REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

1[2.10, 7].—O. V. BABURIN & V. I. LEBEDEV, "O vychislenii tablits korneĭ i vesov polinomov Ērmita i Liagerra dlia $n = 1(1)101$" ("On the calculation of a table of zeros and weights of Hermite and Laguerre polynomials for $n = 1(1)101$"), *Zh. Vychisl. Mat. i Mat. Fiz.*, v. 7, 1967, pp. 1021–1030.

Herein are described the mathematical and computational details (including error estimates) of the electronic digital calculation of the zeros of the first 101 Hermite and Laguerre polynomials, respectively, and of the coefficients (weights) for the associated quadrature formulas

$$\int_a^b p(x)f(x)dx = \sum_{k=1}^{n} B_k F(x_k) + R_n ,$$

where $F(x_k) = p(x_k)f(x_k)$; $p(x) = e^{-x^2}$, $a = -\infty$, $b = \infty$, for Gauss-Hermite quadrature; and $p(x) = e^{-x}$, $a = 0$, $b = \infty$, for Gauss-Laguerre quadrature.

Excerpts of this table that are reproduced in this paper consist of 16S values of the zeros, x_k, and weights, B_k, for $n = 60$, 100, and 101 for the Hermite polynomials (Tables 1–3), and for $n = 60$ and 100 for the Laguerre polynomials (Tables 4, 5).

This reviewer has compared the contents of Table 5 with the corresponding 24S values in the unpublished table of Berger & Danson [1], and has detected just two discrepancies; namely, the first two values of B in Table 5 are too high by three units and one unit, respectively, in the last decimal place. A comparison of the zeros of both the Hermite and Laguerre polynomials when $n = 60$ (Tables 1 and 4) with the corresponding 30S approximations in the tables of Stroud & Secrest [2] has revealed no discrepancies. Comparison of the corresponding weights was not possible, inasmuch as Stroud & Secrest tabulate coefficients A_i, which are equal to $p(x_i) \cdot B_i$, in the notation of this paper.

So far as the reviewer is aware, the data constituting Tables 2 and 3 appear to be new.

Appended to this informative and useful paper is a list of the nine references that are cited in the text.

J. W. W.

1. B. S. BERGER & R. DANSON, *Tables of Zeros and Weights for Gauss-Laguerre Quadrature*, ms. deposited in UMT file. (See *Math. Comp.*, v. 22, 1968, pp. 458–459, UMT **40**.)
2. A. H. STROUD & D. SECREST, *Gaussian Quadrature Formulas*, Prentice-Hall, Englewood Cliffs, N. J., 1966. (See *Math. Comp.*, v. 21, 1967, pp. 125–126, RMT **14**.)

2[4, 5, 6].—SUSAN J. VOIGHT, *Bibliography on the Numerical Solution of Integral and Differential Equations and Related Topics*, Report 2423, Naval Ship Research and Development Center, Washington, D. C., November, 1967, ii, 526 pp., 27 *cm*.

This is a valuable reference. It covers various aspects of the numerical solution of differential (ordinary and partial) and integral equations including methods of solution, computer programs for developing solutions and existence and properties of the solutions. Mixed type equations are also covered. Related topics such as matrix manipulation have been included to some extent in view of their application to particular methods.

Books, journals and research reports (both government and industry) are referenced. The time period is mostly 1960–1966, though numerous earlier references are also presented.

There are essentially four parts. The first is a bibliography of entries giving title and source of article, where it is reviewed, abstracted, etc. In illustration of the review aspect, the bibliography notes where an article has been reviewed in *Mathematical Reviews, Computing Reviews, Nuclear Science Abstracts,* etc. The entries in this part are not completely alphabetized by author. Here each entry is given an accession number to facilitate cross-referencing with other parts. The second part is an author index. The third part is a source index listing the source abbreviations used throughout the volume. The fourth part and perhaps the most useful for information retrieval is a Key-Word-In-Context (KWIC) index of titles of articles. This is not a subject index but rather a list of all the titles each permuted about all the significant words in the title.

There are three appendices. Appendix A describes the bibliography format. Appendix B gives a key which tells the language in which an article is written. Appendix C presents a transliteration scheme from the Cyrillic alphabet. Additional information on the project and its development is found in the introduction.

The value and usefulness of this volume to all research workers is clear. We hope that steps are being taken to continually update the literature of the subject at hand, and to extend these ideas to other segments of the mathematical literature.

Y. L. L.

3[4, 5, 6, 7, 13.15].—R. Sauer & I. Szabo, Editors, *Mathematische Hilfsmittel des Ingenieurs,* Part I: G. Doetsch, F. W. Schäfke & H. Tietz, Authors, Springer-Verlag, New York, 1967, xv + 496 pp., 24 cm. Price $22.00.

This is the first volume of a projected four-volume set. Though labelled as a handbook for engineers, the material is useful to all applied workers. The present volume is divided into three parts.

The first part written by H. Tietz is on function theory. Here in 84 pages are covered the rudiments (mostly without proof) of complex variable theory, elliptic functions, and conformal mapping.

The second part written by F. W. Schäfke deals with special functions. The special functions are conceived as those functions of mathematical physics which emerge by separation of the 3-dimensional wave equation $\Delta u + k^2 u = 0$ by use of certain orthogonal coordinate systems. To this class of functions, the Γ-function is also appended. The latter is treated in the first section. Separation of the wave equation in various coordinate systems is taken up in the second section. The next eight sections deal with cylinder functions, hypergeometric function (the Gaussian ${}_2F_1$), Legendre functions, confluent hypergeometric functions, special functions which satisfy the relation $a(x, \alpha)(dy/dx)(x, \alpha) + b(x, \alpha)y(x, \alpha) = y(x, \alpha + 1)$, orthogonal polynomials (mostly classical), Mathieu functions and spheroidal functions. For the most part, proofs are given. A considerable amount of material is covered in 145 pages, though much valuable material was evidently omitted in view