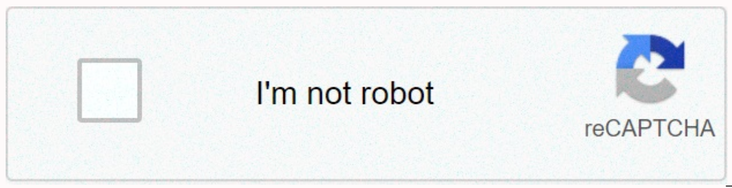

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Essential statistical inference theory and methods solutions

Homework 1 due 09/05. Solutions: HW1_soln Homework 2 due 09/18 [3PM, drop off during TA's OH or by email TA skoner@]. Solutions: HW2_Soln Homework 3 due 09/30. Solutions: HW3_soln Homework 4 due 10/22. Solutions: HW4_soln Homework 5 due 11/05 [extension, also replace 7.1&7.5 with Reading Ch 7.1-7.2.4]. Solutions: HW5_key Homework 6 due 11/16. Solutions: HW6_key Errata for "Essential Statistical Inference: Theory and Methods" Supplementary material for "Essential Statistical Inference: Theory and Methods" p. 11, bottom k3 = u'_3 - 3uu'_2 - 2u^3 should be k3 = u'_3 - 3uu'_2 + 2u^3 p. 22-23, problems 1.13, 1.15, 1.17 replace sigma^2 by c^2 p. 19, Figure 1.2 The x axis should be labeled "Assumed CV (c)" because the curves are based on equation (1.20) times n. p. 21, Problem 1.8 Skew(a+bY)=Skew(Y) should be Skew(a+bY)=sign(b)Skew(Y). p. 23, Problem 1.14 The last sentence would be clearer as follows: "Then compute the value on the two curves at CV=c=(0.5,1.0,1.5,2.0) of Figure 1.2 (p. 19). These values are n times the asymptotic variances found in equation (1.20, p. 18). Also, the exponential distribution used there has mean mu=2 rather than the mu=1 that is stated in the caption. p. 46, last display of Sec. 2.2.6 The I(Yi≤t) should be I(Yi≤y) (change t to y). p. 133, line 2 IT should not have a ^ over it. p. 145, bottom The numerator of TS(Δ) should have ptildes replaced by phats and a Δ subtracted, i.e., {phat1-phat2-Δ}2 p. 146, Section 3.4.1 In the first sentence, insert "calculated under the assumptions of the normal linear model" after T_LR. p. 189, 4th paragraph In the sentence beginning "Typically ...," the sum of \wh{w}i should be replaced by 1 divided by that sum, in both places. p. 226, bottom n/(n-1) in Example 5.12 should be (n-1)/n, two places. p. 286, bottom in I(θ), partial wrt θ should be wrt θT p. 286, bottom in I(θ), partial wrt θT should be wrt θ p. 288, (6.16) partial wrt θ2 should be wrt θ2T p. 288-290 In should be I throughout these pages p. 336, Prob. 7.15 Add "+" in the middle of the displayed summand p. 410-11, Problem 10.15 switch subscripts to αj and βi p. 425, 2nd display inner dF(y) should be dF(x) Theory and Methods Author: Dennis D. Boos Publisher: Springer Science & Business Media ISBN: Category: Mathematics Page: 568 View: 519 DOWNLOAD NOW » This book is for students and researchers who have had a first year graduate level mathematical statistics course. It covers classical likelihood, Bayesian, and permutation inference; an introduction to basic asymptotic distribution theory; and modern topics like M-estimation, the jackknife, and the bootstrap. R code is woven throughout the text, and there are a large number of examples and problems. An important goal has been to make the topics accessible to a wide audience, with little overt reliance on measure theory. A typical semester course consists of Chapters 1-6 (likelihood-based estimation and testing, Bayesian inference, basic asymptotic results) plus selections from M-estimation and related testing and resampling methodology. Dennis Boos and Len Stefanski are professors in the Department of Statistics at North Carolina State. Their research has been eclectic, often with a robustness angle, although Stefanski is also known for research concentrated on measurement error, including a co-authored book on non-linear measurement error models. In recent years the authors have jointly worked on variable selection methods. Author: A. H. Welsh Publisher: John Wiley & Sons ISBN: Category: Mathematics Page: 480 View: 707 DOWNLOAD NOW » Relevant, concrete, and thorough--the essential data-based text onstatistical inference The ability to formulate abstract concepts and draw conclusionsfrom data is fundamental to mastering statistics. Aspects ofStatistical Inference equips advanced undergraduate and graduatestudents with a comprehensive grounding in statistical inference,including nonstandard topics such as robustness, randomization, andfinite population inference. A. H. Welsh goes beyond the standard texts and expertly synthesizesbroad, critical theory with concrete data and relevant topics. Thetext follows a historical framework, uses real-data sets andstatistical graphics, and treats multiparameter problems, yet isultimately about the concepts themselves. Written with clarity and depth, Aspects of Statistical Inference: * Provides a theoretical and historical grounding in statisticalinference that considers Bayesian, fiducial, likelihood, andfrequentist approaches * Illustrates methods with real-data sets on diabetic retinopathy,the pharmacological effects of caffeine, stellar velocity, andindustrial experiments * Considers multiparameter problems * Develops large sample approximations and shows how