



Linear Models in Statistics

By Alvin C. Rencher, G. Bruce Schaalje

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The essential introduction to the theory and application of linear models—now in a valuable new edition

Since most advanced statistical tools are generalizations of the linear model, it is necessary to first master the linear model in order to move forward to more advanced concepts. The linear model remains the main tool of the applied statistician and is central to the training of any statistician regardless of whether the focus is applied or theoretical. This completely revised and updated new edition successfully develops the basic theory of linear models for regression, analysis of variance, analysis of covariance, and linear mixed models. Recent advances in the methodology related to linear mixed models, generalized linear models, and the Bayesian linear model are also addressed.

Linear Models in Statistics, Second Edition includes full coverage of advanced topics, such as mixed and generalized linear models, Bayesian linear models, two-way models with empty cells, geometry of least squares, vector-matrix calculus, simultaneous inference, and logistic and nonlinear regression. Algebraic, geometrical, frequentist, and Bayesian approaches to both the inference of linear models and the analysis of variance are also illustrated. Through the expansion of relevant material and the inclusion of the latest technological developments in the field, this book provides readers with the theoretical foundation to correctly interpret computer software output as well as effectively use, customize, and understand linear models.

This modern Second Edition features:

- New chapters on Bayesian linear models as well as random and mixed linear models
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- Additional sections on the geometry of least squares
- Updated coverage of simultaneous inference

The book is complemented with easy-to-read proofs, real data sets, and an extensive bibliography. A thorough review of the requisite matrix algebra has been added for transitional purposes, and numerous theoretical and applied problems have been incorporated with selected answers provided at the end of the book. A related Web site includes additional data sets and SAS® code for all

numerical examples.

Linear Model in Statistics, Second Edition is a must-have book for courses in statistics, biostatistics, and mathematics at the upper-undergraduate and graduate levels. It is also an invaluable reference for researchers who need to gain a better understanding of regression and analysis of variance.

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Editorial Review

Review

"This indeed clearly written book will do great service for advanced undergraduate and also for PhD students." (*International Statistical Review*, December 2008)

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"This well-written book represents various topics on linear models with great clarity in an easy-to-understand style." (*CHOICE*, Aug 2008)

From the Back Cover

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About the Author

Alvin C. Rencher, PhD, is Professor of Statistics at Brigham Young University. Dr. Rencher is a Fellow of the American Statistical Association and the author of *Methods of Multivariate Analysis* and *Multivariate Statistical Inference and Applications*, both published by Wiley.

G. Bruce Schaalje, PhD, is Professor of Statistics at Brigham Young University. He has authored over 120 journal articles in his areas of research interest, which include mixed linear models, small sample inference, and design of experiments.

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