Upper undergraduate

Product category

Undergraduate textbook

Available

Bibliography

2012,XIII, 799 p. 121 illus.(Undergraduate Texts in Mathematics) Hardcover

Medium Type Book

Imprint Springer





ISBN: 978-3-319-23041-2

Witelski, Thomas, Bowen, Mark, Duke University, Durham, NC, USA

Methods of Mathematical Modelling

Continuous Systems and Differential Equations

• Provides a self-contained and accessible introduction to mathematical modelling using ordinary and partial differential equations

• Presents key approaches for formulating models and solution techniques via asymptotic analysis

• Includes many challenging exercises and connections to classic models in applied mathematics including the Burgers equation, the Korteweg de Vries equation, Euler-Lagrange equations, pattern formation via Turing instabilities

This book presents mathematical modelling and the integrated process of formulating sets of equations to describe real-world problems. It describes methods for obtaining solutions of challenging differential equations stemming from problems in areas such as chemical reactions, population dynamics, mechanical systems, and fluid mechanics. Chapters 1 to 4 cover essential topics in ordinary differential equations, transport equations and the calculus of variations that are important for formulating models. Chapters 5 to 11 then develop more advanced techniques including similarity solutions, matched asymptotic expansions, multiple scale ...

Contents

Rate equations.- Transport equations.-Variational principles.- Dimensional scaling analysis.- Self-similar scaling solutions of differential equations.- Perturbation methods.- Boundary layer theory.- Long-wave asymptotics for PDE problems.- Weaklynonlinear oscillators.- Fast/slow dynamical systems.- Reduced models for PDE problems.-Modelling in applied fluid dynamics.

Fields of Interest

Ordinary Differential Equations; Partial Differential Equations; Mathematical Applications in the Physical Sciences; Mathematical Modeling and Industrial Mathematics; Calculus of Variations and Optimal Control; Optimization

Content Level

Upper undergraduate

Product category

Undergraduate textbook

Available

Bibliography

1st ed. 2015,XVIII, 305 p. 50 illus., 45 illus. in color.(Springer Undergraduate Mathematics Series) Softcover

Medium Type

Book

Imprint

Springer

Order Quantity



ISBN: 978-3-319-48934-6

Borthwick, David, Emory University Dept. Mathematics &, Atlanta, GA, USA

Introduction to Partial Differential Equations

Perfect book for a One-semester PDE course
 Includes a thorough discussion of modeling process for each equation

• Covers indepth three types of linear PDES: elliptic, parabolic, and hyperbolic

This modern take on partial differential equations does not require knowledge beyond vector calculus and linear algebra. The author focuses on the most important classical partial differential equations, including conservation equations and their characteristics, the wave equation, the heat equation, function spaces, and Fourier series, drawing on tools from analysis only as they arise. Within each section the author creates a narrative that answers the five questions: What is the scientific problem we are trying to understand? How do we model that with PDE? What techniques can we use to analyze the PDE? How do those techniques apply to this ...

Contents

1. Introduction.- 2. Preliminaries.- 3. Conservation Equations and Characteristics.-4. The Wave Equation.- 5. Separation of Variables.- 6. The Heat Equation.- 7. Function Spaces.- 8. Fourier Series.- 9. Maximum Principles.- 10. Weak Solutions.- 11. Variational Methods.- 12. Distributions.- 13. The Fourier Transform.- A. Appendix: Analysis Foundations.- References.- Notation Guide.-Index.

Fields of Interest

Partial Differential Equations; Mathematical Applications in the Physical Sciences

Content Level Upper undergraduate

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 1st ed. 2016,XVI, 283 p. 68 illus., 61 illus. in color.(Universitext) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-1-4614-4808-2

Jost, Jürgen, Max Planck Institut für Mathematik in den Naturwissenschafte, Leipzig, Germany

Partial Differential Equations

• New edition extensively revised and updated

• Features a systematic discussion of the relations between different types of partial differential equations

Presents new Harnack type techniques

This book offers an ideal graduate-level introduction to the theory of partial differential equations. The first part of the book describes the basic mathematical problems and structures associated with elliptic, parabolic, and hyperbolic partial differential equations, and explores the connections between these fundamental types. Aspects of Brownian motion or pattern formation processes are also presented. The second part focuses on existence schemes and develops estimates for solutions of elliptic equations, such as Sobolev space theory, weak and strong solutions, Schauder estimates, and Moser iteration. In particular, the reader will ...

Contents

Preface.- Introduction: What are Partial Differential Equations?.- 1 The Laplace equation as the Prototype of an Elliptic Partial Differential Equation of Second Order.- 2 The Maximum Principle.- 3 Existence Techniques I: Methods Based on the Maximum Principle.-4 Existence Techniques II: Parabolic Methods. The Heat Equation.- 5 Reaction-Diffusion Equations and Systems.- 6 Hyperbolic Equations.- 7 The Heat Equation, Semigroups, and Brownian Motion.- 8 Relationships between Different Partial Differential Equations.- 9 The Dirichlet Principle. Variational Methods for the Solutions of PDEs (Existence Techniques III).- 10 Sobolev Spaces and L^2 ...

Fields of Interest

Partial Differential Equations; Theoretical, Mathematical and Computational Physics

Content Level

Graduate

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 3rd ed. 2013,XIII, 410 p. 10 illus.(Graduate Texts in Mathematics, Volume 214) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-3-319-12492-6

Logan, J. David, University of Nebraska-Lincoln, Lincoln, NE, USA

Applied Partial Differential Equations

Concise treatment of the main topics studied in a standard introductory course on partial differential equations
Includes an expanded treatment of numerical computation with MATLAB replacement for all numerical calculations
Increased number of worked out examples give student more concrete techniques to attack exercises

This textbook is for the standard, onesemester, junior-senior course that often goes by the title "Elementary Partial Differential Equations" or "Boundary Value Problems". The audience consists of students in mathematics, engineering, and the sciences. The topics include derivations of some of the standard models of mathematical physics and methods for solving those equations on unbounded and bounded domains, and applications of PDE's to biology. The text differs from other texts in its brevity; yet it provides coverage of the main topics usually studied in the standard course, as well as an introduction to using computer algebra packages ...

