REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the indexing system printed in Volume 22, Number 101, January 1968, page 212.

1[2, 3, 4].—A. César de Freitas, *Introdução à Análise Numérica*, Vol. I, Universidade de Lourenço Marques, Moçambique, 1968, xii + 194 pp., 23 cm. Price $5.50.

This is the first of two volumes of an introductory textbook on Numerical Analysis. It contains the usual material on errors, finite differences, interpolation, numerical differentiation and quadratures, a very short review of numerical integration of ordinary differential equations, and a fairly extensive (relatively speaking) treatment of basic numerical linear algebra. This is probably one of the few books on the subject originally written in the Portuguese language and in that sense has special interest. The printing and general presentation are good.

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2[2, 3, 4].—I. P. Mysovskih, *Lectures on Numerical Methods*, Wolters-Noordhoff Publishing, Groningen, 1969, iii + 344 pp., 23 cm. Price $12.50.

The Russian version of this book appeared in 1962 and the subject matter appears to predate 1960. This is an excellent book when considered as a mathematical text. However, the author imposes a guideline which the computational scientist will find very restrictive. This is:

> The only computational problems considered seriously are those for which it is possible to place a rigorous numerical bound on the accuracy of the result.

For example, to illustrate how to locate a zero, the problem treated is one for which it is known that $f(a)\cdot f(b)$ is negative and $f'(x)$ is positive between a and b. The numerical quadrature section is extensively illustrated by integrating $\sin x/x$ between 0 and 1. It happens here that the nth derivative is bounded by $(n + 1)^{-1}$. Using this information, one starts by deciding which quadrature rule to use on the basis of the standard bound on the discretisation error. In the section on numerical differentiation, the words 'round-off error' do not occur.

This reviewer is a stranger to the world where numerical problems are so tractable, but I did enjoy reading about it. The book has four chapters. These treat numerical solution of equations, algebraic interpolation, numerical quadrature and initial value ordinary differential equations respectively. In each chapter a few methods are chosen and are given a careful, clear and rigorous treatment. The section on divided differences, for example, succeeded in being thorough without being excessively long. The Hermite osculating polynomial is treated by means of Cauchy's Theorem. This treatment happened to be new to this reviewer and seems much more suitable for sufficiently qualified students than the more familiar long-winded discussion. In the quadrature section, the relations between the trapezoidal rules and periodic integrands is introduced early on and a treatment of Bernoulli functions and polynomials is included.

I would recommend this book for instructors who will find excellent descriptions and proofs of various standard theorems in these fields. But students should be exposed to a more realistic view of computing than the one which might be inferred from reading this book.

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3[2, 4, 12].—RALPH H. PENNINGTON, *Introductory Computer Methods and Numerical Analysis*, 2nd ed., The Macmillan Co., New York, 1970, xi + 497 pp., 24 cm. Price $10.95.

The first edition of this textbook was published in 1965. (For a review thereof, see *Math. Comp.*, v. 20, 1966, pp. 198–199, RMT **43**.) This second edition incorporates a number of changes, revisions, and modernizations without at the same time altering the basic character of the original work. More explicitly than before, the author stresses that—to paraphrase his words—"he is drawn toward the needs of departments devoted to science, engineering, business administration, and so on", which "find it necessary to include some computer courses for their own purposes". In line with this, fundamental concepts and rigor "were allowed to suffer to some degree in order to include a sufficient number of descriptions of algorithms to leave the reader with a reasonably versatile beginner's kit of problem-solving tools". The background prerequisites have remained at the integral calculus level.

The overall organization of the book is essentially the same as before, although the arrangement of the material and its subdivision into chapters has been improved in places. The first five chapters now present the introduction to the fundamentals of computers and to FORTRAN programming (using ASA standards), and the remaining eight chapters cover the basic numerical methods traditional for this level.

In recognition of the growing importance of interactive computing, a rather novel change has been the introduction of a FORTRAN variation for remote-terminal operation. Also, the artificial hypothetical machine language used before has been modernized and modified as to resemble somewhat that of, say, the IBM 360 series. The discussion of several numerical topics has been added or enlarged. Newly included are Chebyshev series, Romberg integration, and in the differential equations chapter, the Euler-Romberg method, and the Adams-Moulton formulas (instead of Milne's method). The coverage of error propagation, Gaussian quadrature, and the Runge-Kutta method has been expanded. The abandonment of Sturm sequences in favor of Graeffe's method (called erroneously Graeff's method in the text and the index) should be a matter of opinion; rather questionable appears to be the complete replacement of Gaussian elimination by the Gauss-Jordan method for the sole stated reason that the latter gives "shorter and more understandable FORTRAN