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A FIRST COURSE IN STATISTICAL METHODS addresses a pressing need in the methods course—a shorter text designed for a one-term course. By selecting and revising material from their best-selling two-semester text, AN INTRODUCTION TO STATISTICAL METHODS AND DATA ANALYSIS, Fifth Edition, the authors created an ideal book for a one-term course in statistical methods. Based on the belief that statistics is a thought process tied to the scientific method, the text utilizes a 5-step approach: 1) defining the problem, 2) collecting data, 3) summarizing data, 4) analyzing and interpreting the data, and 5) communicating the results of the analysis. This book introduces complex analysis and is appropriate for a first course in the subject at typically the third-year University level. It introduces the exponential function very early but does so rigorously. It covers the usual topics of functions, differentiation, analyticity, contour integration, the theorems of Cauchy and their many

consequences, Taylor and Laurent series, residue theory, the computation of certain improper real integrals, and a brief introduction to conformal mapping. Throughout the text an emphasis is placed on geometric properties of complex numbers and visualization of complex mappings. This new and exciting book offers a fresh approach to quantitative finance and utilises novel features, including stereoscopic images which permit 3D visualisation of complex subjects without the need for additional tools. Offering an integrated approach to the subject, A First Course in Quantitative Finance introduces students to the architecture of complete financial markets before exploring the concepts and models of modern portfolio theory, derivative pricing and fixed income products in both complete and incomplete market settings. Subjects are organised throughout in a way that encourages a gradual and parallel learning process of both the economic concepts and their mathematical descriptions, framed by additional perspectives from classical utility theory, financial economics and behavioural finance. Suitable for postgraduate students studying courses in quantitative finance, financial engineering and financial econometrics as part of an economics, finance, econometric or mathematics program, this book contains all necessary theoretical and mathematical concepts and numerical methods, as well as the necessary programming code for porting algorithms onto a computer. This new color edition of Braun and Murdoch's bestselling textbook integrates use of the RStudio platform and adds discussion of newer graphics systems, extensive exploration of Markov chain Monte Carlo, expert advice on common error messages, motivating applications of matrix decompositions, and numerous new examples and exercises. This is the only introduction needed to start programming in R, the computing standard for analyzing data. Co-written by an R core team member and an established R author, this book comes with real R code that complies with the standards of the language. Unlike other introductory books on the R system, this book emphasizes programming, including the principles that apply to most computing languages, and techniques used to develop more complex projects.

Solutions, datasets, and any errata are available from the book's website. The many examples, all from real applications, make it particularly useful for anyone working in practical data analysis. A First Course in Combinatorial Optimization is a text for a one-semester introductory graduate-level course for students of operations research, mathematics, and computer science. It is a self-contained treatment of the subject, requiring only some mathematical maturity. Topics include: linear and integer programming, polytopes, matroids and matroid optimization, shortest paths, and network flows. Central to the exposition is the polyhedral viewpoint, which is the key principle underlying the successful integer-programming approach to combinatorial-optimization problems. Another key unifying topic is matroids. The author does not dwell on data structures and implementation details, preferring to focus on the key mathematical ideas that lead to useful models and algorithms. Problems and exercises are included throughout as well as references for further study. This book is an introduction to module theory for the reader who knows something about linear algebra and ring theory. Its main aim is the derivation of the structure theory of modules over Euclidean domains. This theory is applied to obtain the structure of abelian groups and the rational canonical and Jordan normal forms of matrices. The basic facts about rings and modules are given in full generality, so that some further topics can be discussed, including projective modules and the connection between modules and representations of groups. The book is intended to serve as supplementary reading for the third or fourth year undergraduate who is taking a course in module theory. The further topics point the way to some projects that might be attempted in conjunction with a taught course. Contents: Rings and Ideals Euclidean Domains Modules and Submodules Homomorphisms Free Modules Quotient Modules and Cyclic Modules Direct Sums of Modules Torsion and the Primary Decomposition Presentations Diagonalizing and Inverting Matrices Fitting Ideals The Decomposition of Modules Normal Forms for Matrices Projective Modules Readership: Final

year undergraduates and new graduate students in pure mathematics.