Contents

Preface to the Third Edition.- To the Students.- 1: The Physical Origins of Partial Differential Equations.- 1.1 PDE Models.- 1.2 Conservation Laws.- 1.3 Diffusion.- 1.4 Diffusion and Randomness.- 1.5 Vibrations and Acoustics.- 1.6 Quantum Mechanics*.- 1.7 Heat Conduction in Higher Dimensions.- 1.8 Laplace's Equation.- 1.9 Classification of PDEs.- 2. Partial Differential Equations on Unbounded Domains.- 2.1 Cauchy Problem for the Heat Equation.- 2.2 Cauchy Problem for the Wave Equation.- 2.3 Well-Posed Problems.- 2.4 Semi-Infinite Domains.- 2.5 Sources and Duhamel's Principle.- 2.6 Laplace Transforms.- 2.7 Fourier Transforms.- 3. Orthogonal ...

Fields of Interest

Partial Differential Equations; Mathematical Methods in Physics; Community & Population Ecology

Content Level

Upper undergraduate

Product category

Undergraduate textbook

Available

Bibliography

3rd ed. 2015,Xl, 289 p. 51 illus., 6 illus. in color. (Undergraduate Texts in Mathematics) Hardcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-1-4471-5200-2

Borovkov, Alexandr A., Russian Academy of Sciences Sobolev Institute of Mathematics, Novosibirsk, Russia

Probability Theory

• Presents a wide range of results in logic and computational complexity

• Explains the topic informally and then in more detail for the advanced reader

Presents the ideas behind the theoretical concepts

This self-contained, comprehensive book tackles the principal problems and advanced questions of probability theory and random processes in 22 chapters, presented in a logical order but also suitable for dipping into. They include both classical and more recent results, such as large deviations theory, factorization identities, information theory, stochastic recursive sequences. The book is further distinguished by the inclusion of clear and illustrative proofs of the fundamental results that comprise many methodological improvements aimed at simplifying the arguments and making them more transparent. The importance of the Russian school in ...

Contents

Discrete Spaces of Elementary Events.- An Arbitrary Space of Elementary Events.-Random Variables and Distribution Functions.- Numerical Characteristics of Random Variables.- Sequences of Independent Trials with Two Outcomes.- On Convergence of Random Variables and Distributions.- Characteristic Functions.-Sequences of Independent Random Variables. Limit Theorems.- Large Deviation Probabilities for Sums of Independent Random Variables.- Renewal Processes.- Properties of the Trajectories of Random Walks. Zero-One Laws.- Random Walks and Factorisation Identities.- Sequences of Dependent Trials. Markov Chains.-Information and Entropy.- ...

Fields of Interest

Probability Theory and Stochastic Processes

Content Level Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2013,XXVIII, 733 p. 22 illus.(Universitext) Softcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-0-387-88697-8

Cowpertwait, Paul S.P., Metcalfe, Andrew V., Massey University Inst. Information and, Auckland, New Zealand

Introductory Time Series with R

- Easy to read
- Motivated with real cases addressing
- contemporary issues
- Detailed explanations of the use of R for time series analysis

This book gives you a step-by-step introduction to analysing time series using the open source software R. Each time series model is motivated with practical applications, and is defined in mathematical notation. Once the model has been introduced it is used to generate synthetic data, using R code, and these generated data are then used to estimate its parameters. This sequence enhances understanding of both the time series model and the R function used to fit the model to data. Finally, the model is used to analyse observed data taken from a practical application. By using R, the whole procedure can be reproduced by the reader. All the ...

Contents

Time Series Data.- Correlation.- Forecasting Strategies.- Basic Stochastic Models.-Regression.- Stationary Models.- Nonstationary Models.- Long-Memory Processes.-Spectral Analysis.- System Identification.-Multivariate Models.- State Space Models.

Fields of Interest

Probability Theory and Stochastic Processes; Statistical Theory and Methods; Probability and Statistics in Computer Science; Marketing; Econometrics; Signal, Image and Speech Processing

Content Level Professional/practitioner

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 2009,XVI, 256 p.(Use R!) Softcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-0-387-75958-6

Cryer, Jonathan D., Chan, Kung-Sik, University of lowa Dept. Statistics & Actuarial Science, lowa City, IA, USA

Time Series Analysis

With Applications in R

- Fully integrates time series theory with applications
- Has an associated R package, TSA, to carry out the required computations and graphics
 Uses numerous interesting real datsets to illustrate all of the ideas

Time Series Analysis With Applications in R, Second Edition, presents an accessible approach to understanding time series models and their applications. Although the emphasis is on time domain ARIMA models and their analysis, the new edition devotes two chapters to the frequency domain and three to time series regression models, models for heteroscedasticity, and threshold models. All of the ideas and methods are illustrated with both real and simulated data sets. A unique feature of this edition is its integration with the R computing environment. The tables and graphical displays are accompanied by the R commands used to produce them. An ...

Contents

Fundamental Concepts.- Trends.- Models For Stationary Time Series.- Models For Nonstationary Time Series.- Model Specification.- Parameter Estimation.- Model Diagnostics.- Forecasting.- Seasonal Models.-Time Series Regression Models.- Time Series Models Of Heteroscedasticity.- To Spectral Analysis.- Estimating The Spectrum.-Threshold Models.

