

## A Modern Theory Of Factorial Design Springer Series In Statistics

Praise for the First Edition: "If you ... want an up-to-date, definitive reference written by authors who have contributed much to this field, then this book is an essential addition to your library." –Journal of the American Statistical Association

**A COMPREHENSIVE REVIEW OF MODERN EXPERIMENTAL DESIGN** Experiments: Planning, Analysis, and Optimization, Third Edition provides a complete discussion of modern experimental design for product and process improvement—the design and analysis of experiments and their applications for system optimization, robustness, and treatment comparison. While maintaining the same easy-to-follow style as the previous editions, this book continues to present an integrated system of experimental design and analysis that can be applied across various fields of research including engineering, medicine, and the physical sciences. New chapters provide modern updates on practical optimal design and computer experiments, an explanation of computer simulations as an alternative to physical experiments. Each chapter begins with a real-world example of an experiment followed by the methods required to design that type of experiment. The chapters conclude with an application of the methods to the experiment, bridging the gap between theory and practice. The authors modernize accepted methodologies while refining many cutting-edge topics including robust parameter design, analysis of non-normal data, analysis of experiments with complex aliasing, multilevel designs, minimum aberration designs, and orthogonal arrays. The third edition includes:

- Information on the design and analysis of computer experiments
- A discussion of practical optimal design of experiments
- An introduction to conditional main effect (CME) analysis and definitive screening designs (DSDs)
- New exercise problems

This book includes valuable exercises and problems, allowing the reader to gauge their progress and retention of the book's subject matter as they complete each chapter. Drawing on examples from their combined years of working with industrial clients, the authors present many cutting-edge topics in a single, easily accessible source. Extensive case studies, including goals, data, and experimental designs, are also included, and the book's data sets can be found on a related FTP site, along with additional supplemental material. Chapter summaries provide a succinct outline of discussed methods, and extensive appendices direct readers to resources for further study.

Experiments: Planning, Analysis, and Optimization, Third Edition is an excellent book for design of experiments courses at the upper-undergraduate and graduate levels. It is also a valuable resource for practicing engineers and statisticians.

This volume is the first book-length treatment of model-based geostatistics. The text is expository, emphasizing statistical methods and applications rather than the underlying mathematical theory. Analyses of datasets from a range of scientific contexts

feature prominently, and simulations are used to illustrate theoretical results. Readers can reproduce most of the computational results in the book by using the authors' software package, geoR, whose usage is illustrated in a computation section at the end of each chapter. The book assumes a working knowledge of classical and Bayesian methods of inference, linear models, and generalized linear models.

Exponential smoothing methods have been around since the 1950s, and are still the most popular forecasting methods used in business and industry. However, a modeling framework incorporating stochastic models, likelihood calculation, prediction intervals and procedures for model selection, was not developed until recently. This book brings together all of the important new results on the state space framework for exponential smoothing. It will be of interest to people wanting to apply the methods in their own area of interest as well as for researchers wanting to take the ideas in new directions. Part 1 provides an introduction to exponential smoothing and the underlying models. The essential details are given in Part 2, which also provide links to the most important papers in the literature. More advanced topics are covered in Part 3, including the mathematical properties of the models and extensions of the models for specific problems. Applications to particular domains are discussed in Part 4.

This book is the reference on indirect sampling and the generalised weight share method. It reviews the different developments done by the author on these subjects. In addition to the underlying theory, the book presents different possible applications that drive its interest. The reader will find in this book the answer to questions that come, inevitably, when working in a context of indirect sampling.

