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Review: [untitled]

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Source: *Biometrics*, Vol. 50, No. 4 (Dec., 1994), p. 1227

Published by: [International Biometric Society](#)

Stable URL: <http://www.jstor.org/stable/2533465>

Accessed: 02/09/2011 14:52

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structures that might be encountered in practice. Chapter 3 deals with univariate response variables by focussing on ANOVA and ANCOVA models. Chapter 4 progresses to a multivariate setting by outlining approaches to multiplicity in MANOVA models and repeated measures situations. An interesting comparison between bootstrap resampling and permutation resampling in the multivariate context is given. Chapter 5 discusses extensions to binary data, and again considers carefully the comparison between bootstrap and permutation methods. Chapter 6, entitled Further Topics, is a grab-bag of odds-and-ends, considering various issues such as power, comparison of variances, and multiplicity problems that arise as the number of tests considered is infinite. Chapter 6 closes with a brief discussion of asymptotic theory, and some advice for constructing resampling-based methods in more complex models than those considered in the earlier chapters. These five chapters are the meat of the book, and practitioners will find them useful and well written. Chapter 7, however, is the chapter that many will turn to first as it amply and elegantly describes the role multiple-testing procedures can play in real-world problems.

So what does this monograph have to offer? Overall, it proposes new and novel methods to handle some long-standing and thorny problems for people who analyze data. The authors make a compelling argument for the use of multiple-testing methods in routine data analyses. Moreover, in proposing resampling-based methods to solve the multiplicity problem, they lay a wide, easily travelled path out of the multiple-testing jungle.

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BICKEL, P. J., KLAASSEN, C. A. J., RITOV, Y., and WELLNER, J. A. **Efficient and Adaptive Estimation for Semiparametric Models**. Johns Hopkins University Press, Baltimore, Maryland, U.S.A., 1993. xix + 560 pp. \$95.00/£78.50. ISBN 0-8018-4541-6.

The authors have created a very impressive and mathematically rigorous account of asymptotic theory within the framework of nonparametric and semiparametric models for independently, identically distributed (i.i.d.) observations. The theoretical development relies mainly on functional analysis and abstract probability. The book considers examples that illustrate the wide range of models such as location models, mixture models, biased sampling models, censored linear regression, constrained defined models, and Cox's proportional hazards models. Basically the book consists of three main parts:

(i) The first part (Chapters 1–4 and the Appendix) presents fundamental concepts and a review of lower-bound theory and estimation of regular parametric models, with some nice geometric interpretation. The natural extension is then to nonparametric and semiparametric models. The two main approaches used to calculate information bounds for semiparametric models are efficient influence functions and efficient score functions.

(ii) The second part (Chapters 5 and 6) develops information-bound theory for “nuisance” parameters of nonparametric or semiparametric models. The focus is on stating and proving convolution theorems for the parameters, which can subsequently be used as

tools to quantify their convergence rates. Examples of the theory developed in this part are given in Chapter 6.

(iii) The third part consists of a relatively long Chapter 7, which is concerned with the construction of estimators, starting with M-estimates of Euclidean parameters and proceeding to function-valued parameters.

Overall, it is a beautiful book of mathematical derivation in an age of beautiful books on computer-intensive statistical methods without solid theoretical backup. I was quite excited by the title, hoping that it could give answers to problems that involve semiparametric models for spatial or correlated data, in particular questions such as variable selection and goodness-of-fit tests. I was slightly disappointed to discover that only models for i.i.d. observations were considered. However, I do appreciate that the extension to spatial or correlated data is certainly not a trivial or straightforward task. It is reassuring to read that the authors recognised the drawbacks of the book and that they are intending to look into further development in terms of these questions and more involving complicated data structures. Until that happens, I am somewhat reluctant to struggle through the book to find supporting theory for my data analysis problems. Of course, all these comments are written with a *Biometrics* reader in view and should not diminish the book's value to a reader with a strong mathematics and probability interest.

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TARTER, M. E. and LOCK, M. D. **Model-Free Curve Estimation**. Chapman and Hall, New York, 1993. x + 290 pp. £29.95/\$49.95. ISBN 0-412-04251-7.

This is Number 56 in the Chapman and Hall “green book” series of *Monographs on Statistics and Applied Probability* and another contribution to the ever-increasing list of books on smoothing and related topics. But unless you happen to be an avid collector of all these green books, I have to say that I doubt whether many readers of this journal will feel the urge to rush out and buy it.

The book is based on curve estimation via orthogonal series methods. Chapters 3 and 4 comprise a very useful review of probability density estimation using this approach. This is a worthwhile adjunct to the other smoothing literature which typically emphasises spline or kernel methods. It has to be admitted, however (Section 3.3), that orthogonal series and kernel density estimation methods are extremely closely related. Nonetheless, Chapter 3 helpfully introduces and summarises orthogonal series density estimation while Chapter 4 seems to be a thorough review of the literature on choosing the degree of smoothing of such estimators.

These review chapters follow an introduction, by example, to the need for curve estimation (Chapter 1), and an almost philosophical Chapter 2 on the role of smoothing, or “generalized representation”. I didn't get a lot out of this, but perhaps I'm already convinced. A noteworthy feature of these and later chapters is the use of historical background and early references (often new to me) in which basic smoothing ideas can be discerned.

In a sense, Chapters 3 and 4 cover fairly main-