Fields of Interest

Probability Theory and Stochastic Processes; Statistical Theory and Methods; Actuarial Sciences

Content Level

Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2008,XIV, 491 p.(Springer Texts in Statistics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN:978-0-387-79053-4

Dalgaard, Peter, Copenhagen Business School, Frederiksberg, Denmark

Introductory Statistics with R

- New material on Poisson and nonlinear regression
- Expanded coverage of data handling issues
- Answers to exercises now provided

This book provides an elementary-level introduction to R, targeting both nonstatistician scientists in various fields and students of statistics. The main mode of presentation is via code examples with liberal commenting of the code and the output, from the computational as well as the statistical viewpoint. Brief sections introduce the statistical methods before they are used. A supplementary R package can be downloaded and contains the data sets. All examples are directly runnable and all graphics in the text are generated from the examples. The statistical methodology covered includes statistical standard distributions, one- and ...

Contents

Basics.- The R environment.- Probability and distributions.- Descriptive statistics and graphics.- One- and two-sample tests.-Regression and correlation.- Analysis of variance and the Kruskal–Wallis test.- Tabular data.- Power and the computation of sample size.- Advanced data handling.- Multiple regression.- Linear models.- Logistic regression.- Survival analysis.- Rates and Poisson regression.- Nonlinear curve fitting.

Fields of Interest

Probability Theory and Stochastic Processes; Statistics and Computing/Statistics Programs; Bioinformatics; Computer Appl. in Life Sciences

Content Level Professional/practitioner

Product category Undergraduate textbook

Available

Bibliography

2nd ed. 2008,XVI, 364 p.(Statistics and Computing) Softcover

Medium Type Book

Imprint Springer





ISBN: 978-1-85233-896-1

Dekking, F.M., Kraaikamp, C., Lopuhaä, H.P., Meester, L.E.

A Modern Introduction to Probability and Statistics

Understanding Why and How

Developed from tried and tested course material, this book provides a self-contained course that is also suitable for self-study
Uses real examples and real data sets that will be familiar to students
Features quick exercises to give direct feedback to the student, and over 350 exercises

Many current texts in the area are just cookbooks and, as a result, students do not know why they perform the methods they are taught, or why the methods work. The strength of this book is that it readdresses these shortcomings; by using examples, often from real life and using real data, the authors show how the fundamentals of probabilistic and statistical theories arise intuitively. A Modern Introduction to Probability and Statistics has numerous quick exercises to give direct feedback to students. In addition there are over 350 exercises, half of which have answers, of which half have full solutions. A website gives access to the data

Contents

Why probability and statistics?.- Outcomes, events, and probability.- Conditional probability and independence.- Discrete random variables.- Continuous random variables.- Simulation.- Expectation and variance.- Computations with random variables.- Joint distributions and independence.- Covariance and correlation.-More computations with more random variables.- The Poisson process.- The law of large numbers.- The central limit theorem.-Exploratory data analysis: graphical summaries.- Exploratory data analysis: numerical summaries.- Basic statistical models.- The bootstrap.- Unbiased estimators.- Efficiency and mean squared error.- Maximum ...

Fields of Interest

Probability Theory and Stochastic Processes; Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences; Mathematical and Computational Engineering

Content Level

Lower undergraduate

Product category

Undergraduate textbook

Available

Bibliography

2005,XVI, 488 p. 120 illus. With online files/ update.(Springer Texts in Statistics) Hardcover

Medium Type

Book w. online files / update

Imprint Springer

Order Quantity



ISBN: 978-1-4471-5360-3

Klenke, Achim, Johannes Gutenberg-Universität Mainz Institut für Mathematik, Mainz, Germany

Probability Theory

A Comprehensive Course

• Presents an updated, comprehensive and modern introduction to the most important fields of probability theory

 Contains many new figures and examples
 Studies a wide variety of topics on probability theory, many of which are not found in introductory textbooks

This second edition of the popular textbook contains a comprehensive course in modern probability theory, covering a wide variety of topics which are not usually found in introductory textbooks, including: • limit theorems for sums of random variables • martingales • percolation • Markov chains and electrical networks • construction of stochastic processes • Poisson point process and infinite divisibility • large deviation principles and statistical physics • Brownian motion • stochastic integral and stochastic differential equations. The theory is developed rigorously and in a self-contained way, with the chapters on measure theory ...

Contents

Basic Measure Theory.- Independence.-Generating Functions.- The Integral.-Moments and Laws of Large Numbers.-Convergence Theorems.- Lp-Spaces and the Radon-Nikodym Theorem.- Conditional Expectations.- Martingales.- Optional Sampling Theorems.- Martingale **Convergence Theorems and Their** Applications.- Backwards Martingales and Exchangeability.- Convergence of Measures.-Probability Measures on Product Spaces.-Characteristic Functions and the Central Limit Theorem.- Infinitely Divisible Distributions.-Markov Chains.- Convergence of Markov Chains.- Markov Chains and Electrical Networks.- Ergodic Theory.- Brownian Motion.- Law of the ...

Fields of Interest

Probability Theory and Stochastic Processes; Measure and Integration; Dynamical Systems and Ergodic Theory; Functional Analysis; Complex Systems; Statistical Physics and Dynamical Systems

Content Level

Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2014,XII, 638 p. 46 illus., 20 illus. in color.(Universitext) Softcover

Medium Type

Book

Imprint Springer

Mathematics



ISBN: 978-3-319-31088-6

Le Gall, Jean-François, Université Paris-Sud, Orsay Cedex

Brownian Motion, Martingales, and Stochastic Calculus

 Provides a concise and rigorous presentation of stochastic integration and stochastic calculus for continuous semimartingales

 Presents major applications of stochastic calculus to Brownian motion and related stochastic processes

 Includes important aspects of Markov processes with applications to stochastic differential equations and to connections with partial differential equations

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 ...

