

BULLETIN (New Series) OF THE  
AMERICAN MATHEMATICAL SOCIETY  
Volume 14, Number 2, April 1986  
©1986 American Mathematical Society  
0273-0979/86 \$1.00 + \$.25 per page

*Nonparametric functional estimation*, by B. L. S. Prakasa Rao, Probability and Mathematical Statistics, A Series of Monographs and Textbooks, Academic Press, Orlando, Florida, 1983, xiv + 522 pp., \$70.00. ISBN 0-12-564020-X

The author begins his work with the observation that "Recently a large class of nonparametric methods have been developed for the estimation of distribution functions, density functions, etc., for data of several types. This book is a survey of the methods developed in the area." It is interesting to remember that the nonparametric estimation of the distribution function first carried out by Graunt [2] in 1662 predates parametric estimation. Moreover, contemporary interest in nonparametric density estimation goes back to a paper [4] written by Rosenblatt in 1956 and another written by Parzen [3] in 1962. However, Prakasa Rao is quite correct in noting that the explosion of output in the area has really occurred relatively recently, say in the last five to ten years.

The author covers the high points of the material in some 700 articles, dissertations and books. The fact that he has made some significant omissions simply indicates the vastness of the literature in nonparametric probability density estimation. The main point of the book is a survey and synthesis of the work in the nonparametric estimation of one-dimensional densities. In addition, the author has wisely included a number of topics in the related area of parameter estimation of stochastic processes. The inclusion of extensive problem sets at the ends of the chapters, unusual in a reference book, is an unexpected bonus.

Although the book is written at a high level of mathematical sophistication, it is presented in a clear manner which desires to communicate rather than to impress. The author makes no particular attempt to categorize some areas of investigation as fruitful, others as false trails. Inasmuch as there have been a number of rather disappointing (in retrospect) false trails blazed in nonparametric density estimation, it would appear almost obligatory for the author of a survey volume like this one to give the reader some benefits of his experience as to the strengths and weaknesses of each approach lest, at some future time, the unwary be encouraged to start down some futile path. Prakasa Rao's task is explication rather than guidance.

In those cases where several authors have written on similar topics, Prakasa Rao integrates the work, frequently improving on earlier theorems and proofs. A worker in nonparametric density estimation will find this an invaluable bibliographic source, which will save him hours trying to run down the genesis and progression of ideas. However, the author's tendency, on occasion, to put his references in a fine print collage at the end of the chapter rather than inserting them at the relevant points within the text will make it sometimes difficult to decide who did what.

The main shortcoming of the book (one which is also typical of most current work in the area) is its focus on well-defined mathematical issues, such as asymptotic properties, rather than on some representational issues yet to be