Keywords: Module; Commutative Ring; Euclidean Domain; Fitting Ideal; Matrix

Diagonalization; Invariant Factor; Elementary Divisor; Rational Canonical Form; Jordan Normal Form Intended as an introductory text on Functional Analysis for the postgraduate students of Mathematics, this compact and well-organized book covers all the topics considered essential to the subject. In so doing, it provides a very good understanding of the subject to the reader. The book begins with a review of linear algebra, and then it goes on to give the basic notion of a norm on linear space (proving thereby most of the basic results), progresses gradually, dealing with operators, and proves some of the basic theorems of Functional Analysis. Besides, the book analyzes more advanced topics like dual space considerations, compact operators, and spectral theory of Banach and Hilbert space operators. The text is so organized that it strives, particularly in the last chapter, to apply and relate the basic theorems to problems which arise while solving operator equations. The present edition is a thoroughly revised version of its first edition, which also includes a section on Hahn-Banach extension theorem for operators and discussions on Lax-Milgram theorem. This student-friendly text, with its clear exposition of concepts, should prove to be a boon to the beginner aspiring to have an insight into Functional Analysis. KEY FEATURES • Plenty of examples have been worked out in detail, which not only illustrate a particular result, but also point towards its limitations so that subsequent stronger results follow. • Exercises, which are designed to aid understanding and to promote mastery of the subject, are interspersed throughout the text. TARGET AUDIENCE • M.Sc. Mathematics This book is the leader among the new generation of text books on quality that follow the systems approach to creating quality in products and services; the earlier generations focused solely on parts of the system such as statistical methods, process control, and management philosophy. It follows the premise that the body of knowledge and tools documented by quality professionals and researchers, when employed in designing, creating and delivering the product

will lead to product quality, customer satisfaction and reduced waste. The tools employed at the different stages of the product creation cycle are covered in this book using real world examples along with their theoretical bases, strengths and weaknesses. This textbook can be used for training - from shop floor personnel to college majors in business and engineering to practicing professionals. Graduate students training as researchers in the quality field will also find useful material. The book has been used as the text for a Professional Series Massive Open Online Course offered by the Technical University of Munich on edX.org, through which tens of thousands of participants from all over the world have received training in quality methods. According to Professor Dr. Holly Ott, who chose the book for the course, the text is one of the main factors contributing to success of this MOOC. The Third Edition has been fully revised to be friendly for self-study, reflects changes in the standards referenced such as ISO 9000, and includes new examples of application of statistical tools in health care industry. Features: Reviews the history of quality movement in the U.S. and abroad Discusses Quality Cost analysis and quality's impact on a company's bottom line Explains finding customer needs and designing the product using House of Quality Covers selection of product parameters using DOE and reliability principles Includes control charts to control processes to make the product right-the-first-time Describes use of capability indices Cp and Cpk to meet customer needs Presents problem solving methodology and tools for continuous improvement Offers ISO 9000, Baldrige and Six Sigma as templates for creating a quality system With an emphasis on practical solutions to behavior problems, Chance offers an unparalleled approach to behavior analysis. Creating a simulated classroom, course content is presented by Dr. Cee--a fictitious instructor who interacts with equally fictitious students. Through Dr. Cee, Chance teaches the language of behavior theory and analysis as well as the most important procedures for changing behavior and the principles that underlay those procedures. The dialogue between Dr. Cee and the students is realistic; the students ask questions, giving readers a chance to see if they

