REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the American Mathematical Society classification scheme. The 1980 Mathematics Subject Classification can be found in the December index volumes of Mathematical Reviews.

1[65–01, 65–04].—CURTIS F. GERALD & PATRICK O. WHEATLEY, *Applied Numerical Analysis*, 3rd ed., Addison-Wesley, Reading, Mass., 1984, x + 579 pp., 24 cm. Price $29.95.

The Preface states: "A broader range of topics than in most elementary texts for numerical analysis is still a hallmark...". The authors also claim the book is "appropriate for sophomore and junior students in engineering, science, mathematics, and computer science." This reviewer agrees with the first claim, but has some misgivings regarding the second. That is, the wealth of material is presented quite compactly and only an exceptionally superior sophomore class would be able to master it. The authors write clearly and present detailed numerical illustrative examples with figures to explain the principal methods. Each of the ten chapters has a set of programs mostly in Fortran (77), a set of exercises, and a set of applied problems and projects. The chapter headings with the corresponding numbers of pages (p), programs (pm), exercises (e), and applied programs and projects (a) are listed:

Ch. 1 – Solution of nonlinear equations – 79p, 7pm, 47e, 13a.
Ch. 2 – Solving sets of equations – 91p, 8pm, 59e, 9a.
Ch. 3 – Interpolating polynomials – 55p, 4pm, 54e, 6a.
Ch. 4 – Numerical differentiation and numerical integration – 73p, 5pm, 78e, 7a.
Ch. 5 – Numerical solution of ordinary differential equations – 60p, 4pm, 54e, 12a.
Ch. 6 – Boundary-value problems and characteristic-value problems – 40p, 2pm, 31e, 8a.
Ch. 7 – Numerical solution of elliptic partial differential equations – 58p, 3pm, 46e, 6a.
Ch. 8 – Parabolic partial differential equations – 44p, 3pm, 24e, 6a.
Ch. 9 – Hyperbolic partial differential equations – 29p, 1pm, 19e, 5a.
Ch. 10 – Curve-fitting and approximation of functions – 47p, 3pm, 35e, 3a.

In addition, there is a 2 page bibliography of papers and mostly reference books, a 4 page appendix on calculus information, a 17 page appendix on using the method

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of undetermined coefficients to derive formulas, a 2 page appendix on software libraries, a 14 page listing of answers to selected exercises, and a 7 page index.

There are a number of minor typographical errors that should not interfere with the students understanding. The cubic spline in Figure 3.3, for the case of linearly extrapolating the second derivative to the boundaries, seems to be improperly plotted. That is, the second derivative appears to be positive at one end point, where linear extrapolation would seem to require that it be negative.

Although it is possible to quibble about some of the derivations and explanations, and about the selection and organization of some items—nevertheless this is an excellent book! (After all, instructors must be given the opportunity to show that they can do a few things better.)

E. I.