REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the indexing system printed in Volume 28, Number 128, October 1974, pages 1191–1194.

9 [5.05.2.1, 5.05.3.1].—P. BRENNER, B. THOMÉE & L. B. WAHLBIN, *Besov Spaces and Applications to Difference Methods for Initial Value Problems*, Springer-Verlag, Berlin Heidelberg and New York, 1975, 154 pp., 24 cm. Price $7.80.

The authors of this well-written volume have all made important contributions to the study of finite-difference methods for initial value problems of partial differential equations. The main question addressed by this book is the extent by which the accuracy of a finite-difference method suffers when the initial data is not smooth enough. A quite complete theory, including inverse results, is presented. A few model problems, rather than general parabolic systems, etc., are treated to simplify the presentation. The theory is developed in L_p for general p. The authors show how only a few, well-chosen, extra technical tools are required to extend the theory from L_2 to the general case.

The first two chapters contain introductory material on Fourier multipliers and Besov spaces. This highly useful material has not, to my knowledge, previously been presented in English with a comparable clarity.

Chapter 3 surveys the theory of well-posed initial value problems and stable finite-difference schemes with constant coefficients. Chapter 4 treats the heat equation in a very complete way. A discussion of the effects of smoothing of the initial data is included. The theory for hyperbolic problems is developed in the next chapter. Thomée's interesting application of Besov spaces to a semilinear problem is included. The last chapter, which includes previously unpublished material, develops a theory for the Schrödinger equation.

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10 [2.00, 3.00, 4.00].—G. M. PHILLIPS & P. J. TAYLOR, *Theory and Applications of Numerical Analysis*, Academic Press, London and New York, 1973, x + 380 pp., 23 cm. Price $14.95 paperbound.

This is an introductory text for use at the undergraduate level. It is organized in such a way that the only prerequisite is a one-year course in calculus. Background material in linear algebra, e.g., is provided in the appropriate chapters. Although the selection and treatment of topics is fairly conventional, the exposition is exceptionally clear and, to the extent possible, fully supported by mathematical theory. Among topics not included (or only briefly mentioned) are rational and spline approximation, Fourier analysis, polynomial equations, optimization, sparse matrices, overdetermined systems of linear equations, algebraic eigenvalue problems, and partial differential equations. Advanced topics, such as best (polynomial) approximation, systems of nonlinear equations, and boundary value problems for ordinary differential equations, on the other hand, are treated in some detail.