to use them * Presents the philosophy and application of robustness theory * Highlights the central role of randomization in statistics * Uses simple proofs to illuminate foundational concepts * Contains an appendix of useful facts concerning expansions,matrices, integrals, and distribution theory Here is the ultimate data-based text for comparing and presentingthe latest approaches to statistical inference. A Short Course Author: Michael J. Panik Publisher: John Wiley & Sons ISBN: Category: Mathematics Page: 400 View: 800 DOWNLOAD NOW » A concise, easily accessible introduction to descriptive and inferential techniques Statistical Inference: A Short Course offers a concise presentation of the essentials of basic statistics for readers seeking to acquire a working knowledge of statistical concepts, measures, and procedures. The author conducts tests on the assumption of randomness and normality, provides nonparametric methods when parametric approaches might not work. The book also explores how to determine a confidence interval for a population median while also providing coverage of ratio estimation, randomness, and causality. To ensure a thorough understanding of all key concepts, Statistical Inference provides numerous examples and solutions along with complete and precise answers to many fundamental questions, including: How do we determine that a given dataset is actually a random sample? With what level of precision and reliability can a population sample be estimated? How are probabilities determined and are they the same thing as odds? How can we predict the level of one variable from that of another? What is the strength of the relationship between two variables? The book is organized to present fundamental statistical concepts first, with later chapters exploring more advanced topics and additional statistical tests such as Distributional Hypotheses, Multinomial Chi-Square Statistics, and the Chi-Square Distribution. Each chapter includes appendices and exercises, allowing readers to test their comprehension of the presented material. Statistical Inference: A Short Course is an excellent book for courses on probability, mathematical statistics, and statistical inference at the upper-undergraduate and graduate levels. The book also serves as a valuable reference for researchers and practitioners who would like to develop further insights into essential statistical tools. Author: G. A. Young Publisher: Cambridge University Press ISBN: Category: Mathematics Page: 225 View: 812 DOWNLOAD NOW » Concise account of main approaches; first textbook to synthesize modern computation with basic theory. Probability for Statistics Author: Hung T. Nguyen Publisher: Springer Science & Business Media ISBN: Category: Mathematics Page: 432 View: 206 DOWNLOAD NOW » This is the first half of a text for a two semester course in mathematical statistics at the senior/graduate level for those who need a strong background in statistics as an essential tool in their career. To study this text, the reader needs a thorough familiarity with calculus including such things as Jacobians and series but somewhat less intense familiarity with matrices including quadratic forms and eigenvalues. For convenience, these lecture notes were divided into two parts: Volume I, Probability for Statistics, for the first semester, and Volume II, Statistical Inference, for the second. We suggest that the following distinguish this text from other introductions to mathematical statistics. 1. The most obvious thing is the layout. We have designed each lesson for the (U.S.) 50 minute class; those who study independently probably need the traditional three hours for each lesson. Since we have more than (the U.S. again) 90 lessons, some choices have to be made. In the table of contents, we have used a * to designate those lessons which are "interesting but not essential" (INE) and may be omitted from a general course; some exercises and proofs in other lessons are also "INE". We have made lessons of some material which other writers might stuff into appendices. Incorporating this freedom of choice has led to some redundancy, mostly in definitions, which may be beneficial. Author: Jun Shao Publisher: Springer Science & Business Media ISBN: Category: Mathematics Page: 591 View: 899 DOWNLOAD NOW » This graduate textbook covers topics in statistical theory essential for graduate students preparing for work on a Ph.D. degree in statistics. The first chapter provides a quick overview of concepts and results in measure-theoretic probability theory that are useful in statistics. The second chapter introduces some fundamental concepts in statistical decision theory and inference. Chapters 3-7 contain detailed studies on some important topics: unbiased estimation, parametric estimation, nonparametric estimation, hypothesis testing, and confidence sets. A large number of