RESEÑAS / BOOK REVIEWS

ROBUST STATISTICAL METHODS WITH R

J. Jurečková and J. Picek (2006)

Chapman and Hall–CRC ISBN 1-584-88454-1
xii + 198 £44.99

This is a valuable book for every body involved theoretical statistics. It poses an emphasis in robust statistics. As it is well known this methods deal with the use of procedures that are optimal in a neighbourhood of the assumed probability distribution. Hence if a small deviation is present in the assumed distribution F the involved inferences will works with a similar behaviour. The authors present a relevant exposition of some robust statistical methods, which makes it interesting for the potential users of statistical models

It has 7 chapters. An introduction and the needed background is given in the first two chapters (mathematical issues of robustness, statistical characteristics of robustness, etc.). The third chapter is concerned with point estimation (*M*, *L* and *R*-estimators mainly). The following chapter the robust estimation in the linear regression model is developed. Chapter 5 deals with a similar task with estimation in multivariate models, *M* and *S*-estimators are considered. Chapter 6 discusses the more important convergence properties of robust methods presenting the asymptotic representations and distributions of the studied estimators. Chapter 7 is devoted to the evaluation of some goodness-of-fit tests of a distribution considering the existence of nuisance regression and scale parameters.

The discussed examples are used for supporting theoretical aspects of the models. Some to-be-worked theoretical problems are given. Some practical aspects are pointed out as well as numerical illustrations. Quotations on the R available software are given at the end of some of the chapters.

An appendix is devoted to present the R system as well as valuable information on the more important commands. However, the computations in R that are given at the end of the chapters are not especially useful for practical work with the robust methods considered.

I think that this book should be considered useful for being used both as a textbook for graduate and post-graduate students, and as a reference book for statisticians.

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INTRODUCTORY STATISTICAL INFERENCE

N. Mukhopadhyay (2006)

Taylor and Francis xviii + 280
£39.99 ISBN 1-574-44613-4

Anyone who has been involved in preparing a course in theoretical statistics will welcome the existence of a book as this in his shelf. It presents a series of topics that usually take place in the discussion through these courses and that, from time to time, requires of some special pedagogical touch for linking the rigorousness of mathematical theory with the applicability of the supported techniques. The book is composed of 13 chapters and is a classic book for introducing probability and statistics.

At first the text presents the contents in Probability Theory. They are given in 5 chapters. As expected, the issues of probability and random variables are described under the common discrete and continuous distributions models. Expectation and variance definitions and properties are developed and the moments and moment-generating functions are presented. A remarkable discussion on how moment-generating functions, probability-generating functions and distributions are connected is developed, together with a study on the factorial moments. The sequel is the presentation of joint, marginal and conditional distributions and the properties of covariance, correlation coefficients and their relationships with independence. The bivariate normal distribution and the exponential families are used for illustrating the concepts developed. The distributions of some statistics are investigated, using the moment-generating functions and the transformation techniques used to derive distributions of functions of random variables. Then *t*, *F* and multivariate normal distributions are derived consequently. The exposition of probability issues is closed with the discussion on the convergence of random variables, the laws of large numbers and central limit theorems.

Chapter 6 introduces Sufficiency, through the Theorem of Factorization and then, the concepts of Completeness and Minimallity are presented. Chapter 7 gives the theory of point estimators using the Maximum Likelihood. Approach. Then unbiasedness and mean squared error are used for establishing the performance of the estimators. As expected Rao–Blackwell theorem, Cramér–Rao inequality and the Lehmann–Scheffé theorems are giving for deriving optimal estimators. Chapter 8 is devoted to testing. Neyman–Pearson lemma and its role in deriving uniformly most powerful tests are the basics of the theory discussed and some applications for the non-independent case are given. Unbiasedness and uniformly most powerful unbiased tests are employed as alternative criteria when a uniformly most powerful test does not exist. Chapter 9 presents confidence intervals and derive them for one- and two-sample problems. Chapter 10 treats of Bayesian estimation using squared error loss functions.

Likelihood ratio tests under composite hypotheses and normal distributions are discussed in the following chapters as well as the construction of approximate confidence intervals, testing hypotheses about means of populations with unknown distributions, variance stabilization etc.

The book closes with a chapter in which some interesting historical notes and the statistical tables are given. There is a list of references. Each chapter contains many examples and proposed exercises.

The book is well designed and written. It is recommendable for the library of the Statistical Department as well as for the Computer Science Department

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QUANTILE REGRESSION

R. Koenker (2005)

Cambridge University Press ISBN 0-521-60827-9

xvi + 350 £19.99

The author stresses how least squares is the dominating the application of regression and it may be a bad approach due to outliers etc. His proposal is based on a paper written in 1978 by him. There, it was pointed out how ordinary least squares may be misleading. The research of the author in the theme has produced a lot of papers and this book presents the first comprehensive discussion of the method using his experience.

Hence the main objective of the book is to provide the needed information on quantile regression methods.

It has nine chapters. Chapter 1 is devoted to give the historical background of regression methods and how quantile regression provides a challenging alternate to traditional methods. It is followed by presenting the fundaments of the method of quantile regression as well as how Wald tests, rank-based inference, likelihood ratio tests and resampling methods and Asymptotic theory work for this model. The extensions to L-statistics and weighted quantile regression is the theme of chapter 5 and the next chapter is concerned with the computation of the solutions using linear programming approach and other techniques. Chapter 7 is concerned with the nonparametric alternatives of quantile regression. Chapter 8 presents 'are to be investigated' problems, such as survival and longitudinal data, quantile autoregression, multivariate quantiles and structural equation models. The last chapter present his conclusions.

Two appendices present issues on the calculation of quantile regression using R and the asymptotic critical values for some of the tests.

The book is intended to be used by selected researchers in statistics and related areas dealing with regression and with data, which are not suitable for classic Least Squares methodology. As a textbook, it can play a role in graduate courses where the students have a good background in statistics, linear algebra and mathematical analysis.

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