REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

16[G H].—ÉMILE DURAND, *Solutions Numériques des Équations Algébriques*, Masson et Cie, Editeurs, Paris, 1961, viii + 445 p., 24.5 cm. Price 90 NF.

The second volume of Durand's work includes the following chapters: General Properties of Matrices; Discrete Methods for Linear Systems; Iterative Methods for Linear Systems; and Inversion of Matrices.

In these chapters, the author essentially considers problems related to the evaluation of small or medium systems of algebraic equations (iterative methods in the case of two variables).

The rest of the volume is devoted to methods for the determination of characteristic values of matrices by reduction to diagonal form, to triangular form, and to tridiagonal form. Other topics include deflation, solution of non-linear systems, and iterative methods applied to vectors.

The work includes numerous computational examples, as well as contributions of the school of Toulouse to the development and improvement of numerical methods.

The general impression that one obtains from the book is that it contains a series of methods rather than a unified theory. Particularly, the theory of errors is limited to consideration of common-sense methods and certain rules.

The book does not contain a bibliographic index, but only references in the course of the text and a brief list at the end.

The presentation is very clear, and the volume should have bright prospects as an instruction manual.

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17[I].—HERBERT E. SALZER, GENEVIEVE M. KIMBRO, & MARJORY M. THORN, *Tables for Complex Hyperosculatory Interpolation over a Cartesian Grid*, General Dynamics/Astronautics, San Diego, 1962, 71 p., 27.4 cm.

As stated in the introduction, these tables are designed to facilitate interpolation for analytic functions tabulated over a Cartesian grid in the complex plane, when the values of the first and second derivatives are known or readily obtainable at the tabular points. This "hyperosculatory" interpolation formula is thus a special case of the Hermite interpolation formula, as the authors note explicitly.

The hyperosculatory formula, with remainder term, is written in the form

$$f(z_0 + Ph) = \sum_j \{A_j^{(n)}(P)f(z_j) + hB_j^{(n)}(P)f'(z_j) + h^2C_j^{(n)}(P)f''(z_j)\} + h^{3n}[\Pi_j(P-j)]^3\lambda f^{(3n)}(\alpha)/(3n)!$$

Here, $z = z_0 + Ph$ lies within or upon the side of a square Cartesian grid of length h in the complex plane. The fixed point z_0 constitutes the lower left corner of that square, and $z_j = z_0 + jh$, where j is a Gaussian integer. Furthermore, $P = p + iq$, where $0 \leqq p \leqq 1$, $0 \leqq q \leqq 1$. The polynomial coefficients $A_j^{(n)}(P)$, $B_j^{(n)}(P)$, and $C_j^{(n)}(P)$, are of degree $3n - 1$ in P. Explicit expressions for them are listed for

$n = 2$, 3, and 4, and for selected fixed points z_j. Exact decimal values of these coefficients are then tabulated for $p = 0$ (0.1) 1 and $q = 0$ (0.1) 1, corresponding to $n = 2$, 3, and 4.

To expedite the estimate of the remainder term, the function $F(n, P) \equiv |[\Pi_j(P - j)]^3|/(3n)!$ is separately tabulated to two significant figures, for every n and P occurring in the main tables.

Use of these tables is illustrated by an application of three-point hyperosculatory interpolation coefficients to the subtabulation of the modified Hankel function of the first kind and of order one-third, using selected entries from tables [1] of this function for a complex argument.

A reference list of fifteen publications is included.

J. W. W.

1. THE COMPUTATION LABORATORY OF HARVARD UNIVERSITY, *Annals*, Vol. II: *Tables of the Modified Hankel Functions of Order One-Third and of their Derivatives*, Harvard University Press, Cambridge, 1945.

18[J, L, M].—HAROLD JEFFREYS, *Asymptotic Approximations*, Oxford University Press, 1962, 144 p., 22 cm. Price $4.80.

This book treats, in a concise manner, modern work on asymptotic approximations to functions defined either by a definite integral or by a differential equation. The theory is illustrated by means of Bessel functions, the confluent hypergeometric function, and Mathieu functions. A brief discussion of Airey's convergence factor is given, and the book closes with a chapter devoted to the difficult problem of three-dimensional waves. We feel sure that the book will prove useful to students of problems that are attracting considerable attention, but the brevity of the treatment does not make its reading easy. However, ample references are given and difficulties encountered may be overcome by turning, if necessary, to Erdélyi's book [1] and to Langer's papers. The printing is of the high quality we have come to expect from the Oxford University Press.

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1. A. ERDÉLYI, *Asymptotic Expansions*, Dover Publications, Inc., New York, 1956.

19[K].—ANNA GLINSKI & JOHN VAN DYKE, *Tables for Significance Tests in a 2 × 2 Contingency Table (A Recomputation of the Finney and Latscha Tables)*, Statistical Engineering Laboratory, National Bureau of Standards, Washington 25, D.C., September 1962, 5 + 86 p. Deposited in UMT File.

These manuscript tables cover the same range as the original table of Finney [1] together with the extension by Latscha [2], namely, $A = 3(1)20$, $B \leqq A$. The format of these earlier tables is retained, except that the "tail probabilities" now appear to four decimal places instead of three. The authors state that these more precise values were obtained from the Lieberman-Owen tables [3] of the hypergeometric distribution. Errors in the tables of Finney and Latscha as revealed by this recomputation have been reported earlier (*Math. Comp.*, v. 16, 1962, p. 261–262).