exercises in each chapter provide not only practice problems for students, but also many additional results. In addition to improving the presentation, the new edition makes Chapter 1 a self-contained chapter for probability theory with emphasis in statistics. Added topics include useful moment inequalities, more discussions of moment generating and characteristic functions, conditional independence, Markov chains, martingales, Edgeworth and Cornish-Fisher expansions, and proofs to many key theorems such as the dominated convergence theorem, monotone convergence theorem, uniqueness theorem, continuity theorem, law of large numbers, and central limit theorem. A new section in Chapter 5 introduces semiparametric models, and a number of new exercises were added to each chapter. Author: Richard B. Ellis Publisher: Prentice Hall ISBN: Category: Mathematical statistics Page: 258 View: 568 DOWNLOAD NOW » Author: Robert Bartoszynski Publisher: John Wiley & Sons ISBN: Category: Mathematics Page: 592 View: 553 DOWNLOAD NOW » Updated classic statistics text, with new problems and examples Probability and Statistical Inference, Third Edition helps students grasp essential concepts of statistics and its probabilistic foundations. This book focuses on the development of intuition and understanding in the subject through a wealth of examples illustrating concepts, theorems, and methods. The reader will recognize and fully understand the why and not just the how behind the introduced material. In this Third Edition, the reader will find a new chapter on Bayesian statistics, 70 new problems and an appendix with the supporting R code. This book is suitable for upper-level undergraduates or first-year graduate students studying statistics or related disciplines, such as mathematics or engineering. This Third Edition: Introduces an all-new chapter on Bayesian statistics and offers thorough explanations of advanced statistics and probability topics Includes 650 problems and over 400 examples - an excellent resource for the mathematical statistics class sequence in the increasingly popular "flipped classroom" format Offers students in statistics, mathematics, engineering and related fields a user-friendly resource Provides practicing professionals valuable insight into statistical tools Probability and Statistical Inference offers a unique approach to problems that allows the reader to fully integrate the knowledge gained from the text, thus, enhancing a more complete and honest understanding of the topic. A Computational Approach Author: Marc S. Paolella Publisher: John Wiley & Sons ISBN: Category: Mathematics Page: 584 View: 218 DOWNLOAD NOW » A hands-on approach to statistical inference that addresses the latest developments in this ever-growing field This clear and accessible book for beginning graduate students offers a practical and detailed approach to the field of statistical inference, providing complete derivations of results, discussions, and MATLAB programs for computation. It emphasizes details of the relevance of the material, intuition, and discussions with a view towards very modern statistical inference. In addition to classic subjects associated with mathematical statistics, topics include an intuitive presentation of the (single and double) bootstrap for confidence interval calculations, shrinkage estimation, tail (maximal moment) estimation, and a variety of methods of point estimation besides maximum likelihood, including use of characteristic functions, and indirect inference. Practical examples of all methods are given. Estimation issues associated with the discrete mixtures of normal distribution, and their solutions, are developed in detail. Much emphasis throughout is on non-Gaussian distributions, including details on working with the stable Paretian distribution and fast calculation of the noncentral Student's t. An entire chapter is dedicated to optimization, including development of Hessian-based methods, as well as heuristic/genetic algorithms that do not require continuity, with MATLAB codes provided. The book includes both theory and nontechnical discussions, along with a substantial reference to the literature, with an emphasis on alternative, more modern approaches. The recent literature on the misuse of hypothesis testing and p-values for model selection is discussed, and emphasis is given to alternative model selection methods, though hypothesis testing of distributional assumptions is covered in detail, notably for the normal distribution. Presented in three parts—Essential Concepts in Statistics; Further Fundamental Concepts in Statistics; and Additional Topics—Fundamental Statistical Inference: A Computational Approach offers comprehensive chapters on: Introducing Point and Interval Estimation; Goodness of Fit and Hypothesis Testing; Likelihood; Numerical Optimization; Methods of Point Estimation; Q-Q