Chapter 11 presents the *B*-spline series and establishes the properties (well-conditioned, variation diminishing, etc.) of this series which make splines with this basis so effective in practice. The next chapter further explores the approximation theoretic properties of splines and introduces the important topic of knot placement. This line of investigation is continued in Chapter 13 where interpolation is studied in more depth. By this point all the machinery has been established for all the basic operations with splines.

The next three chapters present the more specialized topics of data smoothing, spline collocation for ordinary differential equations and special splines (taut, periodic and cardinal). Each of these chapters is a thorough development of the problem area complete with Fortran programs. The topics are developed carefully to illustrate how to accomplish things with the previously developed machinery, and they further illustrate the strengths and weaknesses of various ways to apply splines. These chapters contain a lot of original and important new material.

The final chapter introduces the important problem of surface approximation. Only tensor product methods are considered, but these are very important in applications. A very clever scheme is presented to take the tensor product of *Fortran programs* and thus easily extend 1-dimensional algorithms to several dimensions.

The book closes with a short discussion of "things not covered". We can hope that some day de Boor will cover these other important topics with the same elegant and penetrating manner that he used to introduce us to the use of splines.

J. R.

2[2.35].—CLAUDE BREZINSKI, *Algorithmes d'Accélération de la Convergence Etude Numérique*, Editions TechniP, 27 Rue Ginoux, 75735 Paris, France, 1978, xi + 392 pp., 24 cm. Price 195 French francs (≈ U. S. $45.00).

The author's intentions are announced at the beginning of the preface: "This book is addressed to engineers, researchers and students who need to use methods for accelerating convergence in the course of their work; it has, moreover, been written at the suggestion of a number of them. This is then an essentially practical book which presents the algorithms and their applications as well as the corresponding computer programs. . ."

In my opinion the presentation is very clear and easy to understand so that the book can serve as a textbook or a handbook for anyone in the intended audience for whom the French language is not a serious barrier. I recommend it highly.

The publisher has paid considerable attention to a pleasing and uncrowded page layout and the typing is nearly perfect—I noted only a very few errors and they were trivial. Physically, the book is a high quality paperback; its price reflects the current high costs of publishing, especially for a limited audience.

Five basic acceleration algorithms are presented. They are (1) Wynn's epsilon algorithm based on Shanks' transforms, (2) Wynn's rho algorithm based on Thiele's reciprocal differences, (3) Brezinski's theta algorithm which provides a link between the epsilon and rho algorithms, (4) Overholt's algorithm, and (5) Richardson's algorithm.

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