introduction to TLS techniques and to the kinds of problems that benefit from TLS treatment. Chapters 3 through 7 focus on numerical issues: extensions of the basic TLS problem, iterative speed improvement for solving slowly varying TLS problems, algebraic connections between TLS and classical least squares problems, and comparisons of the sensitivity of TLS and classical methods. Chapters 8 and 9 deal with the statistical properties of the total least squares problem, and with multicolinearity problems, respectively. In their preface, Van Huffel and Vandewalle provide a simple road map to the book for readers with different objectives, so that those with a problem to solve can locate relevant material quickly.

Books such as this are difficult to write. The authors must strike a delicate balance, attempting to address both specialists in the field who are interested in a succinct account of new discoveries, and outsiders who must be carefully introduced to the terminology and culture of the field in order to follow the key arguments and make confident use of the algorithms. Obviously, I cannot comment on how well the authors have satisfied specialists in numerical analysis. But I can say that they have succeeded in making what is to me a difficult subject remarkably accessible. They carefully define the terminology and notation used, make extensive use of both geometric illustrations and concrete examples to motivate many of their arguments, and in general manage to write in a way that I find helpful and informative without even a hint of disdain for those who are not insiders in the field.

Scientists and engineers looking for a way to learn the simple but powerful methods the TLS techniques provide for dealing with a variety of knotty problems in analyzing real data need look no farther than this book.

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28[68Q40, 65Y15, 65Y25, 11-04, 12-04, 13-04, 14-04, 30-04, 33-04].—David Harper, Chris Wooff & David Hodgkinson, *A Guide to Computer Algebra Systems*, Wiley, Chichester, 1991, xii+148 pp., 23 cm. Price: Softcover $29.95.

The authors provide an overview of facilities to be expected in computer algebra systems, with specific reference to the programs REDUCE, MACSYMA, Maple, Mathematica, and Derive. The chapters cover basic algebra, calculus, solution of algebraic equations, matrix and vector algebra, input/output, and documentation. The book also includes a few short case studies showing some simple applications that may be of interest to potential users of such systems, as well as a modest annotated bibliography.

This book will be useful to persons familiar with one or more such systems hoping to find out how other systems compare; it may also be useful to persons trying to choose amongst these systems, or broadly speaking, trying to figure out if *any* of the systems might be of use.

This book represents systems by a matrix of check-offs. Those boxes indicating the absence of feature x from system y are likely to change over time as systems are revised. Yet, even if all systems have the same feature, one should be aware that they are *not necessarily equivalent.* Some systems have quite elaborate and highly effective algorithms and can solve large problems many times faster than others. Efficiencies of algorithms and representations are often not described in available literature and may even vary depending on particular versions of the systems.

An alternative method for choosing a system may be to see if workers in your application area favor one program over the others.

Especially for the computational consultants who are unfamiliar with computer algebra *per se* but who need to answer questions about available facilities in such systems, this volume is uniquely valuable.

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29[90-01, 90B99].—PANOS Y. PAPALAMBROS & DOUGLASS J. WILDE, *Principles of Optimal Design—Modeling and Computation*, Cambridge Univ. Press, Cambridge, 1991, xxi+416 pp., $25\frac{1}{2}$ cm. Price: Softcover $32.95.

This is a paperback edition of a book published in 1988 and reviewed in [1].

W.G.

1. R. H. F. Jackson, *Review* **27**, Math. Comp. **53** (1989), 769–771.