know the answer to the questions raised. Effective and engaging, Chance's Socratic approach is very readable, yet does not sacrifice accuracy and specificity. The study of network theory is a highly interdisciplinary field, which has emerged as a major topic of interest in various disciplines ranging from physics and mathematics, to biology and sociology. This book promotes the diverse nature of the study of complex networks by balancing the needs of students from very different backgrounds. It references the most commonly used concepts in network theory, provides examples of their applications in solving practical problems, and clear indications on how to analyse their results. In the first part of the book, students and researchers will discover the quantitative and analytical tools necessary to work with complex networks, including the most basic concepts in network and graph theory, linear and matrix algebra, as well as the physical concepts most frequently used for studying networks. They will also find instruction on some key skills such as how to proof analytic results and how to manipulate empirical network data. The bulk of the text is focused on instructing readers on the most useful tools for modern practitioners of network theory. These include degree distributions, random networks, network fragments, centrality measures, clusters and communities, communicability, and local and global properties of networks. The combination of theory, example and method that are presented in this text, should ready the student to conduct their own analysis of networks with confidence and allow teachers to select appropriate examples and problems to teach this subject in the classroom. A comprehensive, self-contained treatment of Fourier analysis and wavelets—now in a new edition Through expansive coverage and easy-to-follow explanations, A First Course in Wavelets with Fourier Analysis, Second Edition provides a self-contained mathematical treatment of Fourier analysis and wavelets, while uniquely presenting signal analysis applications and problems. Essential and fundamental ideas are presented in an effort to make the book accessible to a broad audience, and, in addition, their applications to signal processing are kept at an elementary level. The book begins with an

introduction to vector spaces, inner product spaces, and other preliminary topics in analysis. Subsequent chapters feature: The development of a Fourier series, Fourier transform, and discrete Fourier analysis Improved sections devoted to continuous wavelets and two-dimensional wavelets The analysis of Haar, Shannon, and linear spline wavelets The general theory of multi-resolution analysis Updated MATLAB code and expanded applications to signal processing The construction, smoothness, and computation of Daubechies' wavelets Advanced topics such as wavelets in higher dimensions, decomposition and reconstruction, and wavelet transform Applications to signal processing are provided throughout the book, most involving the filtering and compression of signals from audio or video. Some of these applications are presented first in the context of Fourier analysis and are later explored in the chapters on wavelets. New exercises introduce additional applications, and complete proofs accompany the discussion of each presented theory. Extensive appendices outline more advanced proofs and partial solutions to exercises as well as updated MATLAB routines that supplement the presented examples. A First Course in Wavelets with Fourier Analysis, Second Edition is an excellent book for courses in mathematics and engineering at the upper-undergraduate and graduate levels. It is also a valuable resource for mathematicians, signal processing engineers, and scientists who wish to learn about wavelet theory and Fourier analysis on an elementary level. This book introduces harmonic analysis at an undergraduate level. In doing so it covers Fourier analysis and paves the way for Poisson Summation Formula. Another central feature is that it makes the reader aware of the fact that both principal incarnations of Fourier theory, the Fourier series and the Fourier transform, are special cases of a more general theory arising in the context of locally compact abelian groups. The final goal of this book is to introduce the reader to the techniques used in harmonic analysis of noncommutative groups. These techniques are explained in the context of matrix groups as a principal example. This fifth edition of Lang's book covers all the topics traditionally taught in the first-year calculus sequence. Divided into five parts, each

section of A FIRST COURSE IN CALCULUS contains examples and applications relating to the topic covered. In addition, the rear of the book contains detailed solutions to a large number of the exercises, allowing them to be used as worked-out examples -- one of the main improvements over previous editions. In the last five decades various attempts to formulate theories of quantum gravity have been made, but none has fully succeeded in becoming the quantum theory of gravity. One possible explanation for this failure might be the unresolved fundamental issues in quantum theory as it stands now. Indeed, most approaches to quantum gravity adopt standard quantum theory as their starting point, with the hope that the theory's unresolved issues will get solved along the way. However, these fundamental issues may need to be solved before attempting to define a quantum theory of gravity. The present text adopts this point of view, addressing the following basic questions: What are the main conceptual issues in quantum theory? How can these issues be solved within a new theoretical framework of quantum theory? A possible way to overcome critical issues in present-day quantum physics - such as a priori assumptions about space and time that are not compatible with a theory of quantum gravity, and the impossibility of talking about systems without reference to an external observer - is through a reformulation of quantum theory in terms of a different mathematical framework called topos theory. This course-tested primer sets out to explain to graduate students and newcomers to the field alike, the reasons for choosing topos theory to resolve the above-mentioned issues and how it brings quantum physics back to looking more like a "neo-realist" classical physics theory again. A First Course in Japanese (2007 Edition) has been written specifically for students who are beginning their study of Japanese in the last two years of high school. The textbook is based on the new syllabus published in 2006 and covers two years of study. It has three resources : the Course Book is based around six main topics. Each topic has a number of units. Each unit begins with sentence structures followed by explanations of the structures. This is then followed by various texts, a grammar summary, Kanji, activities,

