Chapter 1 presents these algorithms, first in their basic scalar form, then their extensions to vector sequences, and finally their confluent forms.

Chapter 2 contains enough of the theory of these algorithms so that the reader can use them intelligently, not blindly. For each algorithm are given background, algebraic properties, and convergence theorems; proofs are omitted. The best single source for theoretical discussion with proofs is the author's lecture notes [1] which were reviewed by Evelyn Frank in *Math. Rev.*, v. 55, 1978, #13505.

Chapter 3 shows how these acceleration procedures can be used to solve actual problems. Many numerical examples are given. Applications include scalar sequences, summation of series, analytic continuation, Fourier series and Chebyshev series, solution of equations and systems of equations both linear and nonlinear, calculation of eigenvalues, numerical integration and differentiation, inversion of the Laplace transform, roots of polynomials, differential and integral equations.

Chapter 4 treats problems related to programming and computation: stability and propagation of errors, singular and near singular rules, stopping rules and economization of storage. Finally, there are subroutines, written in FORTRAN, to implement each of the algorithms. Having experimented successfully with some of these same subroutines a few years ago, I can attest to the fact that they do work.

In conclusion, a word about the author's credentials: Claude Brezinski obtained his Ph.D. under Gastinel at Grenoble in 1971. Since that time he has been a Maître de Conférence à l'Université des Sciences et Techniques de Lille and has been an active researcher, teacher, and organizer of, or participant in, conferences in the subject area and related areas. He is eminently qualified to write this book which, to the best of my knowledge, is the first of its kind.

R. P. EDDY

David Taylor Naval Ship Research and Development Center
Bethesda, Maryland

1. C. BREZINSKI, *Accélération de la Convergence en Analyse Numérique*, Lecture Notes in Math., Vol. 584, Springer-Verlag, Berlin, Heidelberg, New York, 1977.

3[3.00, 4.00, 5.00, 13.15].—ISAAC FRIED, *Numerical Solution of Differential Equations*, Academic Press, New York, 1979, xiii + 261 pp., 23 cm. Price $23.50.

This is a carefully written book that uses a judicious amount of engineering, mathematical, and physical intuition to describe the properties of: the physical problems, their mathematical formulations, and their numerical solution by finite difference and by finite element methods. The author has chosen examples that illuminate how and why the numerical methods work. In particular, he deals with the steady state string and beam equations as illustrations of boundary value problems for ordinary differential equations. He returns to the time dependent cases as illustrative of wave propagation problems for partial differential equations. Finite elements, energy theorems and estimates, eigenvalue problems, lumping, stiff systems, heat conduction are some of the topics treated in the book. Engineering students and others at the senior undergraduate or first year graduate level should be able to read this remarkably self-contained book, which has a wealth of good material. Engineers and other applied mathematicians should enjoy this work with its pertinent bibliographical references at the end of each chapter, and its extensive index. Many exercise problems of varying degrees of difficulty are offered to illustrate and extend the work in the text.

E. I.

4[7.20].—HENRY E. FETTIS & JAMES C. CASLIN, *Ten-Place Tables of the Voigt and Growth Functions*, Technical Report AFFDL-TR-77-86, Air Force Flight Dynamics Laboratory, Wright-Patterson Air Force Base, Ohio, August 1977, v + 161 pp., 28 cm.

The precision stated in the title of these definitive tables is somewhat misleading; more precisely, the entries in the two main tables are given to 11S in floating-point form, as calculated on the CDC 6600/Cyber 74 systems at the Air Force Flight Dynamics Laboratory.

The Voigt function $H(a, x)$, defined by the definite integral

$$H(a, x) = \frac{a}{\pi}\int_{-\infty}^{\infty} \frac{e^{-t^2}dt}{(x - t)^2 + a^2},$$

is herein tabulated for $a = .0001(.0001).001(.001).01(.01).1(.1)1$, $x = 0(.1)20$, and $x^{-1} = .001(.001).2$.

The Growth function $G(a, y)$, defined in terms of the Voigt function by the relation

$$G(a, y) = \int_{-\infty}^{\infty} [1 - e^{-yH(a,x)}]\, dx,$$

is tabulated for the same range of the parameter a and for $\log y = -2(.1)b$, say, where b ranges from 9.0 for $a = .0001(.0001).0003$ down to 4.8 for $a = .7(.1)1$. This upper limit for $\log y$ is such that for larger values the function $G(a, y)$ may be calculated conveniently to the tabular precision from its asymptotic expansion, which is presented on page 16 (Appendix 2).

Properties of the Voigt function and the method of computing its tabulated values are presented in Appendix 1; similar information for the Growth function appears in Appendix 2.

As noted in the Introduction, the Voigt function is encountered in the study of spectral line formation under the influence of Doppler broadening, and the Growth function describes the integrated absorptance.

On the final page of the report there appears a short table (whose heading should read $A_G/2b$) which corrects and extends to from 6S to 8S the four-figure table of the Growth function in [1].

Also included in this report is a list of 12 references, which includes citations of earlier tables of these functions and their applications.

J. W. W.

1. C. VAN TRIGT, T. J. HOLLANDER & C. T. J. ALKMADE, "Determination of the a'-parameter of resonance lines in flames," *J. Quant. Spectrosc. Radiat. Transfer*, v. 5, 1965, p. 813.