ELLIOTT, D. (1964). "The Evaluation and Estimation of Coefficients in the Chebyshev Series Expansion of a Function," *Math. of Comp.* Vol. 18, p. 274.
FILIPPI, S. (1964). "Angenäherte Tschebysheff—Approximation einer Stammfunktion—eine Modifikation des Verfahrens von Clenshaw und Curtis," *Numerische Mathematik*, Vol. 6, p. 320.
FOX, L. (1962)' "Chebyshev Methods for Ordinary Differential Equations," *The Computer Journal*, Vol. 4, p. 318.
GAWLIK, H. J. (1958). *Zeroes of Legendre Polynomials of Orders 2–64 and Weight Coefficients of Gauss Quadrature Formulae*, Armament Research and Development Establishment, Memorandum (B)77/58. Kent, England.
GOLOMB, M. (1962). *Lectures on Theory of Approximation*, Argonne National Laboratory.
HESTENES, M. R. (1949). *Numerical Methods of Obtaining Solutions of Fixed End Point Problems in the Calculus of Variations*, Rand Corp. Report RM–102.
KALABA, R. (1959). "On Nonlinear Differential Equations, the Maximum Operation, and Monotone Convergence," *J. Math. Mech.* Vol. 8, p. 519.
KANTOROVICH, L. V. (1948). "Functional Analysis and Applied Mathematics," Dokl Akad Nauk, SSSR (N.S.) 59, p. 1237.
KIZNER, W. (1964a). "A High Order Perturbation Theory Using Rectangular Coordinates." *Celestial Mechanics and Astrodynamics*, Academic Press.
KIZNER, W. (1964b). "A Numerical Method for Finding Solutions of Non-linear Equations," *J. Soc. Indust. Appl. Math*, Vol. 12, No. 2, p. 424.
LANCZOS, C. (1956). *Applied Analysis*, Prentice Hall, New York.
LEFSCHETZ, S. (1962). *Differential Equations: Geometric Theory*, 2nd ed., Interscience, New York.
MCGILL, R. and Kenneth, P. (1964). "Solution of a Generalized Newton-Raphson Operator" *AIAA Journal*, Vol. 2, No. 10, p. 1761.
NATANSON, I. P. (1955). *Konstruktive Funktionentheorie* (German translation), Akademie-Verlag, Berlin. (Part of the book is available in English in *Constructive Function Theory*, Vol. 1, Ungar, 1964.)
NORTON, H. J. (1964). "The Iterative Solution of Non Linear Ordinary Differential Equations in Chebyshev Series," *The Computer Journal*, Vol, 7, p. 76.
RALSTON, A. (1962). "Runge-Kutta Methods With Minimum Error Bounds," *Math. of Comp.*, Vol. 16, p. 431.
WRIGHT, K. (1964). "Chebyshev Collection Methods for Ordinary Differential Equations," *The Computer Journal*, Vol. 6, p. 358.

Book Review

The Algebraic Eigenvalue Problem, by J. H. Wilkinson, 1965; 662 pages. (London: *Clarendon Press; Oxford University Press*, 110s.).

The first chapter of this book contains an account of the mathematical background to the algebraic eigenvalue problem, with emphasis on the manner in which the eigensystem is related to the various canonical forms of a matrix. The remainder of the book deals with the practical problems involved in computing eigenvalues and eigenvectors on a digital computer and in determining their accuracy.

Chapter 2 discusses the way in which the eigensystem is affected by small changes in the elements of the matrix. This leads to a chapter on error analysis of the type that the author has especially pioneered. In Chapter 4 the earlier material is applied to the problem of solving linear algebraic equations and some consideration is given to the various numerical methods that are available.

In Chapter 5 the author describes techniques for solving the eigenvalue problem for Hermitian matrices. This is one of the most important chapters in the book. In Chapter 6 the author passes to the more difficult problem of computing the eigensystem of a general matrix and deals in particular with its reduction to condensed (Hessenberg) form. He then goes on to describe how eigenvalues and eigenvectors of the condensed matrix can be obtained. The two final chapters deal with the LR and QR algorithms and with iterative methods.

No review would give an adequate impression of this book if it did not emphasize its massive character. Most of the chapters are around 70 pages in length and the whole book runs to about 650 pages. The chapters start with the briefest of statements as to their scope and are packed with detailed information. The book is designed for the professional numerical analyst with research interests in the field, and in no way caters for the less specialized worker who would like to obtain an understanding of the problems at a less detailed level. However, an exception must be made in the case of the first chapter, which will undoubtedly be of real use to many people who will not make much of the rest of the book. In spite of all the detail, the author nowhere goes off into realms of purely mathematical interest; as anyone who knows him would expect, he keeps in sight throughout the ultimate objective of practical computation on a digital computer. The book is without doubt an important addition to the specialized literature on numerical analysis.

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