process φ has the order p if

$$\frac{x_{n+1} - x^*}{(x_n - x^*)^p} \to C,$$

the asymptotic error constant. The order theoretically determines the speed of the convergence of the iteration sequence.

In some respect a more rounded theory might have been obtained if complex variables had been taken into consideration.

Well known mathematicians like Newton, Euler, Laguerre in the past, Ostrowski, Householder, Kantorovitch and many others have contributed to the subject. The simple Newton formula and the convergence of its iteration have been investigated from several points of view during the last 30 years. The formula has been generalized in many different ways already by Schröder. It has been extended to the solution of a system of equations.

This takes us near to another matter which has been excluded from the present work. Indeed iteration procedures, in particular Newton's formula, have been generalized to be applicable to equations in Banach spaces and in topological spaces by means of differentiation in the sense of Frechet and Gateaux and their close connection with general fixed point theorems has been recognized. Thus the subject has developed into a part of modern functional analysis.

H. Schwerdtfeger, McGill University

Numerical solution of partial differential equations, by G.D. Smith. Oxford, London, 1965. viii + 179 pages. $3.50.

This book is intended as a textbook for undergraduates in mathematics, physics, and engineering. It is well but concisely written. The good student should have little difficulty supplying the required details and should appreciate the numerous well-chosen numerical examples. The problems are very good and most have at least the outline of a solution supplied.

There are 5 chapters in the book. Independent chapters (2,4 and 5) on parabolic, hyperbolic, and elliptic equations require but a limited knowledge of matric algebra and no prior knowledge of the calculus of finite differences (which is discussed in chapter 1). The important chapter 3 on "Convergence, Stability, and Systematic Iterative Methods" group together those topics requiring a knowledge of matric algebra. This results in some redundancy in chapters 2, 4, and 5, and possibly a somewhat unnatural grouping of topics in chapter 3.

There are some flaws in the work. On page 14, the comparison of the error with $(\delta t)^p$ where the method is $0(\delta t)^p$ is extremely misleading. On page 60, the statement that the Fourier method is "the less rigorous because it neglects the boundary conditions" is questionable. The extensive treatment of iterative solution methods for implicit difference approximations to the heat conditions equation in one space variable seems to lack a certain amount of motivation.

As a text, this book fills a genuine gap in the literature and, on the whole, is recommended for use by senior undergraduates or by beginning graduate students.

R. G. Stanton, University of Waterloo

Discrete Dynamic Programming, by R. Aris. Blaisdell Publ. Co., New York (Division of Ginn and Co.), 1964. x + 148 pages.

A welcome feature of the publication scene in the past few years is the appearance of brief books devoted to timely topics and written in a style that makes them accessible to a wide class of readers. In the present case the required background appears to be little more than a good first course in calculus. Various types of optimization are described in the first chapter. The example of a chemical reaction in a sequence of tanks is then used to lead up to the formal definition of a discrete deterministic decision process, followed by the principle of optimality. The remaining chapters include graphical methods, Lagrange multipliers, problems drawn from economics, communication theory, curve fitting and reliability theory, the connection between the continuous and discrete cases, and some extensions to feedback systems and countercurrent systems.

The author's lucid style and the publisher's pleasing format combine to make a most attractive book. The bibliography is carefully keyed to the corresponding sections in the text (a minor error: the name Vajda is consistently misspelled Vadja).

H. Kaufman, McGill University

Computer Software. Programming Systems for Digital Computers, by Ivan Flores. x + 493 pages. Prentice Hall, Englewood Cliffs, N.J., 1965. $12.00.

This is one of the first text books to be written on computer programming systems - the software which is as important as the hardware of large scale digital computers, and as such it will be extremely valuable to the prospective systems programmer. The book is comprehensive and treats in considerable detail the concepts behind all aspects of systems programming as currently available in IBM 7094 systems. It includes a description of assembly systems, macro-commands, the IOCS buffer subsystems and operating commands, service systems, the monitor, the supervisor, and the loader. However, no mention is made of compiler techniques for translating from an algorithmic language