REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

12[2.05].—J. H. Ahlberg, E. N. Nilson & J. L. Walsh, *The Theory of Splines and Their Applications*, Academic Press, New York, 1967, xi + 284 pp., 24 cm. Price $13.50.

The theory of spline functions has been developed rather recently. However, since Schoenberg's first paper appeared in 1946, the number of research articles devoted to or connected with the theory of splines has grown very fast. The authors have tried to systematize and organize this material and in this reviewer's opinion succeeded rather well.

The simplest spline approximation can be formulated in the following way: Given a function $f(x)$ in the interval $0 \leqq x \leqq 1$. Let $0 = x_1 < x_2 < \cdots < x_n = 1$ be n points. A function $\phi_n(x)$ is a spline approximation if: (1) $\phi_n(x_i) = f(x_i)$, $i = 1, 2, \cdots n$, (2) $\phi_n(x)$ is a polynomial of order three in every subinterval $x_i \leqq x \leqq x_{i+1}$ and (3) $\phi_n(x)$ is as smooth as possible.

Then the following questions arise: Does $\phi_n(x)$ exist for all n ? Does $\phi_n \rightarrow f$ converge for $n \rightarrow \infty$? How fast does ϕ_n converge to f ? All these questions are answered in the first part of the book and other remarkable properties of $\phi_n(x)$ are derived. The rest of the book is devoted to more general spline approximations in one and two space dimensions.

H. O. K.

13[2.05].—E. W. Cheney, *Introduction to Approximation Theory*, McGraw-Hill Book Co., New York, 1966, xii + 259 pp., 24 cm. Price $10.95.

This eminently readable book is intended to be used as a text for a first course in approximation theory. Uniform approximation of functions is emphasized and the discussion is not only theoretical, but provides usable algorithms as well.

An introductory chapter presents some of the major theoretical tools, and assigns an important role to convexity considerations. There follow chapters on the Chebyshev solution of inconsistent linear equations and Chebyshev approximation by polynomials and other linear families. The next chapter treats least-squares approximation and related topics. The scene then shifts back to uniform approximation by rational functions. The final chapter offers a miscellany of topics too interesting to be omitted from the book. Throughout the book the author provides interesting proofs and occasionally new approaches of his own. The approximately 430 problems are an extremely valuable supplement to the text, as is an impressive set of notes to each chapter, which provide the historical context of much of the material and suggestions for further reading. It is not surprising, in view of the great scope of these notes, that there are a few minor misstatements in this part of the book. For example, there is no proof of V. Markoff's theorem in Rogosinski's paper, hence certainly not "the simplest proof". (There is a simple proof of a simpler theorem.) The reader sent to Dickinson's paper for more information about Chebyshev polynomials will not be helped much. These, however, are quibbles in the face