Simulation and Inference for Stochastic Differential Equations

Optimum Experimental Designs, With SAS

Foundations, Models, and Applications

Model-based Geostatistics

Statistical and Computational Techniques in Manufacturing

Design and Analysis of Experiments

***A Modern Theory of Factorial Design Springer***

***In recent years, interest in developing statistical and computational techniques for applied manufacturing engineering has been increased. Today, due to the great complexity of manufacturing engineering and the high number of parameters used, conventional approaches are no longer sufficient. Therefore, in manufacturing, statistical and computational techniques have achieved several applications, namely, modelling and simulation manufacturing processes, optimization manufacturing parameters, monitoring and control, computer-aided process planning, etc. The present book aims to provide recent information on statistical and computational techniques applied in manufacturing engineering. The content is suitable for final undergraduate engineering courses or as a subject on manufacturing at the postgraduate level. This book serves as a***

**useful reference for academics, statistical and computational science researchers, mechanical, manufacturing and industrial engineers, and professionals in industries related to manufacturing engineering.**

**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.**

**This book is devoted to the study of univariate distributions appropriate for the analyses of data known to be nonnegative. The book includes much material from reliability theory in engineering and survival analysis in medicine.**

**AMSTAT News**

**Statistics for Chemical and Process Engineers**

**Tables of Spectral Data for Structure Determination of Organic Compounds**

**Gröbner Bases**

**Configural Frequency Analysis**

**Multiple Testing Procedures with Applications to Genomics**

This highly useful book contains methodology for the analysis of data that arise from multiscale processes. It brings together a number of recent developments and makes them accessible to a wider audience. Taking a Bayesian approach allows for full accounting of uncertainty, and also addresses the delicate issue of uncertainty at multiple scales. These methods can handle different amounts of prior knowledge at different scales, as often occurs in practice. Unlike other books on the modeling and analysis of experimental data, *Design and Analysis of Experiments: Classical and Regression Approaches with SAS* not only covers classical experimental design theory, it also explores regression approaches. Capitalizing on the availability of cutting-edge software, the author uses both manual methods and SAS programs to carry out analyses. The book presents most of the different designs covered in a typical experimental design course. It discusses the requirements for good experimentation, the completely randomized design, the use of orthogonal contrast to test hypotheses, and the

model adequacy check. With an emphasis on two-factor factorial experiments, the author analyzes repeated measures as well as fixed, random, and mixed effects models. He also describes designs with randomization restrictions, before delving into the special cases of the  $2^k$  and  $3^k$  factorial designs, including fractional replication and confounding. In addition, the book covers response surfaces, balanced incomplete block and hierarchical designs, ANOVA, ANCOVA, and MANOVA. Fortifying the theory and computations with practical exercises and supplemental material, this distinctive text provides a modern, comprehensive treatment of experimental design and analysis.

Bringing together both new and old results, *Theory of Factorial Design: Single- and Multi-Stratum Experiments* provides a rigorous, systematic, and up-to-date treatment of the theoretical aspects of factorial design. To prepare readers for a general theory, the author first presents a unified treatment of several simple designs, including completely randomized designs, block designs, and row-column designs. As such, the book is accessible to readers with minimal exposure to experimental design. With exercises and numerous examples, it is suitable as a reference for researchers and as a textbook for advanced graduate students. In addition to traditional topics and a thorough discussion of the popular minimum aberration criterion, the book covers many topics and new results not found in existing books. These include results on the structures of two-level resolution IV designs, methods for constructing such designs beyond the familiar foldover method, the extension of minimum aberration to nonregular designs, the equivalence of generalized minimum aberration and minimum moment aberration, a Bayesian approach, and some results on nonregular designs. The book also presents a theory that provides a unifying framework for the design and analysis of factorial experiments with multiple strata (error terms) arising from complicated structures of the experimental units. This theory can be systematically applied to various structures of experimental units instead of treating each on a case-by-case basis.

