A Method Of Moments For The Estimation Of Weibull

Understanding electromagnetic wave theory is pivotal in the design of antennas, microwave circuits, radars, and imaging systems. Researchers behind technology advances in these and other areas need to understand both the classical theory of electromagnetics as well as modern and emerging techniques of solving Maxwell's equations. To this end, the book provides a graduate-level treatment of selected analytical and computational methods. The analytical methods include the separation of variables, perturbation theory, Green's functions, geometrical optics, the geometrical theory of diffraction, physical optics, and the physical theory of diffraction. The numerical techniques include mode matching, the method of moments, and the finite element method. The analytical methods provide physical insights that are valuable in the design process and the invention of new devices. The numerical methods are more capable of treating general and complex structures. Together, they form a basis for modern electromagnetic design. The level of presentation allows the reader to immediately begin applying the methods to some problems of moderate complexity. It also provides explanations of the underlying theories so that their capabilities and limitations can be understood.

Readers are guided step by step through numerous specific problems and challenges, covering all aspects of electrostatics with an emphasis on numerical procedures. The author focuses on practical examples, derives mathematical equations, and addresses common issues with algorithms. Introduction to Numerical Electrostatics contains problem sets, an accompanying web site with simulations, and a complete list of computer codes. Computer source code listings on accompanying web site Problem sets included with book Readers using MATLAB or other simulation packages will gain insight as to the inner workings of these packages, and how to account for their limitations Example computer code is provided in MATLAB Solutions Manual The first book of its kind uniquely devoted to the field of computational electrostatics

This volume presents advanced techniques to modeling markets, with a wide spectrum of topics, including advanced individual demand models, time series analysis, state space models, spatial models, structural models, mediation, models that specify competition and diffusion models. It is intended as a follow-on and companion to Modeling Markets (2015), in which the authors presented the basics of modeling markets along the classical steps of the model building process: specification, data collection, estimation, validation and implementation. This volume builds on the concepts presented in Modeling Markets with an emphasis on advanced methods that are used to specify, estimate and validate marketing models, including structural equation models, partial least squares, mixture models, and hidden Markov models, as well as generalized methods of moments, Bayesian analysis, non/semi-parametric estimation and endogeneity issues. Specific attention is given to big data. The market environment is changing rapidly and constantly. Models that provide information about the sensitivity of market behavior to marketing activities such as advertising, pricing, promotions and distribution are now routinely used by managers for the identification of changes in marketing programs that can improve brand performance. In today’s environment of information overload, the challenge is to make sense of the data that is being provided globally, in real time, from thousands of sources. Although marketing models are now widely accepted, the quality of the marketing decisions is critically dependent upon the quality of the models on which those decisions are based. This volume provides an authoritative and comprehensive review, with each chapter including: · an introduction to the method/methodology · a numerical example/application in marketing · references to other marketing applications · suggestions about software. Featuring contributions from top authors in the field, this volume will explore current and future aspects of modeling markets, providing relevant and timely research and techniques to scientists, researchers, students, academics and practitioners in marketing, management and economics.

In this work we solve the scattering, a problem of electromagnetic analysis, by mixed homogeneous linear and isotropic three-dimensional materials with the Method of Moments in the harmonic case.

The Most Comprehensive Book on the Subject Chronicles the Development of the Weibull Distribution in Statistical Theory and Applied Statistics Exploring one of the most important distributions in statistics, The Weibull Distribution: A Handbook focuses on its origin, statistical properties, and related distributions. The book also presents various approaches to estimate the parameters of the Weibull distribution under all possible situations of sampling data as well as approaches to parameter and goodness-of-fit testing. Describes the Statistical Methods, Concepts, Theories, and Applications of This Distribution Compiling findings from dozens of scientific journals and hundreds of research papers, the author first gives a careful and thorough mathematical description of the Weibull distribution and all of its features. He then deals with Weibull analysis, using classical and Bayesian approaches along with graphical and linear maximum likelihood techniques to estimate the three Weibull parameters. The author also explores the inference of Weibull processes, Weibull parameter testing, and different types of goodness-of-fit tests and methods. Successfully Apply the Weibull Model By using inferential procedures for estimating, testing, forecasting, and simulating data, this self-contained, detailed handbook shows how to solve statistical life science and engineering problems.

