Book Review: Statistical regression with measurement error

Jixian Wang

Stat Methods Med Res 2001; 10; 156
DOI: 10.1177/096228020101000208

models are described and again the chapter ends with an excellent example.

Chapter 4 looks at mixed models for categorical data and the mixed ordinal logistic regression model is well described. Chapter 5 considers, relatively briefly, multi-centre trials, meta-analysis and sample size estimation, and Chapter 6 is devoted to repeated measure designs. This chapter contains a good account of covariance patterns models and gives examples of their use both for normal and count data. In Chapter 7 mixed models for crossover designs are considered and Chapter 8 looks at some more specialized applications such as matched case-control studies and event-history data. The final chapter, Chapter 9 is devoted to examining software for fitting mixed models. SAS, MLWin, BMDP and BUGS are all included, but somewhat surprisingly the *lme* function in S-PLUS is not mentioned.

This is an extremely useful book for researchers wishing to apply mixed models to their own data, particularly if they are SAS users. It is generally well written and contains many interesting examples. But it is a shame that the authors did not include a further chapter on missing values and dropouts since this would have made a good book, an excellent one.

Reviewed by Brian Everitt, Institute of Psychiatry, London, UK.

Cheng C, Van Ness JW 1999: *Statistical regression with measurement error*. London: Arnold. 262 pp. £35.00 (HB). ISBN 0 340 61461 7.

This book is a monograph in *Kendall's Library of Statistics* dealing with measurement error models, a topic originally covered by a single chapter in *Kendall's Advanced Theory of Statistics*. The extension from one chapter to a monograph reflects the rapidly increasing interest in this area. This book gives comprehensive coverage of basic and some advanced topics in this area.

The first four chapters are devoted to simple linear models with one explanatory variable. Chapters 1 and 2 give detailed accounts on parameter estimation for functional, structural, ultrastructure and Berkson models under different assumptions. Properties of the estimates such as consistency, asymptotic distribution and confidence intervals are given in detail for different situations. Identifibility is also discussed in places with some more technical material in an appendix. The following two chapters introduce a modified generalized least squares procedure and use of instrumental variables. A brief extension of the material in the first four chapters to multivariate cases can be found in Chapter 5. This part of the book is detailed and comprehensible giving a good introduction to readers unfamiliar to this field.

The next two chapters deal with more advanced topics such as the polynomial measurement error model (Chapter 6) and robust estimation procedure (Chapter 7), which are strengths of the authors. Chapter 6 describes extensions of models and methods of estimation discussed in the first part of the book. Chapter 7 starts with standard material about influence function, breakdown point and M-estimates. This will be beneficial to readers not familiar with this topic, but it also occupies about one-third of this chapter. The main part of this chapter is, however, rather short.

I feel the book generally lacks real data examples, particularly medical examples that would be useful for readers of *Statistical Methods in Medical Research*. There is almost no coverage of non-linear measurement error models such as generalized linear models and non-linear regression models with measurement error and semiparametric procedures. Significant progress has been seen in these areas particularly with medical or biological applications. Fortunately, these areas have been well covered in the book by Carrol *et al*.[1]

In general, this book is well written and fits well into the *Kendall's Library of Statistics* series. Most parts of the book, particularly the first four chapters, are of interest to medical statisticians. It is also a good textbook or reference book for postgraduate students.

Reviewed by Jixian Wang, University of Dundee, Dundee, UK.

Reference

1 Carroll RJ, Ruppert D, Stefanski LA. *Measurement error in nonlinear models*. London: Chapman & Hall, 1995.