In a manner accessible to beginning undergraduates, *An Invitation to Modern Number Theory* introduces many of the central problems, conjectures, results, and techniques of the field, such as the Riemann Hypothesis, Roth's Theorem,

the Circle Method, and Random Matrix Theory. Showing how experiments are used to test conjectures and prove theorems, the book allows students to do original work on such problems, often using little more than calculus (though there are numerous remarks for those with deeper backgrounds). It shows students what number theory theorems are used for and what led to them and suggests problems for further research. Steven Miller and Ramin Takloo-Bighash introduce the problems and the computational skills required to numerically investigate them, providing background material (from probability to statistics to Fourier analysis) whenever necessary. They guide students through a variety of problems, ranging from basic number theory, cryptography, and Goldbach's Problem, to the algebraic structures of numbers and continued fractions, showing connections between these subjects and encouraging students to study them further. In addition, this is the first undergraduate book to explore Random Matrix Theory, which has recently become a powerful tool for predicting answers in number theory. Providing exercises, references to the background literature, and Web links to previous student research projects, *An Invitation to Modern Number Theory* can be used to teach a research seminar or a lecture class.

Experiments

Planning, Analysis, and Optimization

Encyclopedia of Research Design

A Modern Theory of Factorial Design

Semiparametric Theory and Missing Data

Replication and Evidence Factors in Observational Studies

*The idea of the Gröbner basis first appeared in a 1927 paper by F. S. Macaulay, who succeeded in creating a combinatorial characterization of the Hilbert functions of homogeneous ideals of the polynomial ring. Later, the modern definition of the Gröbner basis was independently introduced by Heisuke Hironaka in 1964 and Bruno Buchberger in 1965. However, after the discovery of the notion of the Gröbner basis by Hironaka and Buchberger, it was not actively pursued for 20 years. A breakthrough was made in the mid-1980s by David Bayer and Michael Stillman, who created the Macaulay computer algebra system with the help of the Gröbner basis. Since then, rapid development on the Gröbner basis has been achieved by many researchers, including Bernd Sturmfels. This book serves as a standard bible of the Gröbner basis, for which the harmony of theory, application, and computation are indispensable. It provides all the fundamentals for graduate students to learn the ABC's of the Gröbner basis, requiring no special knowledge to understand those basic points. Starting from the*

introductory performance of the Gröbner basis (Chapter 1), a trip around mathematical software follows (Chapter 2). Then comes a deep discussion of how to compute the Gröbner basis (Chapter 3). These three chapters may be regarded as the first act of a mathematical play. The second act opens with topics on algebraic statistics (Chapter 4), a fascinating research area where the Gröbner basis of a toric ideal is a fundamental tool of the Markov chain Monte Carlo method. Moreover, the Gröbner basis of a toric ideal has had a great influence on the study of convex polytopes (Chapter 5). In addition, the Gröbner basis of the ring of differential operators gives effective algorithms on holonomic functions (Chapter 6). The third act (Chapter 7) is a collection of concrete examples and problems for Chapters 4, 5 and 6 emphasizing computation by using various software systems.

Outside of randomized experiments, association does not imply causation, and yet there is nothing defective about our knowledge that smoking causes lung cancer, a conclusion reached in the absence of randomized experimentation with humans. How is that possible? If observed associations do not identify causal effects in observational studies, how can a sequence of such associations become decisive? Two or more associations may each be susceptible to unmeasured biases, yet not susceptible to the same biases. An observational study has two evidence factors if it provides two comparisons susceptible to different biases that may be combined as if from independent studies of different data by different investigators, despite using the same data twice. If the two factors concur, then they may exhibit greater insensitivity to unmeasured biases than either factor exhibits on its own. *Replication and Evidence Factors in Observational Studies* includes four parts: A concise introduction to causal inference, making the book self-contained Practical examples of evidence factors from the health and social sciences with analyses in R The theory of evidence factors Study design with evidence factors A companion R package *evident* is available from CRAN.

"Comprising more than 500 entries, the *Encyclopedia of Research Design* explains how to make decisions about research design, undertake research projects in an ethical manner, interpret and draw valid inferences from data, and evaluate experiment design strategies and results. Two additional features carry this encyclopedia far above other works in the field: bibliographic entries devoted to significant articles in the history of research design and reviews of contemporary tools, such as software and statistical procedures, used to analyze results. It covers the spectrum of research design strategies, from material presented in introductory classes to topics necessary in graduate research; it addresses cross- and multidisciplinary research needs, with many examples drawn from the social and behavioral sciences, neurosciences, and biomedical and life sciences; it provides summaries of advantages and disadvantages of often-used strategies; and it uses hundreds of sample tables, figures, and equations based on real-life cases."--Publisher's description.