Contents

Gaussian variables and Gaussian processes. Brownian motion.- Filtrations and martingales.- Continuous semimartingales.-Stochastic integration.- General theory of Markov processes.- Brownian motion and partial differential equations.- Stochastic differential equations.- Local times.- The monotone class lemma.- Discrete martingales.- References. Probability Theory and Stochastic Processes; Quantitative Finance; Measure and Integration; Mathematical Modeling and Industrial Mathematics; Systems Theory, Control

Content Level Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

1st ed. 2016,XIII, 273 p. 5 illus., 1 illus. in color. (Graduate Texts in Mathematics, Volume 274) Hardcover

Medium Type Book

Imprint Springer





ISBN: 978-0-387-97974-8

Pitman, Jim, University of California Dept. Statistics, Berkeley, CA, USA

Probability

...

This is a text for a one-quarter or onesemester course in probability, aimed at students who have done a year of calculus. The book is organised so a student can learn the fundamental ideas of probability from the first three chapters without reliance on calculus. Later chapters develop these ideas further using calculus tools. The book contains more than the usual number of examples worked out in detail. The most valuable thing for students to learn from a course like this is how to pick up a probability problem in a new setting and relate it to the standard body of theory. The more they see this happen in class, and the more they do it

Contents

1 Introduction.- 1.1 Equally Likely Outcomes.-1.2 Interpretations.- 1.3 Distributions.- 1.4 Conditional Probability and Independence.-1.5 Bayes' Rule.- 1.6 Sequences of Events.-Summary.- Review Exercises.- 2 Repeated Trials and Sampling.- 2.1 The Binomial Distribution.- 2.2 Normal Approximation: Method.- 2.3 Normal Approximation: Derivation (Optional).- 2.4 Poisson Approximation.- 2.5 Random Sampling.-Summary.- Review Exercises.- 3 Random Variables.- 3.1 Introduction.- 3.2 Expectation.-3.3 Standard Deviation and Normal Approximation.- 3.4 Discrete Distributions.-3.5 The Poisson Distribution.- 3.6 Symmetry (Optional).- Summary.- Review ...

Fields of Interest

Probability Theory and Stochastic Processes; Statistical Theory and Methods

Content Level Upper undergraduate

Product category Undergraduate textbook

Available

Bibliography 1993,XI, 560 p.(Springer Texts in Statistics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-0-387-97495-8

Fulton, William, Harris, Joe

Representation Theory A First Course The primary goal of these lectures is to introduce a beginner to the finitedimensional representations of Lie groups and Lie algebras. Since this goal is shared by quite a few other books, we should explain in this Preface how our approach differs, although the potential reader can probably see this better by a quick browse through the book. Representation theory is simple to define: it is the study of the ways in which a given group may act on vector spaces. It is almost certainly unique, however, among such clearly delineated subjects, in the breadth of its interest to mathematicians. This is not surprising: group actions are ubiquitous

Contents

I: Finite Groups.- 1. Representations of Finite Groups.- 2. Characters.- 3. Examples; Induced Representations; Group Algebras; Real Representations.- 4. Representations of: \$\$ {\mathfrak{S}_d}\$\$ Young Diagrams and Frobenius's Character Formula.- 5. Representations of \$\$ {\mathfrak{A}_d}\$\$ and \$\$ G{L_2}\left({{\mathbb{F}_q}} \right)\$\$.- 6. Weyl's Construction.- II: Lie Groups and Lie Algebras.- 7. Lie Groups.- 8. Lie Algebras and Lie Groups.- 9. Initial Classification of Lie Algebras.- 10. Lie Algebras in Dimensions One, Two, and Three.- 11. Representations of \$\$

\mathfrak{s}{\mathfrak{l}_2}\mathbb{C}\$\$.-12. Representations of \$\$...

Fields of Interest

Topological Groups, Lie Groups

Content Level

Research

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2004,XV, 551 p.(Readings in Mathematics, Volume 129) Softcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-3-319-44047-7

Berk, Richard A., The Wharton School, University of Pennsylvania, Philadelphia, PA, USA

Statistical Learning from a Regression Perspective

 Accessible discussion of statistical learning procedures for practitioners with real-world applications in the social and policy sciences
 Methods also of interest in the natural

sciences and engineering

• Fully revised new edition with intuitive explanations and visual representation of underlying statistical concepts

This textbook considers statistical learning applications when interest centers on the conditional distribution of the response variable, given a set of predictors, and when it is important to characterize how the predictors are related to the response. This fully revised new edition includes important developments over the past 8 years. Consistent with modern data analytics, it emphasizes that a proper statistical learning data analysis derives from sound data collection, intelligent data management, appropriate statistical procedures, and an accessible interpretation of results. As in the first edition, a unifying theme is supervised ...

Contents

Statistical Learning as a Regression Problem.-Splines, Smoothers, and Kernels.-Classification and Regression Trees (CART).-Bagging.- Random Forests.- Boosting.-Support Vector Machines.- Some Other Procedures Briefly.- Broader Implications and a Bit of Craft Lore.

Fields of Interest

Statistical Theory and Methods; Probability Theory and Stochastic Processes; Statistics for Social Sciences, Humanities, Law; Public Health; Psychological Methods/Evaluation; Methodology of the Social Sciences

Content Level

Upper undergraduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography 2nd ed. 2016,XXV, 347 p. 120 illus., 91 illus. in color.(Springer Texts in Statistics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-3-319-29852-8

Brockwell, Peter J., Davis, Richard A., Colorado State University, Fort Collins, CO

Introduction to Time Series and Forecasting

Designed for use in full-year courses introducing univariate and multivariate time series and forecasting at the advanced undergraduate and graduate levels
Exercise problems at the end of each chapter reinforce the methods through use of the programs to study provided data sets
Appendix teaches ITSM2000 Professional package (available as a free download); all material is easily applied to R packages and other programs

This book is aimed at the reader who wishes to gain a working knowledge of time series and forecasting methods as applied to economics, engineering and the natural and social sciences. It assumes knowledge only of basic calculus, matrix algebra and elementary statistics. This third edition contains detailed instructions for the use of the professional version of the Windows-based computer package ITSM2000, now available as a free download from the Springer Extras website. The logic and tools of time series modelbuilding are developed in detail. Numerous exercises are included and the software can be used to analyze and forecast data sets of ...

