Springer Series in Statistics

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Vector Generalized Linear and Additive Models

With an Implementation in R

This book presents a statistical framework that expands generalized linear models (GLMs) for regression modelling. The framework shared in this book allows analyses based on many semi-traditional applied statistics models to be performed as a coherent whole. This is possible through the approximately half-a-dozen major classes of statistical models included in the book and the software infrastructure component, which makes the models easily operable.

The book's methodology and accompanying software (the extensive VGAM R package) are directed at these limitations, and this is the first time the methodology and software are covered comprehensively in one volume. Since their advent in 1972, GLMs have unified important distributions under a single umbrella with enormous implications. The demands of practical data analysis, however, require a flexibility that GLMs do not have. Data-driven GLMs, in the form of generalized additive models (GAMs), are also largely confined to the exponential family. This book treats distributions and classical models as generalized regression models, and the result is a much broader application base for GLMs and GAMs.

The book may be used in senior undergraduate and first-year postgraduate courses on GLMs and regression modeling, including categorical data analysis. It may also serve as a reference on vector generalized linear models and as a methodology resource for VGAM users. The methodological contribution of this book stands alone and does not require use of the VGAM package. In the second part of the book, the R package VGAM makes applications of the methodology immediate. R code is integrated in the text, and datasets are used throughout. Potential applications include ecology, finance, biostatistics, and social sciences.

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