cultural notes, vocabulary and remember of pictorial charts. the Workbook contains grammatical exercises, listening, comprehension, composition and Kanji writing exercises. the CDs: the CD that comes with the Course Book covers all the sentence structures and dialogues. The Workbook CD covers all the listening exercises, text and questions. The theory of dynamical systems is a major mathematical discipline closely intertwined with all main areas of mathematics. It has greatly stimulated research in many sciences and given rise to the vast new area variously called applied dynamics, nonlinear science, or chaos theory. This introduction for senior undergraduate and beginning graduate students of mathematics, physics, and engineering combines mathematical rigor with copious examples of important applications. It covers the central topological and probabilistic notions in dynamics ranging from Newtonian mechanics to coding theory. Readers need not be familiar with manifolds or measure theory; the only prerequisite is a basic undergraduate analysis course. The authors begin by describing the wide array of scientific and mathematical questions that dynamics can address. They then use a progression of examples to present the concepts and tools for describing asymptotic behavior in dynamical systems, gradually increasing the level of complexity. The final chapters introduce modern developments and applications of dynamics. Subjects include contractions, logistic maps, equidistribution, symbolic dynamics, mechanics, hyperbolic dynamics, strange attractors, twist maps, and KAM-theory. This book introduces the theory of modular forms, from which all rational elliptic curves arise, with an eye toward the Modularity Theorem. Discussion covers elliptic curves as complex tori and as algebraic curves; modular curves as Riemann surfaces and as algebraic curves; Hecke operators and Atkin-Lehner theory; Hecke eigenforms and their arithmetic properties; the Jacobians of modular curves and the Abelian varieties associated to Hecke eigenforms. As it presents these ideas, the book states the Modularity Theorem in various forms, relating them to each other and touching on their applications to number theory. The authors assume no background in algebraic number

theory and algebraic geometry. Exercises are included. "A First Course in Machine Learning by Simon Rogers and Mark Girolami is the best introductory book for ML currently available. It combines rigor and precision with accessibility, starts from a detailed explanation of the basic foundations of Bayesian analysis in the simplest of settings, and goes all the way to the frontiers of the subject such as infinite mixture models, GPs, and MCMC." —Devdatt Dubhashi, Professor, Department of Computer Science and Engineering, Chalmers University, Sweden "This textbook manages to be easier to read than other comparable books in the subject while retaining all the rigorous treatment needed. The new chapters put it at the forefront of the field by covering topics that have become mainstream in machine learning over the last decade." —Daniel Barbara, George Mason University, Fairfax, Virginia, USA "The new edition of A First Course in Machine Learning by Rogers and Girolami is an excellent introduction to the use of statistical methods in machine learning. The book introduces concepts such as mathematical modeling, inference, and prediction, providing 'just in time' the essential background on linear algebra, calculus, and probability theory that the reader needs to understand these concepts." —Daniel Ortiz-Arroyo, Associate Professor, Aalborg University Esbjerg, Denmark "I was impressed by how closely the material aligns with the needs of an introductory course on machine learning, which is its greatest strength...Overall, this is a pragmatic and helpful book, which is well-aligned to the needs of an introductory course and one that I will be looking at for my own students in coming months." —David Clifton, University of Oxford, UK "The first edition of this book was already an excellent introductory text on machine learning for an advanced undergraduate or taught masters level course, or indeed for anybody who wants to learn about an interesting and important field of computer science. The additional chapters of advanced material on Gaussian process, MCMC and mixture modeling provide an ideal basis for practical projects, without disturbing the very clear and readable exposition of the basics contained in the first part of the book." —Gavin Cawley, Senior Lecturer, School of Computing Sciences,

