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Book Reviews

Numerical Methods and Computers, by Shan S. Kuo, 1965; 341 pages. (Reading, Massachusetts: *Addison-Wesley Publishing Company, Inc.*, 59s.)

This book contains an introduction to computer programming, using FORTRAN, and some numerical methods for which corresponding programs are given. The book is divided into three parts, the first dealing with some of the principles of computers, the second with numerical methods and the third with "Modern methods."

In part I, there are five chapters which give a brief history of computers, a description of their main parts, methods of flow-charting, floating-point arithmetic, the main chapter describing FORTRAN as used on the IBM 1620.

In part II some numerical methods are described for dealing with the following problems: polynomial and transcendental equations, ordinary differential equations, simultaneous linear equations, latent roots and vectors of symmetric matrices, interpolation, curve-fitting and quadrature. All these topics are treated very superficially. There is also one brief chapter on errors, which concentrates on the effect of truncation errors in solving a differential equation.

In part III there are short descriptions of Monte Carlo methods and the use of the Simplex method for solving linear programming problems.

Although the book has been designed for the use of engineering and science students, I would not recommend its use. There are many errors; some only in detail such as requesting a subroutine to calculate the integer $N!$ for $N \leqslant 25$ although integers must be less than 10^5; and some more serious errors, such as the test for convergence of the Gauss-Seidel process for solving simultaneous linear equations which would, for example, indicate that the process had converged after the first iteration if a null vector had been used as the first approximation. In addition to the errors, another source of confusion is the explanation of some programming points. For example there is no clear distinction made between spaces between characters on a line and blank lines, and as a second example the only use of a *common* statement is in a two-segment program in which the variables assigned to the *common* area only occur in one of the segments. No mention is made of the efficiency of programs with regard to running time on a computer, and some of the examples given are not commendable in this respect.

The printing of the book is of high quality and there are few mis-prints.

V. E. PRICE

Elementary Numerical Analysis (*an algorithmic approach*), by S. D. Conte, 1965; 278 pages. (Maidenhead: *McGraw-Hill Publishing Company Ltd.*, 64s.)

This is a textbook for a first course in numerical methods for undergraduates in engineering and science, and is based on a "three-hour, one-semester" course taught at Purdue University. The emphasis is on methods (algorithms) for solving problems on a modern computer, and it is assumed that the student is familiar with a programming language, preferably FORTRAN.

For most of the algorithms we are given a mathematical derivation, together with a careful discussion of the accuracy to be expected. Where several alternative algorithms are available a comparison is made of their relative computational efficiency. Mathematical proofs of theorems have sometimes been omitted where the author considered them inappropriate for the students he had in mind.

There is a large number of worked examples, many of them complete with a flow chart, a program in FORTRAN IV, and actual computer results obtained on an IBM 7090. In fact the presentation of extensive tables of computer results is a special feature of this book, and should help a student to gain insight into the accuracy and efficiency of the various numerical processes, even if he does not have access to a computer himself. However, the author intends that the student should use a computer and write programs for the solution of problems.

The chapter headings are as follows: number systems and errors, the solution of nonlinear equations, interpolation and approximation, differentiation and integration, matrices and systems of linear equations, the solution of differential equations, and boundary-value problems in ordinary differential equations. The author has covered a wide range of numerical methods under these headings, and the book will undoubtedly prove useful to the students for whom it is intended.

Among topics that have *not* been included are least squares methods, curve fitting, linear programming, Monte Carlo methods, and partial differential equations. The only concession that is made to readers unfamiliar with FORTRAN is the inclusion of a book on *Numerical Methods and FORTRAN Programming* in the list of references.

The book is attractively printed and includes a good index.

L. A. G. DRESEL