Praise for the First Edition: "If you . . . want an up-to-date,

*definitive reference written by authors who have contributed much to this field, then this book is an essential addition to your library."*  
—*Journal of the American Statistical Association* Fully updated to reflect the major progress in the use of statistically designed experiments for product and process improvement, *Experiments, Second Edition* introduces some of the newest discoveries—and sheds further light on existing ones—on the design and analysis of experiments and their applications in system optimization, robustness, and treatment comparison. Maintaining the same easy-to-follow style as the previous edition while also including modern updates, this book continues to present a new and integrated system of experimental design and analysis that can be applied across various fields of research including engineering, medicine, and the physical sciences. The authors modernize accepted methodologies while refining many cutting-edge topics including robust parameter design, reliability improvement, analysis of non-normal data, analysis of experiments with complex aliasing, multilevel designs, minimum aberration designs, and orthogonal arrays. Along with a new chapter that focuses on regression analysis, the *Second Edition* features expanded and new coverage of additional topics, including: Expected mean squares and sample size determination One-way and two-way ANOVA with random effects Split-plot designs ANOVA treatment of factorial effects Response surface modeling for related factors Drawing on examples from their combined years of working with industrial clients, the authors present many cutting-edge topics in a single, easily accessible source. Extensive case studies, including goals, data, and experimental designs, are also included, and the book's data sets can be found on a related FTP site, along with additional supplemental material. Chapter summaries provide a succinct outline of discussed methods, and extensive appendices direct readers to resources for further study. *Experiments, Second Edition* is an excellent book for design of experiments courses at the upper-undergraduate and graduate levels. It is also a valuable resource for practicing engineers and statisticians.

*Structure of Nonparametric, Semiparametric, and Parametric Families*  
*A Modern Approach*

*The State Space Approach*

*Design and Analysis of Simulation Experiments*

*A Bayesian Perspective*

*Essays in Honor of D. Basu*

This book establishes the theoretical foundations of a general methodology for multiple hypothesis testing and discusses its software implementation in R and SAS. These are applied to a range of problems in biomedical and genomic research, including identification of differentially expressed and co-expressed genes in high-throughput gene expression experiments; tests of association between gene expression measures and biological annotation metadata; sequence analysis; and genetic mapping of complex traits using single nucleotide polymorphisms. The procedures are based on a test statistics joint null distribution and provide Type I error control in testing problems involving general data generating distributions, null hypotheses, and test statistics.

In conjunction with top survey researchers around the world and with Nielsen Media Research serving as the corporate sponsor, the Encyclopedia of Survey Research Methods presents state-of-the-art information and methodological examples from the field of survey research. Although there are other "how-to" guides and references texts on survey research, none is as comprehensive as this Encyclopedia, and none presents the material in such a focused and approachable manner. With more than 600 entries, this resource uses a Total Survey Error perspective that considers all aspects of possible survey error from a cost-benefit standpoint.

Simulation is a widely used methodology in all Applied Science disciplines. This textbook focuses on this crucial phase in the overall process of applying simulation, and includes the best of both classic and modern methods of simulation experimentation. This book will be the standard reference book on the topic for both researchers and sophisticated practitioners, and it will be used as a textbook in courses or seminars focusing on this topic.

The last twenty years have witnessed a significant growth of interest in optimal factorial designs, under possible model uncertainty, via the minimum aberration and related criteria. This book gives, for the first time in book form, a comprehensive and up-to-date account of this modern theory. Many major classes of designs are covered in the book. While maintaining a high level of mathematical rigor, it also provides extensive design tables for research and practical purposes. Apart from being useful to researchers and practitioners, the book can form the core of a graduate level course in experimental design.

