and there are pointers which allow the interested reader to pursue additional topics or to examine the ideas more deeply. It is a good place to start exploring modern methods in the field.

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Kernel Smoothing. By M.P. Wand & M.C. Jones. London: Chapman and Hall. 1995. ix+212 pages. Price £25.00 (hardcover).

This book's stated aim is to 'develop the reader's intuition and mathematical skills required for a comprehensive understanding of kernel smoothing'; it is intended to be an introductory text directed at 'students and researchers in statistical sciences and interface disciplines'. It is a book principally about *how to analyse* kernel smoothing methods, and introduces in a very systematic and thorough manner everything apparently needed in the mathematical toolkit to do this.

The Introduction motivates the kernel smoothing problem using non-parametric regression and probability density estimation. Chapter Two dives into univariate kernel density estimation, and covers basic definitions, error criteria, types of kernels, modifications and special cases. Chapter Three describes bandwidth selection techniques, both 'simple' and 'hi-tech', and the estimation of density functionals. Chapter Four concludes the density estimation part of the book with multivariate kernel density estimation, introducing suitable kernels and analysing them using the asymptotic Mean Integrated Square Error criterion. Chapter Five deals with local polynomial kernel estimators for non-parametric regression and their associated apparatus of bandwidth selection and variance approximations as well as derivative estimation, and it makes a brief foray into multivariate non-parametric regression. Chapter Six is devoted to special topics including dependent, length-biased, censored and measured-with-error data.

The book is reasonably well indexed, but not extensively cross-referenced, so that I could not find 'Mixtures' until I located 'Normal mixture densities'. The References are extensive, and reflect the nearly exponential growth of publications in this area in the last 20 years. The Appendix on notation is an essential companion to keep track of some of the abbreviations introduced, and the Appendix of arcane facts about Normal densities and related functions is a useful compendium, although it is a pity that the reference for proofs in this section is still unpublished. I found the Appendix on computation of kernel estimates to be sufficiently explicit and well-referenced that I was able to implement a two-dimensional kernel smoother having no experience of such algorithms.

The most disconcerting thing about this book is its physical presentation; the margins on the cut edges of the pages are both extremely narrow (less than

2.5 mm in Appendix A) and noticeably variable, while the centre margins are excessively wide, so that I found myself wondering each time I turned a page if the words would finally have slid off the edge.

As I was at the time interested in learning about kernel smoothing technology, I decided to work through all the exercises at the ends of the chapters, but lasted only one chapter. The questions are very good at directing close attention to successive elements of the text; in Chapter 2 each numbered equation gets a workout. The Exercises seem to take the place of Examples in the book; the Examples are rare and brief indications of applications that may or could or can be shown, with almost everything left to the reader to develop. This could be very good for an intensive graduate course, but for readers wishing to acquire an understanding from reading the text the presentation is too cryptic. Why is equation (2.8) more manageable than (2.7) which is shorter? How do the MISE and MIAE criteria fail to conform with the closeness perception of humans? What does $R(K)$, which is introduced as a shorthand notation, actually mean? Does it have an interpretation? How does bias depend on $\mu_2(K)$? It is implicit that being able to carry out the necessary mathematical manipulations, by working through all the exercises, will clarify all this, but I remain unconvinced.

This would be a good book for teaching students who need to acquire a set of technical skills typically used in rate-of-convergence and similar studies; there are lots of exercises in mathematical puzzle-solving, which are very good for people who like that, or need to be able to do it. I could have done with something like this when I was starting out on my PhD research. However, as a reviewer I am, in the end, disappointed in the limited amount of intuition I have acquired about the concepts, and the amount of effort I have had to put into trying to understand matters that the authors probably already understand and could well have explained. The number of people requiring high-level technical skills in rate-of-convergence studies would seem likely to be smaller than those wishing to understand the implications of the competing kernels and error criteria, but this would be a very useful book for the former group.

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