

REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the indexing system printed in Volume 28, Number 128, October 1974, pages 1191–1194.

- 1 [14].—H. A. LAUWERIER, *Asymptotic Analysis*, Mathematisch Centrum, Amsterdam, 1974, i + 145 pp., 25 cm. Price Dfl. 16.

This little book contains the expanded lecture notes of courses on asymptotic methods given for students in mathematical physics at the University of Amsterdam. The book is entirely devoted to the study of asymptotic series and asymptotic evaluation of integrals. The standard topics are covered, e.g., the methods of Laplace and Kelvin, the saddle point method of stationary phase, etc. Each topic is illustrated with examples which are worked out in detail. In addition, various special topics are discussed such as the asymptotic behavior of Cauchy integrals and asymptotics in the theory of probability.

The book is clearly and carefully written and would, with some supplementary material on differential equations, make an excellent text.

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- 2 [2].—L. COLLATZ & W. WETTERLING, Editors, *Numerische Methoden bei Optimierungsaufgaben*, Band 2, ISNM International Series of Numerical Mathematics, Vol. 23, Birkhäuser Verlag, Basel, 1974, 165 pp., 25 cm. Price \$13.00.

This volume contains papers presented at a meeting organized by L. Collatz and W. Wetterling on “Numerical Methods in Optimization Problems” held November 18–24, 1973 at the Mathematical Research Institute at Oberwolfach.

J. B.

- 3 [3.15], [5.15].—L. COLLATZ & K. P. HADELER, Editors, *Numerische Behandlung von Eigenwertaufgaben*, ISNM International Series of Numerical Mathematics, Vol. 24, Birkhäuser Verlag, Basel, 1974, 142 pp., 25cm. Price \$12.00.

This volume contains papers presented at a meeting organized by L. Collatz and K. P. Hadeler on “Numerical Treatment of Eigenvalue Problems” held November 19–24, 1972 at the Mathematical Research Institute at Oberwolfach.

J. B.

- 4 [2.05].—P. L. BUTZER & B. SZ.-NAGY, *Linear Operators and Approximation. II*, ISNM International Series of Numerical Mathematics, Vol. 25, Birkhäuser Verlag, Basel, 1974, 585 pp., 25 cm. Price \$33.00.

This volume contains papers presented at a meeting organized by P. L. Butzer and B. Sz.-Nagy on “Linear Operators and Approximation. II” held March 30 to April 6, 1974, at the Mathematical Research Institute at Oberwolfach.

J. B.

- 5 [3.15].—B. T. SMITH, J. M. BOYLE, B. S. GARBOW, Y. IKEBE, V. C. KLEMA & C. B. MOLER, *Matrix Eigensystem Routines—EISPACK Guide*, Springer-Verlag, Berlin, 1974, 387 pp., 24cm. Price \$11.50.

This text is part of the lecture notes in computer science series of Springer-Verlag. It is a user guide to EISPACK and to a control program EISPAC.

EISPACK is a systematized collection of Fortran subroutines which compute the eigenvalues and eigenvectors for matrices in one of six classes: complex general, complex Hermitian, real general, real symmetric tridiagonal, and special real tridiagonal.

The subroutines are based mainly upon Algol procedures published in the Handbook series of Springer-Verlag by Wilkinson and Reinsch [1].

The text is divided into seven sections. Section 1 is an introduction that discusses briefly the development of the codes from their Algol base to the systematized collection of certified FORTRAN subroutines that resulted.

Section 2 is a guide to using EISPACK. It describes how one can link EISPACK subroutines together to solve various eigenproblems. Such linkages are called paths in the discussion.

The user first selects one of twenty-two categories of the eigenproblem. A table gives the corresponding subsection within the text that discusses the recommended path for the given category. Each of these subsections gives clear instructions on how to use EISPACK subroutines or the EISPAC control program to solve the problem. Other subsections discuss variations of the recommended EISPACK paths, and give additional information and examples.

Sections 3, 4, 5, and 6 discuss validation of EISPACK, execution times for EISPACK, certification and availability of EISPACK, and the differences between EISPACK subroutines and Handbook Algol procedures, respectively.

Section 7 contains complete documentation and FORTRAN source listings for EISPACK subroutines. Documentation is also given for the EISPAC control program.

This is an excellent text valuable not only for potential users but also as a reference text for persons in the mathematical software area. It does attain the goal that so many seek, of producing a well-documented, thoroughly tested, easy-to-use collection of subroutines.

T. J. AIRD

1. J. H. WILKINSON & CHRISTIAN REINSCH, *Handbook for Automatic Computation*, vol. 2, *Linear Algebra*, Part II, Die Grundlehren der math. Wissenschaften, Bd. 186, Springer-Verlag, New York, 1971.

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6 [9].—ROBERT BAILLIE, *Table of $\phi(n) = \phi(n + 1)$* , Computer-Based Education Lab., University of Illinois, Urbana, 1975. Thirty-eight computer output pages deposited in the UMT file.

With $\phi(n)$ being Euler's function, there are listed here all 306 solutions of

$$\phi(n) = \phi(n + 1)$$

for $1 \leq n \leq 10^8$. The factorizations of n , $n + 1$, and $\phi(n)$ are included. This extensive computation goes far beyond Ballew, Case & Higgins [1] who gave the eighty-nine solutions $< 28 \cdot 10^5$. If $E(m)$ is the number of solutions with $n \leq 10^m$, one has

m	$E(m)$	m	$E(m)$	m	$E(m)$
0	1	3	10	6	68
1	2	4	17	7	142
2	3	5	36	8	306