University of East Anglia, UK "This book could be used for junior/senior undergraduate students or first-year graduate students, as well as individuals who want to explore the field of machine learning...The book introduces not only the concepts but the underlying ideas on algorithm implementation from a critical thinking perspective." —Guangzhi Qu, Oakland University, Rochester, Michigan, USA

A First Course in Machine Learning covers the core mathematical and statistical techniques needed to understand some of the most popular machine learning algorithms. The algorithms presented span the main problem areas within machine learning: classification, clustering and projection. The text gives detailed descriptions and derivations for a small number of algorithms rather than cover many algorithms in less detail. Referenced throughout the text and available on a supporting website (<http://bit.ly/firstcourseml>), an extensive collection of MATLAB®/Octave scripts enables students to recreate plots that appear in the book and investigate changing model specifications and parameter values. By experimenting with the various algorithms and concepts, students see how an abstract set of equations can be used to solve real problems. Requiring minimal mathematical prerequisites, the classroom-tested material in this text offers a concise, accessible introduction to machine learning. It provides students with the knowledge and confidence to explore the machine learning literature and research specific methods in more detail. A comprehensive and self-contained introduction to the field, carefully balancing mathematical theory and practical applications. It starts at an elementary level, developing concepts of multivariate distributions from first principles. After a chapter on the multivariate normal distribution reviewing the classical parametric theory, methods of estimation are explored using the plug-in principles as well as maximum likelihood. Two chapters on discrimination and classification, including logistic regression, form the core of the book, followed by methods of testing hypotheses developed from heuristic principles, likelihood ratio tests and permutation tests. Finally, the powerful self-consistency principle is used to introduce principal components as a method of approximation,

rounded off by a chapter on finite mixture analysis. This innovative, intermediate-level statistics text fills an important gap by presenting the theory of linear statistical models at a level appropriate for senior undergraduate or first-year graduate students. With an innovative approach, the author's introduces students to the mathematical and statistical concepts and tools that form a foundation. Now in a new second edition, this volume presents a clear and concise treatment of an increasingly important branch of mathematics. A unique introductory survey complete with easy-to-understand examples and sample problems, this text includes information on such basic combinatorial tools as recurrence relations, generating functions, incidence matrices, and the non-exclusion principle. It also provides a study of block designs, Steiner triple systems, and expanded coverage of the marriage theorem, as well as a unified account of three important constructions which are significant in coding theory. The goal of this book is to foster a basic understanding of factor analytic techniques so that readers can use them in their own research and critically evaluate their use by other researchers. Both the underlying theory and correct application are emphasized. The theory is presented through the mathematical basis of the most common factor analytic models and several methods used in factor analysis. On the application side, considerable attention is given to the extraction problem, the rotation problem, and the interpretation of factor analytic results. Hence, readers are given a background of understanding in the theory underlying factor analysis and then taken through the steps in executing a proper analysis -- from the initial problem of design through choice of correlation coefficient, factor extraction, factor rotation, factor interpretation, and writing up results. This revised edition includes introductions to newer methods -- such as confirmatory factor analysis and structural equation modeling -- that have revolutionized factor analysis in recent years. To help remove some of the mystery underlying these newer, more complex methods, the introductory examples utilize EQS and LISREL. Updated material relating to the validation of the Comrey Personality Scales also has been added. Finally, program disks for