The past decade has seen powerful new computational tools for modeling which combine a Bayesian approach with recent Monte simulation techniques based on Markov chains. This book is the first to offer a systematic presentation of the Bayesian perspective of finite mixture modelling. The book is designed to show finite mixture and Markov switching models are formulated, what structures they imply on the data, their potential uses, and how they are estimated. Presenting its concepts informally without sacrificing mathematical correctness, it will serve a wide readership including statisticians as well as biologists, economists, engineers, financial and market researchers.

Generalized Method of Moments (GMM) has become one of the main statistical tools for the analysis of economic and financial data. This book is the first to provide an intuitive introduction to the method combined with a unified treatment of GMM statistical theory and a survey of recentimportant developments in the field. Providing a comprehensive treatment of GMM estimation and inference, it is designed as a resource for both the theory and practice of GMM: it discusses and proves formally all the main statistical results, and illustrates all inference techniques using empiricalexamples in macroeconomics and finance.Building from the instrumental variables estimator in static linear models, it presents the asymptotic statistical theory of GMM in nonlinear dynamic models. Within this framework it covers classical results on estimation and inference techniques, such as the overidentifying restrictions test andtests of structural stability, and reviews the finite sample performance of these inference methods. And it discusses in detail recent developments on covariance matrix estimation, the impact of model misspecification, moment selection, the use of the bootstrap, and weak instrumentasymptotics.

The principal objective of this volume is to offer a complete presentation of the theory of GMM estimation.

The report contains the asymptotic efficiencies of some candidate estimators which provide alternatives to maximum likelihood in some common probabilistic settings. The alternative estimators can be found with measurably less effort than solving the likelihood equations. They include the method of moments and similarly constructed estimators that involve the harmonic mean. The most successful example found deals with the negative binomial distribution. Here, the harmonic mean estimator has high efficiency in regions where the method of moments estimator has rather low efficiency. (Author).

The generalized method of moments (GMM) estimation has emerged over the past decade as providing a ready to use, flexible tool of application to a large number of econometric and economic models by relying on mild, plausible assumptions. The principal objective of this volume, the first devoted entirely to the GMM methodology, is to offer a complete and up to date presentation of the theory of GMM estimation as well as insights into the use of these methods in empirical studies. It is also designed to serve as a unified framework for teaching estimation theory in econometrics. Contributors to the volume include well-known authorities in the field based in North America, the UK/Europe, and Australia.

Now Covers Dielectric Materials in Practical Electromagnetic Devices The Method of Moments in Electromagnetics, Second Edition explains the solution of electromagnetic integral equations via the method of moments (MOM). While the first edition exclusively focused on integral equations for conducting problems, this edition extends the integral equation framework to treat objects having conducting as well as dielectric parts. New to the Second Edition Expanded treatment of coupled surface integral equations for conducting and composite conducting/dielectric objects, including objects having multiple dielectric regions with interfaces and junctions Updated topics to reflect current technology More material on the calculation of near fields Reformatted equations and improved figures Providing a bridge between theory and software implementation, the book incorporates sufficient background material and offers nuts-and-bolts implementation details. It first derives a generalized set of surface integral equations that can be used to treat problems with conducting and dielectric regions. Subsequent chapters solve these integral equations for progressively more difficult problems involving thin wires, bodies of revolution, and two- and three-dimensional bodies. After reading this book, students and researchers will be well equipped to understand more advanced MOM topics.