Plots and Distribution Testing; Unbiased Point Estimation and Bias Reduction; Analytic Interval Estimation; Inference in a Heavy-Tailed Context; The Method of Indirect Inference; and, as an appendix, A Review of Fundamental Concepts in Probability Theory, the latter to keep the book self-contained, and giving material on some advanced subjects such as saddlepoint approximations, expected shortfall in finance, calculation with the stable Paretian distribution, and convergence theorems and proofs. Author: Robert Bartoszynski Publisher: John Wiley & Sons ISBN: Category: Mathematics Page: 592 View: 882 DOWNLOAD NOW » Updated classic statistics text, with new problems and examples Probability and Statistical Inference, Third Edition helps students grasp essential concepts of statistics and its probabilistic foundations. This book focuses on the development of intuition and understanding in the subject through a wealth of examples illustrating concepts, theorems, and methods. The reader will recognize and fully understand the why and not just the how behind the introduced material. In this Third Edition, the reader will find a new chapter on Bayesian statistics, 70 new problems and an appendix with the supporting R code. This book is suitable for upper-level undergraduates or first-year graduate students studying statistics or related disciplines, such as mathematics or engineering. This Third Edition: Introduces an all-new chapter on Bayesian statistics and offers thorough explanations of advanced statistics and probability topics Includes 650 problems and over 400 examples - an excellent resource for the mathematical statistics class sequence in the increasingly popular "flipped classroom" format Offers students in statistics, mathematics, engineering and related fields a user-friendly resource Provides practicing professionals valuable insight into statistical tools Probability and Statistical Inference offers a unique approach to problems that allows the reader to fully integrate the knowledge gained from the text, thus, enhancing a more complete and honest understanding of the topic. Author: Malcolm O. Asadoorian Publisher: University Press of America ISBN: Category: Mathematics Page: 286 View: 789 DOWNLOAD NOW » Essentials of Inferential Statistics, fourth edition is appropriate for a one semester first course in Applied Statistics or as a reference book for practicing researchers in a wide variety of disciplines, including medicine, natural and social sciences, law, and engineering. Most importantly, this practical book thoroughly describes the Bayesian principles necessary for applied clinical research and strategic interaction, which are frequently omitted in other texts. After a comprehensive treatment of probability theory concepts, theorems, and some basic proofs, this laconically written text illustrates sampling distributions and their importance in estimation for the purpose of statistical inference. The book then shifts its focus to the essentials associated with confidence intervals, and hypothesis testing for major population parameters, namely, the population mean, population variance, and population proportion. In addition, it thoroughly describes the basics of correlation and simple linear regression as well as non-parametric statistics. Author: Anatoli Juditsky Publisher: Princeton University Press ISBN: Category: Mathematics Page: 656 View: 524 DOWNLOAD NOW » This authoritative book draws on the latest research to explore the interplay of high-dimensional statistics with optimization. Through an accessible analysis of fundamental problems of hypothesis testing and signal recovery, Anatoli Juditsky and Arkadi Nemirovski show how convex optimization theory can be used to devise and analyze near-optimal statistical inferences. Statistical Inference via Convex Optimization is an essential resource for optimization specialists who are new to statistics and its applications, and for data scientists who want to improve their optimization methods. Juditsky and Nemirovski provide the first systematic treatment of the statistical techniques that have arisen from advances in the theory of optimization. They focus on four well-known statistical problems—sparse recovery, hypothesis testing, and recovery from indirect observations of both signals and functions of signals—demonstrating how they can be solved more efficiently as convex optimization problems. The emphasis throughout is on achieving the best possible statistical performance. The construction of inference routines and the quantification of their statistical performance are given by efficient computation rather than by analytical derivation typical of more conventional statistical approaches. In addition to being computation-friendly, the methods described in this book enable practitioners to handle numerous situations too difficult for closed analytical