J of the Royal Statistical Society Ser A, Vol 150,No 2 (1987)
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This collection of review chapters shows the diverse nature of non-parametric statistics, giving simple and elegant solutions to, mostly, problems of testing hypotheses and, on the other hand, generating theoretically complex mathematics to deal with, generally, the asymptotic aspects of these elegant solutions. The statistical literature tends to be concerned with the latter category of topics and unfortunately has the effect of persuading most practitioners that, for them, non-parametrics consists of Mann-Whitney-Wilcoxon statistics and their like and nothing more except complex asymptotics. Careful reading of some chapters in this volume will prove otherwise.

In addition to the review chapters there are tables of order statistic moments generally poorly reproduced from journals and an earlier volume in the series (surely padding, and references would have been adequate, with a corresponding reduction in price and eyestrain). Tables of critical values of the common rank statistics are also reproduced; once again references would be more appropriate in a book of this type. A five page index is provided which seems inadequate for a book of this length.

In conclusion, a volume for a library to acquire, providing useful review and reference chapters on a diverse range of topics.

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11. Advanced Mathematics for Economists: Static and Dynamic Optimization. By P. J. Lambert. ISBN 0631 14139 1 Blackwell, 1985, xiv, 231p. £27.50 (hardbound), £9.95 (paperbound).

This text is divided into two parts: basic mathematical material, and optimization, both static and dynamic. The basic material consists of three chapters on Univariate Calculus, Matrix Algebra and Multivariate Calculus. Chapters on Equality-constrained Optimization, Inequality-constrained Optimization, the Maximum Value Function and Dynamic Optimization comprise the second part. Finally there is a list of references and a set of answers to the exercises. The chapters on optimization use the Lagrange multiplier technique to derive the optimality conditions for general objective and constraint functions. Linear programming is presented as a special application of the Kuhn-Tucker conditions when all the functions are linear. The chapter on dynamic optimization is concerned with the situation in which both the variables and the objective function are time related and the problem is to choose the optimal time-path of the variables.

The book is aimed at final year undergraduates and postgraduates doing a mathematics for economists course. The bias towards economists is reflected mainly in the examples. With the teacher supplying alternative examples, this text would be excellent for final year non numerate students wishing to learn some mathematics beyond the most elementary and also for numerate students, for example natural scientists and engineers, who need a firm mathematical foundation in order to study their own subject. It is assumed that the reader is mathematically literate and familiar with sets, functions and limits.

The text is written by an author who is keen to teach the ideas and use of mathematics while being aware of the difficulties experienced by students in understanding the concepts. His style is relaxed but purposeful and the subject matter is clearly presented. For anyone who has to teach mathematics to non mathematicians this book is to be recommended.

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12. Proceedings of the First International Tampere Seminar on Linear Statistical Models and their Applications. Edited by T. Pukkila and S. Puntanen. ISBN 951 44 1693 7. Tampere (Finland), Dept of Mathematical Sciences, University of Tampere, P.O. Box 607, SF-33101 Tampere, Finland; 1985. 351p. FIM150 ($25 U.S.)

Here we have the edited proceedings of the first Tampere seminar on linear models, which took place in the summer of 1983. The volume is dedicated to the memory of the Finnish statistician Gustav Elfving (1908–1984). The words "and their applications" in the title need to be interpreted with some caution—actual data are conspicuous by their absence! It is stated that all the papers are refereed. The papers are in English.

Although Finland (with Sweden) was the first country to introduce the systematic collection of population statistics (in 1749), there was very little involvement with the later development of mathematical statistics which was to advance so rapidly in this country and elsewhere. An exception is J. W. Lindeburg, a name familiar to probabilists through his work in the central limit theorem. However, about a third of the papers in this volume are by Finnish authors and show something of the statistical work of quality going on in Finland today, of which the rest of us would do well to take note.

The highlight of the book is the account of two extended seminars reviewing the uses of two particular mathematical ideas in linear model theory; C. R. Rao's seminar on generalized inverses and "a unified approach to inference in linear models", and G. P. H. Styan's seminar on Schur complements and their use in linear statistical models. (If a matrix V is partitioned in a 2×2 fashion into submatrices V_{ij}, $V_{22} - V_{21}V_{11}^{-1}V_{12}$ is the "Schur complement of V_{11} in V". If V is the variance matrix of the combined vector random variables (x, y), this is just the residual variance matrix of y after regressing out x). These are excellently presented and authoritive expository articles which will repay careful study.

Next there are four invited papers including a fascinating historical essay by R. W. Farebrother on estimation in linear models between the mid-18th and mid-19th centuries. Many readers will be amazed at the depth and scope of statistical ideas being discussed at that time, long before the present day formulation of the topic. The other invited papers are on singular linear models (J. Fellman), time-dependent covariates and parameters (H. Niemi), and robustness in linear models (B. K. Simta and H. Drygas).

The second half of the volume contains contributed papers covering topics on change-point models (H. Bunke and U. Schulze), asymptotic distributions of sample means in linear processes (K. C. Chanda) and of survey regression estimators (D. S. Chang), canonical correlations in two-way designs (D. Latour and G. P. H. Styan) and between fitted values and fitted residuals in regression (S. Puntanen), shrinkage estimators (E. P. Liski), ridge estimators (P. Slahlecker and G. Trenkler), prediction in a model linerized with respect to a random approximation (B. Schaffrin), estimation for stable laws (L. B. Klebanou, G. M. Manija and J. A. Melamed), a matrix inequality in genetics (J. K. Merikoski) and, finally, bounds for imbalance in designs (Y. Thiebaudeau and G. P. H. Styan).

Although perhaps not a first priority for one's own bookshelf, this collection of papers would make a useful addition to a departmental or university library.

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13. An Introduction to Bispectral Analysis and Bilinear Time Series Models. By T. Subba Rao and M. M. Gabr. ISBN 3 540 96039 2. Springer-Verlag, 1984. 278p. DM43. (Lecture Notes in Statistics No. 24).

Despite the rather daunting title this is a very interesting and informative book which is an invaluable reference for anyone with an interest in time series, especially in non-linear or non-normal series. It gives very good coverage of bispectral theory and methods and also of bilinear models with many useful results given in some detail. The style and level of presentation is very much that of the "Manchester School".

The first chapter introduces stationary time series and the spectrum and polyspectra. It also defines the linear and bilinear models for time series. Having thus set the stage the next chapter discusses spectral and bispectral estimation and ideas of windowing which are involved. Chapter 3 follows this with some practical points involved in estimation and gives some practical examples. Chapter 4 looks at tests for linearity and normality and shows them applied to some real data series. Chapter 5 starts the detailed discussion of bilinear models and their properties which is continued in Chapter 6 leading to a treatment of estimation and prediction.

Chapter 7 details work on existence theorems and a state space representation for these models. There are 4 appendices and listings of four programmes (in Fortran IV).

Most of the subject matter has been published but this book brings the whole work together. I think that overall this book is a very good reference source and has many good things for the interested reader. One can quibble, the programs are a bit obscure and contain bits of the operating system commands, the discussion could be more to the point. Treated as a "timely informal manuscript", as Springer suggests, I can recommend it as a good read.

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