This book presents an efficient and robust method of modelling the magnetostatic properties of different technical elements, especially thin layers for magnetic sensors. The solutions presented utilise the principles of the method of moments. However, the principles have been developed both from the point of view of physical analyses as well as from the point of view of numerical optimisation. To enable cost-efficient use of the solutions for commercial applications in industry, the proposed method was implemented as a code optimised for use in the open-source OCTAVE environment. The scripts can be also used with MATLAB software, which is more user friendly, especially for less experienced users.

"Maximum likelihood estimation is a general method for estimating the parameters of econometric models from observed data. The principle of maximum likelihood plays a central role in the exposition of this book, since a number of estimators used in econometrics can be derived within this framework. Examples include ordinary least squares, generalized least squares and full-information maximum likelihood. In deriving the maximum likelihood estimator, a key concept is the joint probability density function (pdf) of the observed random variables, yt. Maximum likelihood estimation requires that the following conditions are satisfied. (1) The form of the joint pdf of yt is known. (2) The specification of the moments of the joint pdf are known. (3) The joint pdf can be evaluated for all values of the parameters, 9. Parts ONE and TWO of this book deal with models in which all these conditions are satisfied. Part THREE investigates models in which these conditions are not satisfied and considers four important cases. First, if the distribution of yt is misspecified, resulting in both conditions 1 and 2 being violated, estimation is by quasi-maximum likelihood (Chapter 9). Second, if condition 1 is not satisfied, a generalized method of moments estimator (Chapter 10) is required. Third, if condition 2 is not satisfied, estimation relies on nonparametric methods (Chapter 11). Fourth, if condition 3 is violated, simulation-based estimation methods are used (Chapter 12). 1.2 Motivating Examples To highlight the role of probability distributions in maximum likelihood estimation, this section emphasizes the link between observed sample data and 4 The Maximum Likelihood Principle the probability distribution from which they are drawn"--publisher.

Function theory, spectral decomposition of operators, probability, approximation, electrical and mechanical inverse problems, prediction of stochastic processes, the design of algorithms for signal-processing VLSI chips--these are among a host of important theoretical and applied topics illuminated by the classical moment problem. To survey some of these ramifications and the research which derives from them, the AMS sponsored the Short Course Moments in Mathematics at the Joint Mathematics Meetings, held in San Antonio, Texas, in January 1987. This volume contains the six lectures presented during that course. The papers are likely to find a wide audience, for they are expository, but nevertheless lead the reader to topics of current research. In his paper, Henry J. Landau sketches the main ideas of past work related to the moment problem by such mathematicians as Caratheodory, Herglotz, Schur, Riesz, and Krein and describes the way the moment problem has interconnected so many diverse areas of research. J. H. B. Kemperman examines the moment problem from a geometric viewpoint which involves a certain natural duality method and leads to interesting applications in linear programming, measure theory, and dilations. Donald Sarason first provides a brief review of the theory of unbounded self-adjoint operators then goes on to sketch the operator-theoretic treatment of the Hamburger problem and to discuss Hankel operators, the Adamjan-Arov-Krein approach, and the theory of unitary dilations. Exploring the interplay of trigonometric moment problems and signal processing, Thomas Kailath describes the role of Szego polynomials in linear predictive coding methods, parallel implementation, one-dimensional inverse scattering problems, and the Toeplitz moment matrices. Christian Berg contrasts the multi-dimensional moment problem with the one-dimensional theory and shows how the theory of the moment problem may be viewed as part of harmonic analysis on semigroups. Starting from a historical survey of the use of moments in probability and statistics, Persi Diaconis illustrates the continuing vitality of these methods in a variety of recent novel problems drawn from such areas as Wiener-Ito integrals, random graphs and matrices, Gibbs ensembles, cumulants and self-similar processes, projections of high-dimensional data, and empirical estimation.

