appeared in 1960. Written for the user rather than the specialist, it provides a well documented and fairly complete survey of finite-difference methods for the numerical solution of parabolic partial differential equations. The notation and style are classical and no highly specialized mathematical knowledge is required for its reading. Although it is certainly a practical book, it is definitely not a cookbook. However, in order to make the book accessible to a wide range of scientists and engineers, the author does avoid a rigorous mathematical formulation and has omitted the details of many proofs.

The book is divided into two parts. Part I is devoted to the construction, stability and convergence of various difference schemes for parabolic operators. Included are all of the classical difference schemes and several recent ones, many of which have appeared before only in the Russian literature. The second part describes methods for the practical solution of systems of equations arising from the implicit parabolic difference equations considered in Part I. Included are direct methods, simple and block iterative methods, variational methods, and Chebyshev semi-iterative methods.

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78[X].—FRANK G. LETHER, *Abscissas for Chebyshev Quadrature*, Computer Center, University of Utah, Salt Lake City, Utah. Ms. of six typewritten pages deposited in the UMT File.

Values of the abscissas for the Chebyshev quadrature formula with unit weight function are herein tabulated to 95D for $n = 2(1)7$ and 9. The author in his introduction cites Bernstein's theorem [1] that for no other values of n greater than 1 are all the abscissas real.

The abscissas were calculated as the zeros of the associated polynomials by means of the Newton algorithm, using as initial values the 10D approximations of Salzer [2]. The underlying computations were carried to 100D on an IBM 7044, using multiple-precision arithmetic.

The careful overall checks applied to the final results inspire confidence in the accuracy of these extended tabular values.

J. W. W.

1. S. N. BERNSTEIN, "Sur les formules de quadrature de Cotes et Tchebycheff," *Dokl. Akad. Nauk SSSR*, v. 14, 1937, pp. 323–326.

2. H. E. SALZER, "Tables for facilitating the use of Chebyshev's quadrature formula," *J. Math. Phys.*, v. 26, 1947, pp. 191–194.

79[X].—WALTER JENNINGS, *First Course in Numerical Methods*, The Macmillan Company, New York, 1964, xiv and 233 pp. 24 cm. Price $7.50.

The purpose of this book is to serve as an introduction to Numerical Analysis for an undergraduate student of science or engineering, presupposing only the calculus and differential equations. According to the author, the book is intended to present Numerical Analysis "in breadth rather than depth, without being superficial," to lay an adequate groundwork for the study of the more sophisticated problems of Numerical Analysis, and to motivate students to continue their studies

in this field. By presenting a not overly long and very readable discussion centered about the basic problems of approximation, solutions of polynomial equations and systems of equations, and the numerical solution of ordinary differential equations, the author attains all of his objectives.

The book consists of 22 relatively short chapters. The first twelve chapters are concerned with approximation of functions and the solution of equations; included herein are discussions of Chebyshev and Legendre polynomials, approximation in the square integral sense, interpolation, and the methods of Newton-Raphson and Bernoulli. The next five chapters deal with numerical differentiation and integration. In the last five chapters are introduced some methods for the solution of ordinary differential equations, systems of linear equations, matrix inversion and eigenvalue problems. At the end of the book is a set of five appendices, containing statements of some basic results of calculus and linear algebra, to which the student may refer.

The main emphasis of the book is on the application of the methods presented to specific problems. The text is studded with numerical examples, most of which are well suited for a desk calculator; in addition each chapter contains a nice assortment of problems (and answers), as well as a bibliography containing, to a large measure, references to recent literature which are suitable for a good undergraduate student.

The main shortcomings of the book lie in the presence of a number of misprints and an occasional tendency to examine some ideas too briefly.

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80[X].—S. B. NORKIN, Editor, *The Elements of Computational Mathematics*, Pergamon Press, New York, 1965, xiii + 192 pp., 21 cm. Price $6.00.

This is an excellent and unobtrusive translation by G. J. Tee of a short, elementary textbook on computational mathematics. The Russian original (1960) was designed for use by correspondence students taking basic courses in higher mathematics, and for engineering students as a supplementary course in computational techniques.

It consists of seven chapters: on computation with approximate numbers by I. A. Zhabin, on the construction of tables by M. I. Rozental′, on the approximate solution of equations by D. P. Polozkov, on systems of linear equations by Kh. R. Suleimanova, on interpolation polynomials by S. B. Norkin, on the approximate computation of integrals by R. Ya. Berri, and on the approximate integration of ordinary differential equations again by S. B. Norkin.

The contents of the chapters were considered by the authors jointly, and the finished product was reviewed by the faculties of a number of institutions of higher learning in Moscow.

As one might expect, the standard of presentation is quite exceptionally high: the material is carefully selected, the exercises strategically placed, and the successive chapters disciplined into a balanced and harmonious whole.

If one feels called upon to offer adverse criticism, it is that the publication of this book would not have been out of place fifty years ago. Certainly all the methods dealt with are older than this, and there is a preoccupation with such topics as the