Handbook of Design and Analysis of Experiments

Current Issues in Statistical Inference

Statistical Decision Theory

Linear and Generalized Linear Mixed Models and Their Applications

Information Criteria and Statistical Modeling

An Invitation to Modern Number Theory

*Using real-world data examples, this authoritative book shows how to use the latest configural frequency analysis (CFA) techniques to analyze categorical data. Some of the techniques are presented here for the first time. In contrast to methods that focus on relationships among variables, such as log-linear modeling, CFA allows researchers to evaluate differences and change at the level of individual cells in a table. Illustrated are ways to identify and test for cell configurations that are either consistent with or contrary to hypothesized patterns (the types and antitypes of CFA); control for potential covariates that might influence observed results; develop innovative prediction models; address questions of moderation and mediation; and analyze intensive longitudinal data. The book also describes free software applications for executing CFA.*

*This volume collects the extended versions of papers presented at the SIS Conference "Statistics and Data Science: new challenges, new generations", held in Florence, Italy on June 28-30, 2017. Highlighting the central role of statistics and data analysis methods in the era of Data Science, the contributions offer an essential overview of the latest developments in various areas of statistics research. The 35 contributions have been divided into six parts, each of which focuses on a core area contributing to "Data Science". The book covers topics including strong statistical methodologies, Bayesian*



*approaches, applications in population and social studies, studies in economics and finance, techniques of sample design and mathematical statistics. Though the book is mainly intended for researchers interested in the latest frontiers of Statistics and Data Analysis, it also offers valuable supplementary material for students of the disciplines dealt with here. Lastly, it will help Statisticians and Data Scientists recognize their counterparts' fundamental role.*

*This book covers two major classes of mixed effects models, linear mixed models and generalized linear mixed models. It presents an up-to-date account of theory and methods in analysis of these models as well as their applications in various fields. The book offers a systematic approach to inference about non-Gaussian linear mixed models.*

*Furthermore, it includes recently developed methods, such as mixed model diagnostics, mixed model selection, and jackknife method in the context of mixed models. The book is aimed at students, researchers and other practitioners who are interested in using mixed models for statistical data analysis.*

*This book summarizes current knowledge regarding the theory of estimation for semiparametric models with missing data, in an organized and comprehensive manner. It starts with the study of semiparametric methods when there are no missing data. The description of the theory of estimation for semiparametric models is both rigorous and intuitive, relying on geometric ideas to reinforce the intuition and understanding of the theory. These methods are then applied to problems with missing, censored, and coarsened data with the goal of deriving estimators that are as robust and efficient as possible.*

*Classical and Regression Approaches with SAS*

*Journal of Economic Literature*

*Correlated Data Analysis: Modeling, Analytics, and Applications*

*Single- and Multi-Stratum Experiments*

*Theory of Factorial Design*

This book covers recent developments in correlated data analysis. It utilizes the class of dispersion models as marginal components in the formulation of joint models for correlated data. This enables the book to cover a broader range of data types than the traditional generalized linear models. The reader is provided with a systematic treatment for the topic of estimating functions, and both generalized estimating equations (GEE) and quadratic inference functions (QIF) are studied as special cases. In addition to the discussions on marginal models and mixed-effects models, this book covers new topics on joint regression analysis based on Gaussian copulas.

Although numerical data are, in principle, universal, the compilations presented in this book are extensively annotated and interleaved with text. This translation of the second German edition has been prepared to facilitate the use of this work, with all its valuable detail, by the large community of English-speaking scientists. Translation has also provided an opportunity to correct and revise the text, and to update the nomenclature. Fortunately, spectroscopic data and their relationship with structure do not change much with time so one can predict that this book will, for a long period of time, continue to be very useful to organic chemists involved in the identification of organic