Conceptual Econometrics Using R, Volume 41 provides state-of-the-art information on important topics in econometrics, including quantitative game theory, multivariate GARCH, stochastic frontiers, fractional responses, specification testing and model selection, exogeneity testing, causal analysis and forecasting, GMM models, asset bubbles and crises, corporate investments, classification, forecasting, nonstandard problems, cointegration, productivity and financial market jumps and co-jumps, among others. Presents chapters authored by distinguished, honored researchers who have received awards from the Journal of Econometrics or the Econometric Society Includes descriptions and links to resources and free open source R, allowing readers to not only use the tools on their own data, but also jumpstart their understanding of the state-of-the-art

Applied Underwater Acoustics meets the needs of scientists and engineers working in underwater acoustics and graduate students solving problems in, and preparing theses on, topics in underwater acoustics. The book is structured to provide the basis for rapidly assimilating the essential underwater acoustic knowledge base for practical application to daily research and analysis. Each chapter of the book is self-supporting and focuses on a single topic and its relation to underwater acoustics. The chapters start with a brief description of the topic's physical background, necessary definitions, and a short description of the applications, along with a roadmap to the chapter. The subtopics covered within individual subchapters include most frequently used equations that describe the topic. Equations are not derived, rather, assumptions behind equations and limitations on the applications of each equation are emphasized. Figures, tables, and illustrations related to the sub-topic are presented in an easy-to-use manner, and examples on the use of the equations, including appropriate figures and tables are also included. Provides a complete and up-to-date treatment of all major subjects of underwater acoustics Presents chapters written by recognized experts in their individual field Covers the fundamental knowledge scientists and engineers need to solve problems in underwater acoustics Illuminates, in shorter sub-chapters, the modern applications of underwater acoustics that are described in worked examples Demands no prior knowledge of underwater acoustics, and the physical principles and mathematics are designed to be readily understood by scientists, engineers, and graduate students of underwater acoustics Includes a comprehensive list of literature references for each chapter

The Method of Moments in Electromagnetics, Third Edition details the numerical solution of electromagnetic integral equations via the Method of Moments (MoM). Previous editions focused on the solution of radiation and scattering problems involving conducting, dielectric, and composite objects. This new edition adds a significant amount of material on new, state-of-the art compressive techniques. Included are new chapters on the Adaptive Cross Approximation (ACA) and Multi-Level Adaptive Cross Approximation (MLACA), advanced algorithms that permit a direct solution of the MoM linear system via LU decomposition in compressed form. Significant attention is paid to parallel software implementation of these methods on traditional central processing units (CPUs) as well as new, high performance graphics processing units (GPUs). Existing material on the Fast Multipole Method (FMM) and Multi-Level Fast Multipole Algorithm (MLFMA) is also updated, blending in elements of the ACA algorithm to further reduce their memory demands. The Method of Moments in Electromagnetics is intended for students, researchers, and industry experts working in the area of computational electromagnetics (CEM) and the MoM. Providing a bridge between theory and software implementation, the book incorporates significant background material, while presenting practical, nuts-and-bolts implementation details. It first derives a generalized set of surface integral equations used to treat electromagnetic radiation and scattering problems, for objects comprising conducting and dielectric regions. Subsequent chapters apply these integral equations for progressively more difficult problems such as thin wires, bodies of revolution, and two- and three-dimensional bodies. Radiation and scattering problems of many different types are considered, with numerical results compared against analytical theory as well as measurements.

This book provides the most comprehensive treatment to date of microeconometrics, the analysis of individual-level data on the economic behavior of individuals or firms using regression methods for cross section and panel data. The book is oriented to the practitioner. A basic understanding of the linear regression model with matrix algebra is assumed. The text can be used for a microeconometrics course, typically a second-year economics PhD course; for data-oriented applied microeconometrics field courses; and as a reference work for graduate students and applied researchers who wish to fill in gaps in their toolkit. Distinguishing features of the book include emphasis on nonlinear models and robust inference, simulation-based estimation, and problems of complex survey data. The book makes frequent use of numerical examples based on generated data to illustrate the key models and methods. More substantially, it systematically integrates into the text empirical illustrations based on seven large and exceptionally rich data sets.