Contents

springer.com

Introduction.- Stationary Processes.- ARMA Models.- Spectral Analysis.- Modeling and Forecasting with ARMA Processes.-Nonstationary and Seasonal Time Series Models.- Time Series Models for Financial Data.- Multivariate Time Series.- State-Space Models.- Forecasting Techniques.- Further Topics.- Appendix A: Random Variables and Probability Distributions.- Appendix B: Statistical Complements.- Appendix C: Mean Square Convergence.- Appendix D: Lévy Processes, Brownian Motion and Itô Calculus.-Appendix E: An ITSM Tutorial.- References.-Index.

Fields of Interest

Statistical Theory and Methods; Statistics for Business, Management, Economics, Finance, Insurance; Econometrics; Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences

Content Level

Upper undergraduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

3rd ed. 2016,XIV, 425 p. 118 illus., 4 illus. in color. With online files/update.(Springer Texts in Statistics) Hardcover

Medium Type Book w. online files / update

Imprint

Springer

Order Quantity



ISBN: 978-3-319-52248-7

Dean, A., Voss, D., Draguljić, D., Ohio State University, Columbus, OH, USA

Design and Analysis of Experiments

• Second edition includes new material on screening experiments and analysis of mixed models, a new chapter on computer experiments, added "Using R" sections, updated SAS output, and use of SAS Proc Mixed

Presents a step-by-step guide to design, including a planning checklist that emphasizes practical considerations
Explains all the basics of analysis: estimation of treatment contrasts and analysis of variance, while also applying these in a wide variety of settings

This textbook takes a strategic approach to the broad-reaching subject of experimental design by identifying the objectives behind an experiment and teaching practical considerations that govern design and implementation, concepts that serve as the basis for the analytical techniques covered. Rather than a collection of miscellaneous approaches, chapters build on the planning, running, and analyzing of simple experiments in an approach that results from decades of teaching the subject. In most experiments, the procedures can be reproduced by readers, thus giving them a broad exposure to experiments that are simple enough to be followed ...

Contents

Principles and Techniques.- Planning Experiments.- Designs With One Source of Variation.- Inferences for Contrasts and **Treatment Means.- Checking Model** Assumptions.- Experiments With Two Crossed Treatment Factors.- Several Crossed Treatment Factors.- Polynomial Regression.-Analysis of Covariance.- Complete Block Designs.- Incomplete Block Designs.- Designs With Two Blocking Factors.- Confounded Two-Level Factorial Experiments.-Confounding in General Factorial **Experiments.- Fractional Factorial Experiments.- Response Surface** Methodology.- Random Effects and Variance Components.- Nested Models.- Split-Plot Designs

Fields of Interest

Statistical Theory and Methods; Probability Theory and Stochastic Processes; Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences

Content Level

Upper undergraduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2017,XXV, 840 p. 146 illus., 52 illus. in color.(Springer Texts in Statistics) Softcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-3-319-19424-0

Harrell , Jr., Frank E., School of Medicine, Vanderbilt University, Nashville, TN, USA

Regression Modeling Strategies

With Applications to Linear Models, Logistic and Ordinal Regression, and Survival Analysis

• Fully revised new edition features new material and color figures

• Published with mature, supplementary R package: rms

• New chapters and sections on generalized least squares for analysis of serial response data, redundancy analysis, bootstrap confidence intervals for rankings of predictors, expanded material on multiple imputation and predictive mean matching and more

This highly anticipated second edition features new chapters and sections, 225 new references, and comprehensive R software. In keeping with the previous edition, this book is about the art and science of data analysis and predictive modelling, which entails choosing and using multiple tools. Instead of presenting isolated techniques, this text emphasises problem solving strategies that address the many issues arising when developing multi-variable models using real data and not standard textbook examples. Regression Modelling Strategies presents fullscale case studies of non-trivial datasets instead of over-simplified illustrations of •••

Contents

Introduction.- General Aspects of Fitting Regression Models.- Missing Data.-Multivariable Modeling Strategies.-Describing, Resampling, Validating and Simplifying the Model.- R Software.-Modeling Longitudinal Responses using Generalized Least Squares.- Case Study in Data Reduction.- Overview of Maximum Likelihood Estimation.- Binary Logistic Regression.- Binary Logistic Regression Case Study 1.- Logistic Model Case Study 2: Survival of Titanic Passengers.- Ordinal Logistic Regression.- Case Study in Ordinal Regression, Data Reduction and Penalization. - Regression Models for Continuous Y and Case Study in Ordinal Regression.- ...

Fields of Interest

Statistical Theory and Methods; Statistics for Life Sciences, Medicine, Health Sciences; Statistics and Computing/Statistics Programs

Content Level

Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2015,XXV, 582 p. 157 illus., 53 illus. in color.(Springer Series in Statistics) Hardcover

Medium Type Book

Imprint

Springer

Order Quantity



ISBN: 978-1-4939-2121-8

Heiberger, Richard M., Holland, Burt, Temple University, Philadelphia, PA, USA

Statistical Analysis and Data Display

An Intermediate Course with Examples in R

• New edition continues the exposition of data analysis methods with examples and

graphics of distributions, regression, analysis of variance, design of experiments, contingency table analysis, nonparametrics, logistic regression, and time series analysis • Features color graphics throughout, with R code to produce all figures and tables in the book

• New sections: on Likert Scale Data to pick up on the importance of rating scales in fields from population studies to psychometrics; on Medical, Pharmaceutical, and Social Science Examples; on mosaic graphics for discrete data; and on perception of graphics including discussions of color vision, microplots, and structured sets of graphs and panels

This contemporary presentation of statistical methods features extensive use of graphical displays for exploring data and for displaying the analysis. The authors demonstrate how to analyze data—showing code, graphics, and accompanying tabular listings—for all the methods they cover. Complete R scripts for all examples and figures are provided for readers to use as models for their own analyses. This book can serve as a standalone text for statistics majors at the master's level and for other quantitatively oriented disciplines at the doctoral level, and as a reference book for researchers. Classical concepts and techniques are illustrated ...