running factor analyses on either an IBM-compatible PC or a mainframe with FORTRAN capabilities are available. The intended audience for this volume includes talented but mathematically unsophisticated advanced undergraduates, graduate students, and research workers seeking to acquire a basic understanding of the principles supporting factor analysis. Disks are available in 5.25" and 3.5" formats for both mainframe programs written in Fortran and IBM PCs and compatibles running a math co-processor. While the standard sophomore course on elementary differential equations is typically one semester in length, most of the texts currently being used for these courses have evolved into calculus-like presentations that include a large collection of methods and applications, packaged with state-of-the-art color graphics, student solution manuals, the latest fonts, marginal notes, and web-based supplements. All of this adds up to several hundred pages of text and can be very expensive. Many students do not have the time or desire to read voluminous texts and explore internet supplements. That's what makes the format of this differential equations book unique. It is a one-semester, brief treatment of the basic ideas, models, and solution methods. Its limited coverage places it somewhere between an outline and a detailed textbook. The author writes concisely, to the point, and in plain language. Many worked examples and exercises are included. A student who works through this primer will have the tools to go to the next level in applying ODEs to problems in engineering, science, and applied mathematics. It will also give instructors, who want more concise coverage, an alternative to existing texts. This text also encourages students to use a computer algebra system to solve problems numerically. It can be stated with certainty that the numerical solution of differential equations is a central activity in science and engineering, and it is absolutely necessary to teach students scientific computation as early as possible. Templates of MATLAB programs that solve differential equations are given in an appendix. Maple and Mathematica commands are given as well. The author taught this material on several occasions to students who have had a standard three-semester calculus sequence. It has been well

received by many students who appreciated having a small, definitive parcel of material to learn. Moreover, this text gives students the opportunity to start reading mathematics at a slightly higher level than experienced in pre-calculus and calculus; not every small detail is included. Therefore the book can be a bridge in their progress to study more advanced material at the junior-senior level, where books leave a lot to the reader and are not packaged with elementary formats. J. David Logan is Professor of Mathematics at the University of Nebraska, Lincoln. He is the author of another recent undergraduate textbook, *Applied Partial Differential Equations*, 2nd Edition (Springer 2004). *A First Course in Computational Algebraic Geometry* is designed for young students with some background in algebra who wish to perform their first experiments in computational geometry. Originating from a course taught at the African Institute for Mathematical Sciences, the book gives a compact presentation of the basic theory, with particular emphasis on explicit computational examples using the freely available computer algebra system, Singular. Readers will quickly gain the confidence to begin performing their own experiments. Data Sets Statistical reasoning and modeling are of critical importance to modern biology. This textbook introduces fundamental concepts from probability and statistics which will pave the way for the student of biology to become a well-rounded scientist. No previous study of probability or statistics is assumed. Calculus topics are not used extensively in this book, though some integration and differentiation are expected. The calculus prerequisite is primarily intended to assure a certain level of mathematical maturity. This book puts emphasis on examples, which are presented to motivate the theory. The presentation style is concise and self-contained, briefly including the mathematical elements that are needed for studying probability and statistics. The examples are relevant to students in the life sciences with interests in genetics, biology, ecology, health, etc. We believe that aspects of probability theory are of biological interest and that probability underlies the theory of inferential statistics. Thus, we place an equal emphasis on probability and statistics which are both essential for

solving and understanding many types of biological problems. The Solution Manual is available upon request for all instructors who adopt this book as a course text. Please send your request to sales@wspc.com. This book is an original first approach to quantum physics, the core of modern physics. It combines the competence of a well-known researcher in quantum information science and the freshness in style of two high school students. Quantum physics is known to be challenging for two reasons: it describes counter-intuitive phenomena and employs rather advanced mathematics. The description of "traditional" quantum phenomena (the structure of atoms and molecules, the properties of solids, the zoology of sub-atomic particles) does indeed involve the whole formalism. However, some other striking

phenomena, somehow the most "typically quantum" ones, can be described using only high school mathematical skills. This approach exploits this fact, thus making it possible for a beginner to tackle mind-boggling experiments like teleportation and the violation of Bell's inequalities, and practice notions like superposition, entanglement and decoherence. Suitable for advanced undergraduate and graduate students, this text presents the general properties of partial differential equations, including the elementary theory of complex variables. Topics include one-dimensional wave equation, properties of elliptic and parabolic equations, separation of variables and Fourier series, nonhomogeneous problems, and analytic functions of a complex variable. Solutions. 1965 edition.