This is the first text in a generation to re-examine the purpose of the mathematical statistics course. The book's approach interweaves traditional topics with data analysis and reflects the use of the computer with close ties to the practice of statistics. The author stresses analysis of data, examines real problems with real data, and motivates the theory. The book's descriptive statistics, graphical displays, and realistic applications stand in strong contrast to traditional texts that are set in abstract settings. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Specially selected from The New Palgrave Dictionary of Economics 2nd edition, each article within this compendium covers the fundamental themes within the discipline and is written by a leading practitioner in the field. A handy reference tool.

The Method of Moments in ElectromagneticsCRC Press

This book is devoted to biased sampling problems (also called choice-based sampling in Econometrics parlance) and over-identified parameter estimation problems. Biased sampling problems appear in many areas of research, including Medicine, Epidemiology and Public Health, the Social Sciences and Economics. The book addresses a range of important topics, including case and control studies, causal inference, missing data problems, meta-analysis, renewal process and length biased sampling problems, capture and recapture problems, case cohort studies, exponential tilting genetic mixture models etc. The goal of this book is to make it easier for Ph. D students and new researchers to get started in this research area. It will be of interest to all those who work in the health, biological, social and physical sciences, as well as those who are interested in survey methodology and other areas of statistical science, among others.

Electromagnetic wave scattering from randomly rough surfaces inthe presence of scatterers is an active, interdisciplinary area ofresearch with myriad practical applications in fields such asoptics, acoustics, geoscience and remote sensing. In this book, the Method of Moments (MoM) is applied to compute thefield scattered by scatterers such as canonical objects (cylinderor plate) or a randomly rough surface, and also by an object aboveor below a random rough surface. Since the problem is considered tobe 2D, the integral equations (IEs) are scalar and only the TE(transverse electric) and TM (transverse magnetic) polarizationsare addressed (no cross-polarizations occur). In Chapter 1, the MoMis applied to convert the IEs into a linear system, while Chapter 2compares the MoM with the exact solution of the field scattered bya cylinder in free space, and with the Physical Optics (PO)approximation for the scattering from a plate in free space.Chapter 3 presents numerical results, obtained from the MoM, of thecoherent and incoherent intensities scattered by a random roughsurface and an object below a random rough surface. The finalchapter presents the same results as in Chapter 3, but for anobject above a random rough surface. In these last two chapters,the coupling between the two scatterers is also studied in detailby inverting the impedance matrix by blocks. Contents 1. Integral Equations for a Single Scatterer: Method of Momentsand Rough Surfaces. 2. Validation of the Method of Moments for a SingleScatterer. 3. Scattering from Two Illuminated Scatterers. 4. Scattering from Two Scatterers Where Only One isIlluminated. Appendix. Matlab Codes. About the Authors Christophe Bourlier works at the IETR (Institutd'Electronique et de Télécommunications de Rennes)laboratory at Polytech Nantes (University of Nantes, France) aswell as being a Researcher at the French National Center forScientific Research (CNRS) on electromagnetic wave scattering fromrough surfaces and objects for remote sensing applications andradar signatures. He is the author of more than 160 journalarticles and conference papers. Nicolas Pinel is currently working as a Research Engineer at theIETR laboratory at Polytech Nantes and is about to join AlyotechTechnologies in Rennes, France. His research interests are in theareas of radar and optical remote sensing, scattering andpropagation. In particular, he works on asymptotic methods ofelectromagnetic wave scattering from random rough surfaces andlayers. Gildas Kubické is in charge of the “Expertise inelectroMagnetism and Computation” (EMC) laboratory at the DGA(Direction Générale de l'Armement), French Ministryof Defense, where he works in the field of radar signatures andelectromagnetic stealth. His research interests includeelectromagnetic scattering and radar cross-section modeling.

