This is a very useful book, which also sets a new style for books in numerical analysis. Similar books are needed for many other problem areas.

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27 [2.05.03].—HERBERT E. SALZER, NORMAN LEVINE & SAUL SERBEN, *Hundred-Point Lagrange Interpolation Coefficients for Chebyshev Nodes*, 47 computer printout sheets, 1969, deposited in the UMT file.

Tables of Lagrange interpolation coefficients $L_i^{(100)}(x)$, where

$$L_i^{(100)}(x) = \prod_{j=1, j\neq i}^{100} (x - x_j) \Big/ \prod_{j=1, j\neq i}^{100} (x_i - x_j),$$

are given for the Chebyshev nodes

$$x_i = -\cos[(2i - 1)\pi/200], \qquad i = 1(1)100,$$

for $x = 0(0.01)1.00$, to 26S. For negative arguments, we have

$$L_i^{(100)}(-x) = L_{101-i}^{(100)}(x).$$

$L_i^{(100)}(x)$ is tabulated so that there is a separate block of four columns for each i, and is read horizontally. The argument x is not printed, and the 2nd through 26th digits are unseparated.

Three functional checks,

$$\sum_{i=1}^{100} L_i^{(100)}(x) = 1, \quad \sum_{i=1}^{100} x_i L_i^{(100)}(x) = x \quad \text{and} \quad \sum_{i=1}^{100} x_i^2 L_i^{(100)}(x) = x^2,$$

for $x = 0(0.01)1.00$, were performed upon the entries on tape before final printout, the greatest relative deviation from a true answer being $< \frac{1}{4} \cdot 10^{-21}$. The user is cautioned that these checks upon the 26S entries, prior to printout, cannot guarantee the correctness of digits on tape which occur beyond the twenty-first decimal place, or the accuracy of the printout in any place. However, it appears likely that all entries are correct to around 23S.

It was not noticed until 1975 that the printout was defective in that minus signs were not printed in all the first columns, making uncertain twenty-five percent of the entries. As the means and opportunity for reproducing a corrected version of the printout were no longer available, a careful determination was made of the locations of the missing minus signs, which were then inserted by hand.

AUTHOR'S SUMMARY (H. E. S.)

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28 [2.10].—PHILIP J. DAVIS & PHILIP RABINOWITZ, *Methods of Numerical Integration*, Academic Press, New York, 1975, xii + 459 pp., 24 cm. Price $34.50.

This book is an expanded and updated successor to the previous works on this subject by the same authors, *Numerical Integration*, Blaisdell Publishing Co., Waltham, Mass., 1967 (see *Math. Comp*, v. 22, 1968, pp. 459–460; *Math. Reviews*, v. 35, 1968, #2482). The new version is almost exactly twice the size of the old, yet retains the sparkle of the original version. The overall organization is the same, with about sixty-four new sections and subsections added, some of the latter being interpolated two deep. Even to list these would go beyond the limits of this review, so only a few high points will be noted. Chapter 1, Introduction, has been augmented by material on orthogonal polynomials and extrapolation and speed-up. Chapter 2, Approximate Integration over a Finite Interval, has been augmented by a discussion of spline interpolation with applications to numerical integration, the Kronrod scheme, and a number of other methods developed recently. Chapter 3, Approximate Integration over Infinite Intervals, contains a wealth of new material on the Fourier transform, including the discrete Fourier transform and fast Fourier transform methods, and the Laplace transform and its numerical inversion. Chapter 4, Error Analysis, in addition to other new topics, contains a greatly expanded treatment of the applications of functional analysis to numerical integration. Chapter 5, Approximate Integration in Two or More Dimensions, has a new section on the state of the art in this extremely difficult field. Chapter 6, Automatic Integration, has been supplemented by a number of new results. As one might expect, a number of programs (about eight) have been added to Appendix 2, FORTRAN Programs, and Appendix 3, Bibliography of ALGOL, FORTRAN, and PL/I Procedures has been increased by about seventy-two items. Additions have been made to Appendix 4, Bibliography of Tables, and about six hundred and forty-nine additional entries have been made to Appendix 5, Bibliography of Books and Articles, showing the feverish activity in this field, as well as the scholarly diligence of the authors.

The previous version was an excellent example of mathematical typography at its best; the present book, if anything, is even easier to read. A random inspection finds an "l" missing from Zweifel's name on p. 180, but nothing serious in the way of misprints was noted.

A mere recitation of details does not do justice to this book. Each section and subsection gives a clear statement of the basic idea discussed, its theoretical foundation, proofs (if needed), examples, and references. It is a rare achievement to produce a book which is an inspiration to the student, useful to the occasional as well as the frequent practitioner, and invaluable to the theoretician as a resource; but that is what the authors have done.

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29 [3, 13].—William C. Maguire, *Rotation Matrices $d^j_{m'm}$ for Argument $\pi/2$ in Numerically Factored Form,* ms. of seventy computer pages deposited in the UMT file, May 1975.

This unpublished table gives the rotation matrices $d^j_{m'm}(\beta)$ for arguments $\pi/2$ for integer values j from 1 to 30 in the form $2^{-k}\Pi p_i\sqrt{\Pi p_i}$, p prime. The matrices are defined as in Edmonds [1]. An effort has been made to see that all integers are prime (except for powers indicated by ** powers), but the seventy-five largest integers, each greater than 100,000, have not been checked. A test calculation has been made and a third separate calculation [2] shows no differences to the latter's five available decimal places. The computations were performed at NASA/Goddard Space Flight Center on an IBM 360/91 with the main algorithms written in FORMAC and PL/I.

Author's Summary

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