Fields of Interest

Statistical Theory and Methods; Statistics and Computing/Statistics Programs; Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences

Content Level

Upper undergraduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2015,XXXI, 898 p. 341 illus., 326 illus. in color.(Springer Texts in Statistics) Hardcover

Medium Type Book

Imprint

Springer

Order Quantity



ISBN: 978-3-319-46160-1

Heumann, C., Schomaker, M., Shalabh, Ludwig-Maximilians-Universität München, München, Germany

Introduction to Statistics and Data Analysis

With Exercises, Solutions and Applications in R

Introduces undergraduate students to quantitative data analysis and statistics
Includes a wealth of examples, exercises and solutions

• Features working computer code in the statistical software R

This introductory statistics textbook conveys the essential concepts and tools needed to develop and nurture statistical thinking. It presents descriptive, inductive and explorative statistical methods and guides the reader through the process of quantitative data analysis. In the experimental sciences and interdisciplinary research, data analysis has become an integral part of any scientific study. Issues such as judging the credibility of data, analyzing the data, evaluating the reliability of the obtained results and finally drawing the correct and appropriate conclusions from the results are vital. The text is primarily intended for ...

Contents

Part I Descriptive Statistics: Introduction and Framework.- Frequency Measures and Graphical Representation of Data.- Measures of Central Tendency and Dispersion.-Association of Two Variables.- Part I Probability Calculus: Combinatorics.-Elements of Probability Theory.- Random Variables.- Probability Distributions.- Part III Inductive Statistics: Inference.- Hypothesis Testing.- Linear Regression.- Part IV Appendices: Introduction to R.- Solutions to Exercises.- Technical Appendix.- Visual Summaries.

Fields of Interest

Statistical Theory and Methods; Statistics for Business, Management, Economics, Finance, Insurance; Econometrics; Macroeconomics/

Monetary Economics//Financial Economics

Content Level Upper undergraduate

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 1st ed. 2016,XIII, 456 p. 89 illus. Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-1-4614-7137-0

James, G., Witten, D., Hastie, T., Tibshirani, R., University of Southern California Dept. Information & Operations, Los Angeles, CA, USA

An Introduction to Statistical Learning

with Applications in R

 Provides tools for Statistical Learning that are essential for practitioners in science, industry and other fields

- Analyses and methods are presented in R
- Topics include linear regression,

classification, resampling methods, shrinkage approaches, tree-based methods, support vector machines, and clustering

An Introduction to Statistical Learning provides an accessible overview of the field of statistical learning, an essential toolset for making sense of the vast and complex data sets that have emerged in fields ranging from biology to finance to marketing to astrophysics in the past twenty years. This book presents some of the most important modeling and prediction techniques, along with relevant applications. Topics include linear regression, classification, resampling methods, shrinkage approaches, tree-based methods, support vector machines, clustering, and more. Color graphics and realworld examples are used to illustrate the methods ...

Contents

Introduction.- Statistical Learning.- Linear Regression.- Classification.- Resampling Methods.- Linear Model Selection and Regularization.- Moving Beyond Linearity.-Tree-Based Methods.- Support Vector Machines.- Unsupervised Learning.- Index.

Fields of Interest

Statistical Theory and Methods; Statistics and Computing/Statistics Programs; Artificial Intelligence; Statistics, general

Content Level

Professional/practitioner

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 2013,XIV, 426 p. 556 illus.(Springer Texts in Statistics) Hardcover

Medium Type Book

Imprint Springer





ISBN: 978-1-4419-0924-4

Wakefield, Jon, University of Washington Department of Statistics & Biostatistics, Seattle, WA, USA

Bayesian and Frequentist Regression Methods

• Provides a balanced, modern summary of Bayesian and frequentist methods for regression analysis • A book website contains R code to reproduce all of the analyses and figures in the book: http://faculty.washington.edu/ jonno/regression-methods.html

Bayesian and Frequentist Regression Methods provides a modern account of both Bayesian and frequentist methods of regression analysis. Many texts cover one or the other of the approaches, but this is the most comprehensive combination of Bayesian and frequentist methods that exists in one place. The two philosophical approaches to regression methodology are featured here as complementary techniques, with theory and data analysis providing supplementary components of the discussion. In particular, methods are illustrated using a variety of data sets. The majority of the data sets are drawn from biostatistics but the techniques are ...

Contents

Introduction.- Frequentist Inference.-Bayesian Inference.- Linear Models.- Binary Data Models.- General Regression Models.

Fields of Interest Statistical Theory and Methods; Statistics, general

Content Level Graduate

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 2013,XIX, 697 p.(Springer Series in Statistics) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-1-4614-8686-2

Marin, Jean-Michel, Robert, Christian P., Université Montpellier 2, Montpellier cedex 5, France

Bayesian Essentials with R

New Complete Solutions Manual for readers available on Springer book page
No prior knowledge of R required to learn the essentials for using it with Bayesian statistics

• Each chapter includes exercises that are both methodology and data-based

This Bayesian modeling book provides a selfcontained entry to computational Bayesian statistics. Focusing on the most standard statistical models and backed up by real datasets and an all-inclusive R (CRAN) package called bayess, the book provides an operational methodology for conducting Bayesian inference, rather than focusing on its theoretical and philosophical justifications. Readers are empowered to participate in the real-life data analysis situations depicted here from the beginning. Special attention is paid to the derivation of prior distributions in each case and specific reference solutions are given for each of the models. ...