compounds or the elucidation of their structure. Klaus Biemann Cambridge, MA, April 1983 Preface to the First German Edition Making use of the information provided by various spectroscopic techniques has become a matter of routine for the analytically oriented organic chemist. Those who have graduated recently received extensive training in these techniques as part of the curriculum while their older colleagues learned to use these methods by necessity. One can, therefore, assume that chemists are well versed in the proper choice of the methods suitable for the solution of a particular problem and to translate the experimental data into structural information. A complete and well-balanced introduction to modern experimental design Using current research and discussion of the topic along with clear applications, Modern Experimental Design highlights the guiding role of statistical principles in experimental design construction. This text can serve as both an applied introduction as well as a concise review of the essential types of experimental designs and their applications. Topical coverage includes designs containing one or multiple factors, designs with at least one blocking factor, split-unit designs and their variations as well as supersaturated and Plackett-Burman designs. In addition, the text contains extensive treatment of: Conditional effects analysis as a proposed general method of analysis Multiresponse optimization Space-filling designs, including Latin hypercube and uniform designs Restricted regions of operability and debarred observations Analysis of Means (ANOM) used to analyze data from various types of designs The application of available software, including Design-Expert, JMP, and MINITAB This text provides thorough coverage of the topic while also introducing the reader to new approaches. Using a large number of references with detailed analyses of datasets, Modern Experimental Design works as a well-rounded learning tool for beginners as well as a valuable resource for practitioners.

Statistical modeling is a critical tool in scientific research. This book provides comprehensive explanations of the concepts and philosophy of statistical modeling, together with a wide range of practical and numerical examples. The authors expect this work to be of great value not just to statisticians but also to researchers and practitioners in various fields of research such as information science, computer science, engineering, bioinformatics, economics, marketing and environmental science. It's a crucial area of study, as statistical models are used to understand phenomena with uncertainty and to determine the structure of complex systems. They're also used to control such systems, as well as to make reliable predictions in various natural and social science fields.

Mathematical Statistics

Statistics and Software Systems

New Statistical Developments in Data Science

Advances in Configural Frequency Analysis

Forecasting with Exponential Smoothing

SIS 2017, Florence, Italy, June 28-30

*This book requires knowledge of probability theory (combinatorics, probability distributions, functions and sequences of random variables) which is typically taught in the earlier semesters of scientific and mathematical study courses. After the basic ideas of mathematical statistics, Mathematical Statistics gives an introduction to point estimation, confidence intervals and statistical tests. Based on the general theory of linear models, the book provides an in-depth overview of the*

*following: Analysis of variance for models with fixed, random and mixed effects Regression analysis is also first presented for linear models with fixed, random and mixed effects before being expanded to nonlinear models. Statistical multi-decision problems like statistical selection procedures (Bechhofer and Gupta) and sequential tests Design of experiments from a mathematical-statistical point of view. The chapters also contain exercises with hints for solutions.*

*For advanced graduate students, this book is a one-stop shop that presents the main ideas of decision theory in an organized, balanced, and mathematically rigorous manner, while observing statistical relevance. All of the major topics are introduced at an elementary level, then developed incrementally to higher levels. The book is self-contained as it provides full proofs, worked-out examples, and problems. The authors present a rigorous account of the concepts and a broad treatment of the major results of classical finite sample size decision theory and modern asymptotic decision theory. With its broad coverage of decision theory, this book fills the gap between standard graduate texts in mathematical statistics and advanced monographs on modern asymptotic theory.*

*Experiments in the field and in the laboratory cannot avoid random error and statistical methods are essential for their efficient design and analysis. Authored by leading experts in key fields, this text provides many examples of SAS code, results, plots and tables, along with a fully supported website.*