The environmental sciences are undergoing a revolution in the use of models and data. Facing ecological data sets of unprecedented size and complexity, environmental scientists are struggling to understand and exploit powerful new statistical tools for making sense of ecological processes. In Models for Ecological Data, James Clark introduces ecologists to these modern methods in modeling and computation. Assuming only basic courses in calculus and statistics, the text introduces readers to basic maximum likelihood and then works up to more advanced topics in Bayesian modeling and computation. Clark covers both classical statistical approaches and powerful new computational tools and describes how complexity can motivate a shift from classical to Bayesian methods. Through an available lab manual, the book introduces readers to the practical work of data modeling and computation in the language R. Based on a successful course at Duke University and National Science Foundation-funded institutes on hierarchical modeling, Models for Ecological Data will enable ecologists and other environmental scientists to develop useful models that make sense of ecological data. Consistent treatment from classical to modern Bayes Underlying distribution theory to algorithm development Many examples and applications Does not assume statistical background Extensive supporting appendixes Lab manual in R is available separately

This book covers recent developments in correlated data analysis, using the class of dispersion models as marginal components in the formulation of joint models for correlated data. Much new material is covered here that you won't find elsewhere.

Responding to the need for a clear, up-to-date introduction to the field, The Method of Moments in Electromagnetics explores surface integral equations in electromagnetics and presents their numerical solution using the method of moments (MOM) technique. It provides the numerical implementation aspects at a nuts-and-bolts level while discuss

The beta distribution is useful in modeling continuous random variables that lie between 0 and 1, such as proportions and percentages. The beta distribution takes on many different shapes and may be described by two shape parameters, alpha and [beta], that can be difficult to estimate. Maximum likelihood and method of moments estimation are

possible, though method of moments is much more straightforward. We examine both of these methods here, and compare them to three more proposed methods of parameter estimation: 1) a method used in the Program Evaluation and Review Technique (PERT), 2) a modification of the two-sided power distribution (TSP), and 3) a quantile estimator based on the first and third quartiles of the beta distribution. We find the quantile estimator performs as well as maximum likelihood and method of moments estimators for most beta distributions. The PERT and TSP estimators do well for a smaller subset of beta distributions, though they never outperform the maximum likelihood, method of moments, or quantile estimators. We apply these estimation techniques to two data sets to see how well they approximate real data from Major League Baseball (batting averages) and the U.S. Department of Energy (radiation exposure). We find the maximum likelihood, method of moments, and quantile estimators perform well with batting averages (sample size 160), and the method of moments and quantile estimators perform well with radiation exposure proportions (sample size 20). Maximum likelihood estimators would likely do fine with such a small sample size were it not for the iterative method needed to solve for alpha and beta, which is quite sensitive to starting values. The PERT and TSP estimators do more poorly in both situations. We conclude that in addition to maximum likelihood and method of moments estimation, our method of quantile estimation is efficient and accurate in estimating parameters of the beta distribution.
The Encyclopedia of Statistical Sciences is designed to be an essential reference work on statistical methods and their application to virtually all facets of human endeavor. Its scope covers all principle subfields of statistical science, including probability theory, statistical distribution theory, computational methods, sampling survey methods, decision theory, sequential analysis, and multivariable analysis. It also deals with the application of modern-day statistics to agriculture, economics, censuses, health science, computers, demography, statistical mechanics, engineering, crystallography, geology, zoology, anthropology and scores of other disciplines that utilize statistics as a vital matter of course. These volumes provide in-depth coverage of the philosophical foundations, theoretical bases and computational techniques of statistical methods in such a variety of contexts. The contributions are authored by some of the world's most distinguished statisticians and are completely up-to-date.
In this book the author surveys new techniques in econometrics which may be used to analyse semiparametric models. As well as covering topics such as instrumental variable estimation, nonparametric density and regression function estimation and semiparametric limited dependent variable models, the book provides details of how these methods may be implemented using software.