Contents

User's Manual.- Normal Models.- Regression and Variable Selection.- Generalized Linear Models.- Capture-Recapture Experiments.-Mixture Models.- Time Series.- Image Analysis.- References.- Index.

Fields of Interest

Statistics and Computing/Statistics Programs; Statistical Theory and Methods

Content Level

Upper undergraduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2014,XIV, 296 p. 75 illus., 38 illus. in color.(Springer Texts in Statistics) Hardcover

Medium Type

Book

Imprint Springer

Order Quantity



ISBN: 978-1-4614-6226-2

Schumacker, Randall, Tomek, Sara, University of Alabama, Tuscaloosa, AL, USA

Understanding Statistics Using R

• Provides strong fundamental Background in statistics and probability through simulation exercises

 Perfect resource for advanced undergraduates and professionals. Anyone who has at least taken one course with experience/knowledge in linear regression
 R software code utilized throughout for assessment and interpretation of data and data mining exercises

This book was written to provide resource materials for teachers to use in their introductory or intermediate statistics class. The chapter content is ordered along the lines of many popular statistics books so it should be easy to supplement the content and exercises with class lecture materials. The book contains R script programs to demonstrate important topics and concepts covered in a statistics course, including probability, random sampling, population distribution types, role of the Central Limit Theorem, creation of sampling distributions for statistics, and more. The chapters contain T/F quizzes to test basic knowledge of the topics ...

Contents

R Fundamentals.- Probability.- Statistical Theory.- Frequency Distributions.- Central Tendency and Dispersion.- Statistical Distributions.- Hypothesis Testing.- Chi-Square Test.- z-test.- t-test.- F-test.-Correlation.- Linear Regression.- Replication of Results.- Synthesis of Findings.- Glossary.-Appendix.- Author Index.- Subject Index.

Fields of Interest

Statistics and Computing/Statistics Programs; Statistics for Social Sciences, Humanities, Law; Statistics, general

Content Level

Upper undergraduate

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 2013,XVI, 292 p. Hardcover

Medium Type Book

Imprint Springer

Order Quantity





Zuur, A., Ieno, E.N., Meesters, E., Highland Statistics Ltd., Newburgh, UK

A Beginner's Guide to R

• Takes a different approach to explaining R, namely without the need to know/learn statistics at the same time

Based on their extensive experience with teaching R and statistics to applied scientists, the authors provide a beginner's guide to R. To avoid the difficulty of teaching R and statistics at the same time, statistical methods are kept to a minimum. The text covers how to download and install R, import and manage data, elementary plotting, an introduction to functions, advanced plotting, and common beginner mistakes. This book contains everything you need to know to get started with R.

Contents

Getting Data into R.- Accessing Variables and Managing Subsets of Data.- Simple Functions.- An Introduction to Basic Plotting Tools.- Loops and Functions.- Graphing Tools.- An Introduction to the Lattice Package.- Common R Mistakes.

Fields of Interest

Statistics and Computing/Statistics Programs; Theoretical Ecology/Statistics; Statistics for Life Sciences, Medicine, Health Sciences

Content Level Graduate

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 2009,XV, 220 p.(Use R!) Softcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-3-662-54485-3

Härdle, W.K., Chen, C.Y.-H., Overbeck, L. (Eds.), Humboldt-Universität zu Berlin, Berlin, Germany

Applied Quantitative Finance

Presents the latest developments in risk management; market risk, credit risk and dynamics of risk management
Provides a unique balance between theoretical concepts, computational tools and practical implementation
Features fully reproducible results and provides the underlying quantlets on the accompanying website www.quantlet.de

This volume provides practical solutions and introduces recent theoretical developments in risk management, pricing of credit derivatives, quantification of volatility and copula modeling. This third edition is devoted to modern risk analysis based on quantitative methods and textual analytics to meet the current challenges in banking and finance. It includes 14 new contributions and presents a comprehensive, state-of-the-art treatment of cutting-edge methods and topics, such as collateralized debt obligations, the high-frequency analysis of market liquidity, and realized volatility. The book is divided into three parts: Part 1 revisits ...

Contents

Part I Market Risk: VaR in High-Dimensional Systems.- Multivariate Volatility Models.-Portfolio Selection with Spectral Risk Measures.- Implementation of Local Stochastic Volatility Model.- Part II Credit **Risk: Estimating DTD via Sequential Monte** Carlo.- Risk Measurement with Spectral Capital Allocation.- Market Based Credit Rating and its Applications.- Using Public Information to Predict Corporate Default Risk. - Stress Testing in Credit Portfolio Models. - Penalized Independent Factor.- Term Structure of Loss Cascades in Portfolio Securitisation.- Credit Rating Score Analysis.-Part III Dynamics Risk Measurement: Copulae in High ...

Fields of Interest

Statistics for Business, Management, Economics, Finance, Insurance; Quantitative Finance; Risk Management; Business Finance

Content Level Graduate

Gluddute

Product category Graduate/advanced undergraduate textbook

Available

Bibliography

3rd ed. 2017,X, 372 p. 111 illus., 75 illus. in color.(Statistics and Computing) Hardcover

Medium Type Book

Imprint

Springer

Order Quantity



ISBN: 978-1-4939-2613-8

Ruppert, David, Matteson, David S., Cornell University, Ithaca, NY, USA

Statistics and Data Analysis for Financial Engineering

with **R** examples

• Examples using financial markets and economic data illustrate important concepts • R Labs with real-data exercises give students practice in data analysis

• Integration of graphical and analytic methods for model selection and model checking quantify

The new edition of this influential textbook. geared towards graduate or advanced undergraduate students, teaches the statistics necessary for financial engineering. In doing so, it illustrates concepts using financial markets and economic data, R Labs with real-data exercises, and graphical and analytic methods for modeling and diagnosing modeling errors. These methods are critical because financial engineers now have access to enormous quantities of data. To make use of this data, the powerful methods in this book for working with guantitative information, particularly about volatility and risks, are essential. Strengths of this ...