form analysis, such as composite hypothesis testing and signal recovery in inverse problems. Statistical Inference via Convex Optimization features exercises with solutions along with extensive appendixes, making it ideal for use as a graduate text. Author: J. Philip Miller Publisher: Elsevier ISBN: Category: Mathematics Page: 368 View: 278 DOWNLOAD NOW » Essential Statistical Methods for Medical Statistics presents only key contributions which have been selected from the volume in the Handbook of Statistics: Medical Statistics, Volume 27 (2009). While the use of statistics in these fields has a long and rich history, the explosive growth of science in general, and of clinical and epidemiological sciences in particular, has led to the development of new methods and innovative adaptations of standard methods. This volume is appropriately focused for individuals working in these fields. Contributors are internationally renowned experts in their respective areas. · Contributors are internationally renowned experts in their respective areas · Addresses emerging statistical challenges in epidemiological, biomedical, and pharmaceutical research · Methods for assessing Biomarkers, analysis of competing risks · Clinical trials including sequential and group sequential, crossover designs, cluster randomized, and adaptive designs · Structural equations modelling and longitudinal data analysis Methods and Implementation Using R Author: Maria Kateri Publisher: Springer ISBN: Category: Mathematics Page: 304 View: 729 DOWNLOAD NOW » Contingency tables arise in diverse fields, including life sciences, education, social and political sciences, notably market research and opinion surveys. Their analysis plays an essential role in gaining insight into structures of the quantities under consideration and in supporting decision making. Combining both theory and applications, this book presents models and methods for the analysis of two- and multidimensional-contingency tables. An excellent reference for advanced undergraduates, graduate students, and practitioners in statistics as well as biosciences, social sciences, education, and economics, the work may also be used as a textbook for a course on categorical data analysis. Prerequisites include basic background on statistical inference and knowledge of statistical software packages. Exploring the World Through Data Author: Robert Gould Publisher: ISBN: Category: Mathematical statistics Page: View: 120 DOWNLOAD NOW » "This book is about understanding how statistical inference and data analysis can improve the world by helping us see more clearly"-- Author: Hang Lee Publisher: Springer Science & Business Media ISBN: Category: Medical Page: 161 View: 747 DOWNLOAD NOW » This is a text in methods of applied statistics for researchers who design and conduct experiments, perform statistical inference, and write technical reports. These research activities rely on an adequate knowledge of applied statistics. The reader both builds on basic statistics skills and learns to apply it to applicable scenarios without over-emphasis on the technical aspects. Demonstrations are a very important part of this text. Mathematical expressions are exhibited only if they are defined or intuitively comprehensible. This text may be used as a self review guidebook for applied researchers or as an introductory statistical methods textbook for students not majoring in statistics. Discussion includes essential probability models, inference of means, proportions, correlations and regressions, methods for censored survival time data analysis, and sample size determination. The author has over twenty years of experience on applying statistical methods to study design and data analysis in collaborative medical research setting as well as on teaching. He received his PhD from University of Southern California Department of Preventive Medicine, received a post-doctoral training at Harvard Department of Biostatistics, has held faculty appointments at UCLA School of Medicine and Harvard Medical School, and currently a biostatistics faculty member at Massachusetts General Hospital and Harvard Medical School in Boston, Massachusetts, USA. Reaching Decisions With Data Author: Stephen C. Loftus Publisher: Academic Press ISBN: Category: Mathematics Page: 304 View: 589 DOWNLOAD NOW » Basic Statistics with R: Reaching Decisions with Data, First Edition, provides readers with an understanding of the processes at work in using data for results. The work begins with data collection and discusses exploratory analyses - including visual graphs, numerical summaries, and relationships between variables - basic probability, and statistical inference - including hypothesis testing and confidence intervals. All of these topics are taught using real data drawn from various topics including economics, biology, political science, and sports. Using