Multivariate Geostatistics: an Introduction with Applications
H. WACKERNAGEL, 1995
New York, Springer
xiv + 256 pp., DM 74
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This book arose from courses given by the author at the Ecoles de Mines de Paris, an institution which is synonymous with geostatistics. It is divided into 30 chapters, plus three appendixes, most of the chapters corresponding roughly to a two-hour lecture. There are a few exercises, embedded in the text with solutions at the end of the book. Apart from these exercises, which do not appear until Chapter 17, the book does not come across as a text-book for a course. In my view it is most useful as a starting point to enter the literature on geostatistics, much of which is in French. A section on (selected) references and software after the appendixes is particularly good for this.

As a 'stand-alone' text, however, I found it rather disappointing. Although some sections give useful insights into the variations on kriging, the descriptions of techniques and results are generally rather too brief to gain a good understanding of the material. There are also some odd and confusing parts, at least to someone with a statistical background. For example, in Chapter 2 simple concepts such as the mean and linear regression are introduced in an unusual way. The notation in regression is perverse, with a used for slope and b for intercept. Furthermore, within a few pages m and σ are used as symbols for mean and variance in *both* the population and the sample context.

There are relatively few mistakes or misprints. Among these are $F(dz)$ for $dF(z)$ on p. 8, h for $|h|$ in Fig. 4.2 and the incorrect statement on p. 121 that principal component analysis 'only provides an optimal projection plane for the samples if the cloud is of elliptical shape', presuming that by 'optimal' the author means 'maximizing variance'.

After some preliminaries, the book is divided into two large and two small sections. The first large section comprises roughly half the book and covers (univariate) geostatistics, with seven of its 14 chapters on various aspects of kriging. There follows a short section which gives a sketchy introduction to the multivariate techniques of principal component analysis, canonical (correlation) analysis and correspondence analysis. The next, longer, section has eight chapters and has the same title as the book, 'Multivariate geostatistics'. Three chapters on non-stationary geostatistics and appendixes on matrix algebra, linear regression and covariances and variogram models complete the book.

To summarize, this book will be a useful addition to my shelves as a starting point to find more informative sources, but I doubt whether I shall make much direct use of its rather sparse descriptions.

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Kernel Smoothing
M. P. WAND AND M. C. JONES, 1995
London, Chapman and Hall
xii + 212 pp., £25
ISBN 0 412 55270 1

This book, which is divided into six chapters and four appendixes, is devoted to the principles, applications and analysis of kernel smoothers. Each chapter ends with some bibliographical notes and exercises which allow the reader to go deeper into each topic. Although the authors wrote this book as an introductory text to smoothing problems, the required level of calculus and linear algebra is nevertheless important.

The purpose of Chapter 1 is to introduce the motivation and ideas of kernel smoothing by using two examples: nonparametric regression and the estimation of probability density functions. In Chapter 2, the authors introduce the problem of univariate kernel density estimation by defining the mean-squared error and mean integrated squared error (MISE) criteria. They give asymptotic approximations and exact calculations for these quantities. Canonical and optimal kernel theory is then treated, which in turn leads to a definition of high order kernels and some modifications to the kernel density estimator.

The sequel of this key chapter deals with some peripheral problems such as the estimation of density at boundaries and the estimation of density derivatives. Chapter 3 gives a very up-to-date overview of some methods for selecting the bandwidth of kernel density estimators, ranging from the simplest to the more sophisticated rules. One section of this chapter is dedicated to a comparison of these selectors. Chapter 4 can be viewed as a generalization of Chapter 2 to the problem of multivariate kernel density estimation, where the authors redefine the MISE criterion and give asymptotic approximations and exact calculations for this quantity. At the end of this chapter, the choice of smoothing parameters and bandwidth selection are briefly treated. As pointed out by the authors, the last subject has received considerably less attention in the literature than its univariate counterpart. In Chapter 5, the authors chose to study the class of polynomial kernel estimators among the more general set of kernel-type regression estimators, showing its advantages over other more traditional kernel methods. The case of multivariate nonparametric regression is discussed briefly at the end of this chapter.

Finally, Chapter 6 contains some extra topics related to kernel smoothing. These are divided into two categories. In the first category the authors deal with the situations where the data do not conform with the usual random sample assumptions: dependent data, length-biased data, right-censored data ..., whereas in the second category they focus on the estimation of special functions, like hazard functions, and spectral density.

It is my opinion that this book reaches the goal of clearly introducing the topic of kernel smoothers, by smoothly incorporating some important concepts and using throughout the text many very comprehensive plots. For these reasons I strongly recommend the book for people who wish to open their minds to the field of the kernel smoother, and particularly for graduate students in statistics.

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