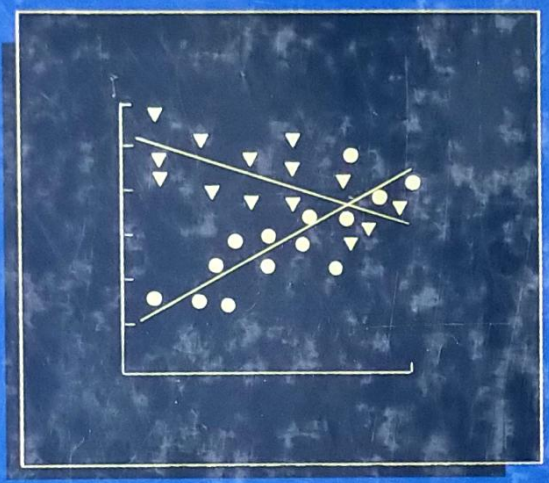
APPLIED LINEAR STATISTICAL MODELS

FOURTH EDITION



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FOURTH EDITION

Applied Linear Statistical Models

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Preface

Linear statistical models for regression, analysis of variance, and experimental designs are widely used today in business administration, economics, engineering, and the social, health, and biological sciences. Successful applications of these models require a sound understanding of both the underlying theory and the practical problems that are encountered in using the models in real-life situations. While *Applied Linear Statistical Models,* Fourth Edition, is basically an applied book, it seeks to blend theory and applications effectively, avoiding the extremes of presenting theory in isolation and of giving elements of applications without the needed understanding of the theoretical foundations.

The fourth edition differs from the third in a number of important respects.

1. In the area of regression analysis, we have reorganized the chapters in order to get to multiple linear regression analysis more quickly. Old Chapter 1 on basic results in probability and statistics has been placed in Appendix A, old Chapter 9 on polynomial regression has been interwoven in the discussion of multiple linear regression, and old Chapter 10 on qualitative predictor variables now comes after a full discussion of multiple regression model building and diagnostics.

We have expanded substantially the discussion of diagnostics and remedial measures. In Chapters 3 and 10, we have added robust tests for constancy of the error variance, smoothing techniques to explore the shape of the regression function, robust regression and nonparametric regression techniques, bootstrapping methods for evaluating the precision of sample estimates for complex situations, and estimation of the variance and standard deviation functions to obtain weights for weighted least squares.

2. We have retained the three chapters on nonlinear regression, logistic regression, and correlation analysis that were dropped from the third edition. Chapter 14 has been extensively revised and expanded to include an introduction to polytomous logistic regression, Poisson regression, and generalized linear models, as well as greater coverage of diagnostic procedures using the model deviance, deviance residuals, and simulated envelopes.

3. In the area of analysis of variance and experimental designs, we have added new Chapters 31 and 32 on fractional factorial designs and response surface method-

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Study Designs