Contents

Introduction.- Returns.- Fixed income securities.- Exploratory data analysis.-Modeling univariate distributions.-Resampling.- Multivariate statistical models.-Copulas.- Time series models: basics.- Time series models: further topics.- Portfolio theory.- Regression: basics.- Regression: troubleshooting.- Regression: advanced topics.- Cointegration.- The capital asset pricing model.- Factor models and principal components.- GARCH models.- Risk management.- Bayesian data analysis and MCMC.- Nonparametric regression and splines.

Fields of Interest

Statistics for Business, Management, Economics, Finance, Insurance; Quantitative Finance; Statistical Theory and Methods; Finance, general

Content Level Graduate

Graduate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

2nd ed. 2015,XXVI, 719 p. 221 illus., 108 illus. in color.(Springer Texts in Statistics) Hardcover

Medium Type Book

Imprint

Statistics

Springer

Order Quantity



ISBN: 978-3-319-18538-5

Friedman, L.M., Furberg, C.D., DeMets, D.L., Reboussin, D.M., Granger, C.B., North Bethesda, MD, USA

Fundamentals of Clinical Trials

• New chapter covers current regulatory issues and data monitoring is now covered in two chapters

 An essential, up-to-date reference for researchers and students involved with clinical trials

 Includes numerous examples of published clinical trials from a variety of medical disciplines

This is the fifth edition of a very successful textbook on clinical trials methodology, written by recognized leaders who have long and extensive experience in all areas of clinical trials. The three authors of the first four editions have been joined by two others who add great expertise. A chapter on regulatory issues has been included and the chapter on data monitoring has been split into two and expanded. Many contemporary clinical trial examples have been added. There is much new material on adverse events, adherence, issues in analysis, electronic data, data sharing and international trials. This book is intended for the clinical ...

Contents

Introduction to Clinical Trials.- Ethical Issues.-What is the Question?.- Study Population.-Basic Study Design.- The Randomization Process.- Blinding.- Sample Size.- Baseline Assessment.- Recruitment of Study Participants.- Data Collection and Quality Control.- Assessment and Reporting of Harm.-Assessment of Health Related Quality of Life.-Participant Adherence.- Survival Analysis.-Monitoring Committee Structure & Function.-Statistical Methods Used in Interim Monitoring.- Issues in Data Analysis.- Closeout.- Reporting and Interpreting of Results.- Multicenter Trials.- Regulatory Issues.

Fields of Interest

Statistics for Life Sciences, Medicine, Health Sciences; Public Health; Epidemiology; Cancer Research; Oncology

Content Level Professional/practitioner

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 5th ed. 2015,XXI, 550 p. 49 illus., 7 illus. in color. Hardcover

Medium Type

Book

Imprint Springer





ISBN: 978-1-4419-6645-2

Kleinbaum, David G., Klein, Mitchel, Emory University Rollins School of Public Health, Atlanta, GA, USA

Survival Analysis

A Self-Learning Text, Third Edition

Second edition of the text originally published in 1996
New material has been added and the original six chapters have been modified

This greatly expanded third edition of Survival Analysis- A Self-learning Text provides a highly readable description of state-of-the-art methods of analysis of survival/event-history data. This text is suitable for researchers and statisticians working in the medical and other life sciences as well as statisticians in academia who teach introductory and second-level courses on survival analysis. The third edition continues to use the unique "lecture-book" format of the first two editions with one new chapter, additional sections and clarifications to several chapters, and a revised computer appendix. The Computer Appendix, with ...

Contents

Introduction to Survival Analysis.- Kaplan-Meier Survival Curves and the Log-Rank Test.-The Cox Proportional Hazards Model and Its Characteristics.- Evaluating the Proportional Hazards Assumption.- The Stratified Cox Procedure.- Extension of the Cox Proportional Hazards Model for Time-Dependent Variables.- Parametric Survival Models. - Recurrent Events Survival Analysis.-Competing Risks Survival Analysis.

Fields of Interest

Statistics for Life Sciences, Medicine, Health Sciences; Epidemiology

Content Level Graduate

nauuate

Product category

Graduate/advanced undergraduate textbook

Available

Bibliography

3rd ed. 2012,XV, 700 p. 500 illus.(Statistics for Biology and Health) Hardcover

Medium Type Book

Imprint Springer

Order Quantity



ISBN: 978-1-4614-6848-6

Kuhn, Max, Johnson, Kjell, Pfizer Global Research and Development, Groton, CT, USA

Applied Predictive Modeling

· Book specializes in data analysis with focus

on practice of predictive modeling

- Useful as a guide for practitioners
- Reader can reproduce all results using R

Applied Predictive Modeling covers the overall predictive modeling process, beginning with the crucial steps of data preprocessing, data splitting and foundations of model tuning. The text then provides intuitive explanations of numerous common and modern regression and classification techniques, always with an emphasis on illustrating and solving real data problems. The text illustrates all parts of the modeling process through many hands-on, real-life examples, and every chapter contains extensive R code for each step of the process. This multi-purpose text can be used as an introduction to predictive models and the overall modeling ...

Contents

General Strategies.- Regression Models.-Classification Models.- Other Considerations.-Appendix.- References.- Indices.

Fields of Interest

Statistics for Life Sciences, Medicine, Health Sciences; Statistics and Computing/Statistics Programs; Statistics, general

Content Level

Graduate

Product category Graduate/advanced undergraduate textbook

Available

Bibliography 2013,XIII, 600 p. 204 illus. Hardcover

Medium Type Book

Imprint Springer

Order Quantity