101[X, Z].—JOHN M. McCORMICK & MARIO G. SALVADORI, *Numerical Methods in FORTRAN*, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1964, 324 pp., 23 cm. Price $14.00.

This is an elementary numerical analysis book designed for undergraduate use. According to the dust jacket, "The only mathematical prerequisites are a knowledge of elementary calculus and an awareness of the existence and importance of differential equations." A unique feature is that most of the numerical methods are illustrated by complete programs written in FORTRAN II. The dust jacket also states, "Explanatory notes, flow charts, and beginners hints provide a complete handbook in FORTRAN."

The FORTRAN programs have been placed in a separate section, occupying somewhat more than half of the book. There is ample cross-referencing to the numerical methods which are presented in the first section. The topics covered are indicated by the chapter heading: (1) Computers and Programming, (2) Approximate Computations, (3) Differentiation, Integration, Interpolation and Extrapolation, (4) Solution of Algebraic and Transcendental Equations, (5) Simultaneous Linear Algebraic Equations, (6) Ordinary Initial-Value Problems, (7) Two-Dimensional Problems. The numerical analysis section covers 146 pages. The FORTRAN programs cover 171 pages.

A textbook which tries to cover two complementary subjects often fails to cover either adequately. This book suffers from this difficulty. The chapters on numerical analysis are very brief. Since they contain a good number of problems and worked examples, it is clear that theory gets the short end of things. The last chapter, on two-dimensional methods, includes interpolation, integration, and partial differential equations, all in 21 pages. This is pretty thin stuff. The other chapters are more satisfactory and present standard numerical methods in a terse cookbook style. The last part of the book gives a set of complete FORTRAN programs together with flow charts, hints, and printouts of results. Many students and teachers would find this section useful. It does not, however, constitute a complete course in FORTRAN programming, and needs to be supplemented with additional material.

There have been a number of books published which purport to teach numerical analysis and computer programming. Even with their faults, it is often convenient to have one textbook instead of two, particularly if the price of the book is reasonable. At the quoted price of this book, the reviewer feels that one would get more for his money by buying two books which treat each subject separately.

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102[Z].—FRANZ L. ALT & MORRIS RUBINOFF, Editors, *Advances in Computers*, Volume 5, Academic Press Inc., New York, 1964, xiii + 397 pp., 24 cm. Price $14.00.

The volume under review consists of seven articles by specialists.

The first, "The role of computers in election night broadcasting," by Jack Moshman, is very interesting and carries the weight of one of the leading experts in the field.

The second, "Some results of research on automatic programming in eastern Europe," by Wladyslaw Turski, is also very interesting, though at times it is a bit cryptic.

The third and longest (127 pp.), "A discussion of artificial intelligence and self-organization," by Gordon Pask, reveals that the field has developed its own literature (204 references), jargon, and conventions which the outsider (this reviewer) finds incomprehensible. Thus, "Since we are considering the real world, a computing machine is *not* a typical localized automaton. It has an aura of permanence which belies the fact that any localized automaton, open to the structural perturbations of the real world, has a finite life span. A better exemplar, perhaps, is an ape in a cage." That one should draw such distinctions, and continue to discuss them for some pages, makes the outsider wonder at the level of science being done.

The fourth article, "Automatic optical design," by Orestes N. Stravroudis, gives a good deal of information about one of the earliest applications of digital computers and presents both the history and the current state in a manner that is quite readable to anyone who knows some physical optics.

The fifth article, "Computing problems and methods in X-ray crystallography," by Charles L. Coulter, also treats a classic application in a manner that is reasonably clear.

The sixth, "Digital computers in nuclear reactor design," by Elizabeth Cuthill, being a topic of vast dimensions, tends at times to degenerate into listings of these and those codes, but is useful to the beginner (and perhaps the expert) in the field (386 references).

The last, "An introduction to procedure-oriented languages," by Harry D. Huskey, is a short article (28 pp.). It is interesting, and at least this reader wished that the author had taken more time and space on this important topic.

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103[Z].—DONALD I. CUTLER, *Introduction to Computer Programming*, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1964, viii + 216 pp., 24 cm. Price $9.35.

This book is intended to be a primer of basic programming concepts and is directed toward readers with no previous knowledge of computers and with a mathematical background of high school algebra. The presentation is based on a simple hypothetical binary computer called the EX-1, and the material is very standard and by nature similar to that of various other texts of this type. The first two-thirds of the work cover the rudiments of number representation, data representation in machines, flow diagramming, and programming the EX-1 in a simple assembly language, using both fixed- and floating-point arithmetic. Topics discussed include indexing, symbol tables and table-lookup, elements of sorting, and the subroutine concept. Also included are chapters on input-output and on scaling techniques for fixed-point arithmetic. In its final third section, the book enters into a somewhat vague descriptive presentation of "modern" topics. This begins with a cursory discussion of a "typical modern giant computer" and continues with the introduction of a compiler language called TRIVIAL. In both cases the presentation is extremely hurried and would undoubtedly be quite unsatisfactory for a novice reader.