

14[65–01].—JAMES L. BUCHANAN & PETER R. TURNER, *Numerical Methods and Analysis*, McGraw-Hill, New York, 1992, xvi+751 pp., 24 cm. Price \$44.95.

The text gives a careful explanation of how arithmetic operations are performed by computers (from pocket calculators to serial or parallel central processors). Here one of the novel features is the description of the CORDIC algorithms that are built into pocket calculators to do multiplication and division and to find the values of the elementary functions. Overwhelming is the amount of sound information in the densely filled pages of this book—where intuitively motivated numerical methods are algorithmically presented in TURBO PASCAL, mathematically analyzed, and then applied in illustrative examples that confirm the validity of the analysis and intuition. Readers will find each section to be relatively self-contained and supplied with many supplementary exercises and “projects”.

“Ordinary” are the differential equations treated in Chs. 10 and 12 except for two projects suggested in the latter, one for heat conduction and the other for Poisson’s equation in a rectangular region. Ultimately, an efficient code for solving a finite difference formulation of Poisson’s equation is described for a hypothetical parallel computer in the last chapter. Good advice for performing a variety of basic tasks on a parallel system is also given there.

Here is a listing of the chapter headings in this classroom-tested opus that was skillfully prepared by experts and which will prove to be a wonderfully useful contribution to our literature:

	Preface – 3 pages
	General Introduction – 4 pages
Ch. 1	Computer Arithmetic and Errors – 44 pages
Ch. 2	Iterative Solution of Nonlinear Equations – 49 pages
Ch. 3	Approximate Evaluation of Elementary Functions – 34 pages
Ch. 4	Polynomial Interpolation – 44 pages
Ch. 5	Other Interpolation Functions – 45 pages
Ch. 6	Systems of Linear Equations – 45 pages
Ch. 7	Approximation of Functions – 80 pages
Ch. 8	Optimization – 73 pages
Ch. 9	Numerical Calculus – 72 pages
Ch. 10	Numerical Solution of Differential Equations – 106 pages
Ch. 11	The Eigenvalue Problem – 43 pages
Ch. 12	Boundary Value Problems for Differential Equations – 19 pages
Ch. 13	The Impact of Parallel Computers – 55 pages
App. A	Background Theorems in Real Analysis – 7 pages
App. B	Background in Linear Algebra – 8 pages
App. C	Answers to Selected Exercises – 14 pages
	Bibliography – 3 pages
	Index – 6 pages