model, Koene's book can be highly recom-

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Numerical Recipes: The Art of Scientific Computing, By William H. Press, Brian P. Flannery, Saul A. Teukolsky, and William T Vetterling. Cambridge University Press, Cambridge, UK, 1986. xx + 818 pp. \$39.50. ISBN 0-521-30811-9; Numerical Recipes: Lample Book (FORTRAN). viii + 179 pp. \$18.95, paper. ISBN 0-521-31330-9; and Numerical Recipes: Example Book (PASCAL). s + 236 pp. \$18.95, paper. ISBN 0-521-30956-5. Also available: Numerical Recipes FORTRAN Diskette V1.0, \$19.95, ISBN 0-521-30958-1; Numerical Recipes Example Diskette (FORTRAN), \$19.95, ISBN 0-521-30957-3; Numerical Recipes Pascal Diskette V1.0, \$19.95, ISBN 0-521-30955-7; and Numerical Recipes Example Diskette (Pascal), \$19.95, ISBN 0-521-30954-9.

"We call this book Numerical Recipes for several reasons. In one sense, this book is solved a 'cookbook' on numerical computation. However, there is a distinction between a cookbook and a restaurant menu. The latter presents choices among complete dishes in each of which the individual flavors are blended and disguised. The former—and this book—reveals the individual ingredients and explains how they are prepared and combined." So begins the Preface of this masterpiece.

It is a compendium of the most useful wrentific codes, given first in Fortran 77, and presented in seventeen chapters:

Chapter 1. Preliminaries. This chapter outlines how to organize programs; rounding and truncation errors; and stability. It has 3 wetions, 4 programs, and 18 pages.

Chapter 2. Solution of linear algebraic equations. It has 12 sections, 10 programs, and 58 pages.

Chapter 3. Interpolation and Extrapolation. It has 7 sections, 13 programs, and 25 pages.

Chapter 4. Integration of functions. It has 7 sections, 13 programs, and 29 pages.

Chapter 5. Evaluation of functions. It has 9 sections, 9 programs, and 24 pages. Chapter 6. Special functions. It has 8 sections, 30 programs, and 36 pages.

Chapter 7. Random Numbers. It has 7 sections, 15 programs, and 35 pages.

Chapter 8. Sorting. It has 6 sections, 11 programs, and 14 pages.

Chapter 9. Root finding and nonlinear sets of equations. It has 7 sections, 13 programs, and 34 pages.

Chapter 10. Minimization or maximization of functions. It has 10 sections, 16 programs, and 61 pages.

Chapter 11. Eigensystems. It has 8 sections, 7 programs, and 46 pages.

Chapter 12. Fourier transform spectral methods. It has 12 sections, 13 programs, and 73 pages.

Chapter 13. Statistical description of data. It has 10 sections, 21 programs, and 44 pages.

Chapter 14. Modeling of data. This chapter is on fitting data by formulas. It has 7 sections, 12 programs, and 49 pages.

Chapter 15. Integration of ordinary differential equations. It has 7 sections, 8 programs, and 31 pages.

Chapter 16. Two point boundary values problems. It has 7 sections, 8 programs, and 37 pages.

Chapter 17. Partial differential equations. It has 7 sections, 2 programs, and 53 pages.

Each of the sections concludes with references for further reading. The main text is then followed by a five-page list of references. Next, the authors present a 118-page chapter called Numerical Recipes in Pascal. This has an Introduction explaining the differences between FORTRAN 77 and PASCAL and then lists, section by section, a PASCAL and then lists, section by section, a PASCAL version of each of the previous FORTRAN programs. A five-page alphabetical listing is then given of the dependencies among the programs. An 82-page index concludes this monumental work.

These four authors have demonstrated that too many cooks do *not* spoil the book! They have devised an attractive format that uses a smaller but heavier type for the programs. They provide a cogent, well-motivated, and complete treatment of each of the topics. It is possible to open the book at any section and learn without the necessity of starting at the beginning of Chapter 1. In

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fact, although it was not their original purpose, this book could serve as the text for a well-rounded numerical analysis course in the senior undergraduate or first graduate year.

I find that the authors achieved their goal of presenting and explaining the most useful, carefully documented, scientific programs. They have prepared diskettes that contain all of the programs in several machine readable formats. In particular, PC format is available. To aid the user, they have also prepared example bookiets along with example diskettes. We have used the diskettes and run some programs on a PC/ AT. In order to avoid the difficulty of preparing separate codes for the many different computing environments, the authors explain that they have not included interactive or graphics codes (except for one rough plotting routine). We highly recommend the book and the refreshing spirit that it brings to the reader and computer user.

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