this wide variety of motivating examples allows students to directly connect and make Statistics essential to their field of interest, rather than seeing it as a separate and ancillary knowledge area. In addition to introducing students to statistical topics using real data, the book provides a gentle introduction to coding, having the students use the statistical language and software R. Students learn to load data, calculate summary statistics, create graphs, and do statistical inference using R with either Windows or Macintosh machines. Features real data to give students an engaging practice to connect with their areas of interest Evolves from basic problems that can be worked by hand, to elementary use of opensource R software Offers a direct, clear approach highlighted by useful visuals and examples Exploring the World Through Data Author: Robert Gould Publisher: ISBN: Category: Mathematical statistics Page: View: 264 DOWNLOAD NOW » "This book is about understanding how statistical inference and data analysis can improve the world by helping us see more clearly"-- A Resampling Perspective Author: Peter C. Bruce Publisher: John Wiley & Sons ISBN: Category: Mathematics Page: 320 View: 940 DOWNLOAD NOW » Concise, thoroughly class-tested primer that features basic statistical concepts in the concepts in the context of analytics, resampling, and the bootstrap A uniquely developed presentation of key statistical topics, Introductory Statistics and Analytics: A Resampling Perspective provides an accessible approach to statistical analytics, resampling, and the bootstrap for readers with various levels of exposure to basic probability and statistics. Originally class-tested at one of the first online learning companies in the discipline, www.statistics.com, the book primarily focuses on applications of statistical concepts developed via resampling, with a background discussion of mathematical theory. This feature stresses statistical literacy and understanding, which demonstrates the fundamental basis for statistical inference and demystifies traditional formulas. The book begins with illustrations that have the essential statistical topics interwoven throughout before moving on to demonstrate the proper design of studies. Meeting all of the Guidelines for Assessment and Instruction in Statistics Education (GAISE) requirements for an introductory statistics course, Introductory Statistics and Analytics: A Resampling Perspective also includes: Over 300 "Try It Yourself" exercises and intermittent practice questions, which challenge readers at multiple levels to investigate and explore key statistical concepts Numerous interactive links designed to provide solutions to exercises and further information on crucial concepts Linkages that connect statistics to the rapidly growing field of data science Multiple discussions of various software systems, such as Microsoft Office Excel®, StatCrunch, and R, to develop and analyze data Areas of concern and/or contrasting points-of-view indicated through the use of "Caution" icons Introductory Statistics and Analytics: A Resampling Perspective is an excellent primary textbook for courses in preliminary statistics as well as a supplement for courses in upper-level statistics and related fields, such as biostatistics and econometrics. The book is also a general reference for readers interested in revisiting the value of statistics. Reaching Decisions with Data Author: Stephen C. Loftus Publisher: Academic Press ISBN: Category: Mathematics Page: 304 View: 161 DOWNLOAD NOW » Basic Statistics with R: Reaching Decisions with Data provides an understanding of the processes at work in using data for results. Sections cover data collection and discuss exploratory analyses, including visual graphs, numerical summaries, and relationships between variables - basic probability, and statistical inference - including hypothesis testing and confidence intervals. All topics are taught using real-data drawn from various fields, including economics, biology, political science and sports. Using this wide variety of motivating examples allows students to directly connect and make statistics essential to their field of interest, rather than seeing it as a separate and ancillary knowledge area. In addition to introducing students to statistical topics using real data, the book provides a gentle introduction to coding, having the students use the statistical language and software R. Students learn to load data, calculate summary statistics, create graphs and do statistical inference using R with either Windows or Macintosh machines. Features real-data to give students an engaging practice to connect with their areas of interest Evolves from basic problems that can be worked by hand to the elementary use of opensource R software Offers a direct, clear approach highlighted by useful visuals and examples