35[2.05].—Leslie F. Bailey, *Tables of Folded*-sin x/x *Interpolation Coefficients*, U. S. Government Printing Office, Washington, D. C., 1966, xv + 161 pp., 30 cm. Price $2.75. (Obtainable from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

Although not so identified explicitly by the author, these interpolation tables consist of 11D values (without differences) of

$$A(k) = \frac{\sin \pi(p - k)}{n \sin \pi(p - k)/n} \text{ for } n = 3(2)11 , \qquad k = -\frac{n-1}{2}(1)\frac{n-1}{2} ,$$

and of

$$A(k) = \frac{\sin \pi(p - k)}{n \tan \pi(p - k)/n} \text{ for } n = 4(2)12 , \qquad k = -\frac{n-2}{2}(1)\frac{n}{2} ,$$

where in both cases $p = 0(0.001)1$.

The underlying calculations were performed to 14D on an IBM 7030 system. The pertinent Fortran program (which includes three redundant lines of coding) is appended to the introductory text. Also included is a bibliography of nine publications.

The author states in the Preface that these tables originated in the course of developing a method for designing digital filters of specified characteristics for processing data from seismometers of geophones in a seismic array. Other applications are referred to in a special section of the text. Two numerical examples of the use of the tables are also given.

The arrangement of the tables has been patterned after the WPA tables [1] for Lagrangian interpolation.

A mathematical motivation and explanation of these tables has not been supplied by the author. One procedure for deriving these coefficients is as follows. Suppose a function $f(t)$ is given at n points:

$$t = -\frac{n-1}{2}(1)\frac{n-1}{2} \text{ when } n \text{ is odd} ,$$

and

$$t = -\frac{n-2}{2}(1)\frac{n}{2} \text{ when } n \text{ is even} .$$

Assume further that $f(t + n) = f(t)$ for all t. Then the interpolation formula

$$f(t) = \sum_{m=-\infty}^{\infty} \frac{\sin \pi(t - m)}{\pi(t - m)} f(m)$$

reduces to

$$f(t) = \sum_{k=-(n-1)/2}^{(n-1)/2} \sum_{m=-\infty}^{\infty} \frac{\sin \pi(t - k + mn)}{\pi(t - k - mn)} f(k)$$

when n is odd. Thus, in this case

$$f(t) = \sum_{k=-(n-1)/2}^{(n-1)/2} A(k) f(k) \,,$$

where

$$A(k) = \frac{\sin \pi(t-k)}{\pi} \left[\frac{1}{t-k} + \sum_{m=1}^{\infty} (-1)^m \frac{2(t-k)}{(t-k)^2 - (mn)^2} \right] = \frac{\sin \pi(t-k)}{n \sin \pi(t-k)/n} \,.$$

When n is even, a similar manipulation leads to the result

$$A(k) = \frac{\sin \pi(t-k)}{\pi} \left[\frac{1}{t-k} + \sum_{m=1}^{\infty} \frac{2(t-k)}{(t-k)^2 - (mn)^2} \right] = \frac{\sin \pi(t-k) \cos \pi(t-k)/n}{n \sin \pi(t-k)/n} \,.$$

From this derivation of the formulas for the interpolation coefficients $A(k)$ it is evident that the author's descriptive phrase "folding, accordion style" is inaccurate in characterizing this type of interpolation.

J. W. W.

1. MATHEMATICAL TABLES PROJECT, WORK PROJECTS ADMINISTRATION, *Tables of Lagrangian Interpolation Coefficients,* Columbia Univ. Press, New York, 1944.

36[2.05, 2.10, 2.20, 2.25, 2.30, 2.35, 3, 5, 7, 8, 12].—ANTHONY RALSTON & HERBERT S. WILF, Editors, *Mathematical Methods for Digital Computers,* Vol. 2, John Wiley & Sons, Inc., New York, 1967, x + 287 pp., 27 cm. Price $11.95.

In a format similar to that of the first volume, but considerably improved, the editors have collected the contributions of experts in special areas of numerical analysis, calculation and programming languages. The first chapter gives a critical analysis of FORTRAN versus ALGOL and then makes comments about their limitations. Each subsequent writer presents a theoretical treatment of a method or class of methods for accomplishing a particular numerical calculation. In addition, flow charts, FORTRAN programs, estimates of running time and other practical hints are provided.

The depth of the analyses is variable, but appropriate to the complete understanding of the different methods. The list of the chapter headings and authors attests to the usefulness and the excellence of the exposition.

Part I. Programming Languages
1. An Introduction to FORTRAN and ALGOL Programming—Niklaus Wirth

Part II. The Quotient-Difference Algorithm
2. Quotient-Difference Algorithms—Peter Henrici

Part III. Numerical Linear Algebra
3. The Solution of Ill-Conditioned Linear Equations—J. H. Wilkinson
4. The Givens-Householder Method for Symmetric Matrices—James Ortega
5. The *LU* and *QR* Algorithms—B. N. Parlett

Part IV. Numerical Quadrature and Related Topics
6. Advances in Numerical Quadrature—Herbert S. Wilf
7. Approximate Multiple Integration—A. H. Stroud
8. Spline Functions, Interpolation, and Numerical Quadrature—T. N. E. Greville