*Handbook of Design and Analysis of Experiments provides a detailed overview of the tools required for the optimal design of experiments and their analyses. The handbook gives a unified treatment of a wide range of topics, covering the latest developments. This carefully edited collection of 25 chapters in seven sections synthesizes the state of the art in the theory and applications of designed experiments and their analyses. Written by leading researchers in the field, the chapters offer a balanced blend of methodology and applications. The first section presents a historical look at experimental design and the fundamental theory of parameter estimation in linear models. The second section deals with settings such as response surfaces and block designs in which the response is modeled by a linear model, the third section covers designs with multiple factors (both treatment and blocking factors), and the fourth section presents optimal designs for generalized linear models, other nonlinear models, and spatial models. The fifth section addresses issues involved in designing various computer experiments. The sixth section explores "cross-cutting" issues relevant to all experimental designs, including robustness and algorithms. The final section illustrates the application of experimental design in recently developed areas. This comprehensive handbook equips new researchers with a broad understanding of the field's numerous techniques and applications. The book is also a valuable reference for more experienced research statisticians working in engineering and manufacturing, the basic sciences, and any discipline that depends on controlled experimental investigation.*

*Estimation, Testing, and Selection*

*Incomplete Block Designs*

*Proceedings of the XV International Scientific Conference on Industrial Systems (IS'11)*

*Life Distributions*

*Indirect Sampling*

*Encyclopedia of Survey Research Methods*

**A coherent, concise and comprehensive course in the statistics**

*needed for a modern career in chemical engineering; covers all of the concepts required for the American Fundamentals of Engineering examination. This book shows the reader how to develop and test models, design experiments and analyse data in ways easily applicable through readily available software tools like MS Excel® and MATLAB®. Generalized methods that can be applied irrespective of the tool at hand are a key feature of the text. The reader is given a detailed framework for statistical procedures covering: · data visualization; · probability; · linear and nonlinear regression; · experimental design (including factorial and fractional factorial designs); and · dynamic process identification. Main concepts are illustrated with chemical- and process-engineering-relevant examples that can also serve as the bases for checking any subsequent real implementations. Questions are provided (with solutions available for instructors) to confirm the correct use of numerical techniques, and templates for use in MS Excel and MATLAB can also be downloaded from [extras.springer.com](http://extras.springer.com). With its integrative approach to system identification, regression and statistical theory, *Statistics for Chemical and Process Engineers* provides an excellent means of revision and self-study for chemical and process engineers working in experimental analysis and design in petrochemicals, ceramics, oil and gas, automotive and similar industries and invaluable instruction to advanced undergraduate and graduate students looking to begin a career in the process industries.*

*This unique book provides a comprehensive and detailed coverage of configural frequency analysis (CFA), the most useful method of analysis of categorical data in person-oriented research. It presents the foundations, methods, and models of CFA and features numerous empirical data examples from a range of disciplines that can be reproduced by the readers. It also addresses computer applications, including relevant R packages and modules. Configural frequency analysis is a statistical method that allows the processing of important and interesting questions in categorical data. The perspective of CFA differs from the usual perspective of relations among variables; its focus is on patterns of variable categories that stand out with respect to specific hypotheses, and as such, CFA allows for testing numerous substantive hypotheses. The book describes the origins of CFA and their relation to chi-square analysis as well as the developments that are based on log-linear modeling. The models covered range from simple models of variable independence to complex models that are needed when causal hypotheses are tested. Empirical data examples are provided for each model. New models are introduced for person-oriented mediation analysis and*

*locally optimized time series analysis, and new results concerning the characteristics of CFA methods are bolstered using Monte Carlo simulations. Primarily intended for researchers and students in the social and behavioral sciences, the book will also appeal to anyone who deals with categorical data from a person-centered perspective.*

*This book covers a highly relevant and timely topic that is of wide interest, especially in finance, engineering and computational biology. The introductory material on simulation and stochastic differential equation is very accessible and will prove popular with many readers. While there are several recent texts available that cover stochastic differential equations, the concentration here on inference makes this book stand out. No other direct competitors are known to date. With an emphasis on the practical implementation of the simulation and estimation methods presented, the text will be useful to practitioners and students with minimal mathematical background. What's more, because of the many R programs, the information here is appropriate for many mathematically well educated practitioners, too.*

*Multiscale Modeling*

*With R Examples*

*Modern Experimental Design*

*Finite Mixture and Markov Switching Models*