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Regression graphics. Ideas for studying regressions through graphics. (English)

Zbl 0903.62001

Wiley Series in Probability and Statistics. New York, NY: Wiley. xviii, 349 p. (1998).

The book is devoted to a new and exciting topic: how to use computer graphics within regression data analysis. Regression graphics requires both an application context and a statistical context, and it is not intended to replace the traditional paradigms of regression analysis but to blend with them in order to improve the final results. E.g., regression graphics could be particularly useful at the beginning of an analysis for guiding the choice of a first model, or during the model-checking phase when the response is replaced by a residual. Relying the entire regression analysis just on graphics it is however a possibility that is also discussed. The contents of the 15 chapters are, briefly, as follows:

Chapter 1 introduces selected graphical issues, while Chapter 2 does the same for several specific topics to be later developed: 2D scatterplots, scatterplot matrices, smoothing, response transformations in regressions with a single predictor, plotting exchangeable pairs, etc. Chapter 3 provides the construction background for a rotating 3D scatterplot on a 2D screen, and Chapter 4 makes extensive use of 3D scatterplots for graphical analyses of regression problems with two predictors and a many-valued response. The fundamental idea of reducing the dimension of the predictor vector through the use of central dimension-reduction subspaces and sufficient summary plots is met in Chapter 5 for binary response, and in Chapters 6, 7 and 8 for many predictors. Chapter 9 illustrates these ideas with examples.

The graphical foundations for inverse regressions are introduced in Chapter 10, and continued in Chapters 11 and 12 for estimating a central dimension-reduction subspace via inverse regression. The role of traditional models for studying the effects of individual predictors is investigated in Chapter 13. Chapters 14 and 15 are devoted to graphical methods for visualizing predictor transformations in linear models and, respectively, for model assessment. Important to be mentioned that residuals play a key role in regression graphics analysis but they occur throughout the book in different roles depending on the context. Finally, each chapter ends with a few problems exploring further the proposed ideas and methodologies.

Color and 3D versions of selected plots, data sets, links to recent developments and other information are available via <http://www.stat.umn.edu/RegGraph/>.

Reviewer: [N.Curteanu \(Iași\)](#)

MSC:

62-09 Graphical methods in statistics (MSC2010)

62-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to statistics

62J99 Linear inference, regression

Cited in 4 Reviews
Cited in 235 Documents

Keywords:

[computer graphics](#); [regression graphics](#); [scatterplots](#); [smoothing](#); [response transformations](#); [central dimension-reduction subspaces](#); [inverse regressions](#); [residuals](#)

Software:

[KernSmooth](#)