27[65–02, 65R20].—H. BRUNNER & P. J. VAN DER HOUWEN, *The Numerical Solution of Volterra Equations*, CWI Monographs, vol. 3, North-Holland, Amsterdam, 1986, xvi + 588 pp., $24\frac{1}{2}$ cm. Price \$55.00/Dfl. 150.00.

The numerical solution of Volterra equations (VE's) is a rather new subject. A subclass of VE's are ordinary differential equations (ODE's). The numerical treatment of this class is by now well understood. A commonly used approach, when discussing methods for VE's, is simply to transform results from ODE's to VE's. Concepts like convergence and stability are then inherited directly from the ODE theory without verifying their validity when applied to VE's. This book can be viewed as a milestone, in that it establishes the numerical solution of VE's as a subject on its own. The authors succeed in presenting the latest results for VE's in a readable way. A good background in ODE's, however, would be helpful for the reader. Various numerical concepts introduced are then easier to understand. The preface states that a background in calculus is sufficient as a prerequisite. I would recommend to supplement this with a course in basic numerical analysis.

In addition to dealing with the construction and convergence of multistep and Runge-Kutta type methods, there is a separate chapter on numerical stability. The authors recognize that the question of stability is still in its infancy. Some results are given, but a good deal more needs to be done in that direction.

The last chapter is dealing with software for VE's. An overview over available routines is presented, including an indication of their performance. Since there is very little tradition in writing codes for VE's, the book would have been even better if a discussion had been included on how to write a good code for VE's. For example, how does one treat the lag term in a satisfactory manner?

In the chapter on Runge-Kutta type methods, the Volterra series approach is only referred to. No details are given. In order to understand the construction of these methods, one has to read the appropriate literature. In my opinion, this is an inconvenience to the reader.

The historical notes are of great interest and value, as they provide a flavor of the evolution of the subject.

This monograph is well suited for any reader who wants to gain insight into the latest results on the numerical solution of VE's.

S.P.N.

28[65–01, 65H10].—ALEXANDER MORGAN, *Solving Polynomial Systems Using Continuation for Engineering and Scientific Problems*, Prentice-Hall, Englewood Cliffs, N.J., 1987, xiii + 546 pp., $23\frac{1}{2}$ cm. Price \$40.00.

The topic of this book is the computation of all solutions of a system of n polynomial equations in n variables, where n is assumed to be small. Such problems arise in many applications, and there is much interest in simple and reliable methods which do not require a deeper analysis. This excludes, for instance, Newton's method, since the determination of suitable initial approximations for all the solutions often requires more information about the system than is readily available.