22[2.05]. – THEODORE J. RIVLIN, *An Introduction to the Approximation of Functions*, Blaisdell Publishing Co., Waltham, Mass., 1969, viii + 150 pp., 24 cm. Price $7.50.

This is a well written, enjoyable book. It requires only a good undergraduate mathematics program as background. The author is quite successful in his compromise of restricting the discussion to concrete interpolation and approximation procedures, without losing sight of the basic mathematical ideas, which can be carried over to more general situations. It is an elementary book in the best sense of the word.

The main emphasis of the book is on approximation by polynomials and by piecewise polynomials. What follows is a short description of the various chapters.

A short introduction gives the abstract existence theory, discusses the role of uniform convexity and introduces the necessary spaces.

Chapter 1. "Uniform Approximation," is a skillful presentation of Weierstrass' theorem, Jackson's theorems and the Chebyshev characterization of the best approximation. The corresponding problem on finite point sets is discussed as well as two numerical procedures.

Chapter 2. "Least Squares Approximation," contains a treatment of approximation with orthonormal polynomials on a bounded interval as well as on a finite set of points. Also included is a discussion of the effectiveness, as a uniform approximation, of least squares approximation.

Chapter 3. This chapter develops a theory of least-first-power approximation on intervals and finite point sets. It is shown that the solution of the discrete problem converges to that of the continuous one under appropriate conditions. The solution of the discrete problem by linear programming is discussed.

Chapter 4. Here polynomial and spline interpolation are treated. The chapter starts with an illuminating discussion of Lagrange interpolation, the convergence problem, and how the convergence depends on the location of the nodes. Next follows a discussion of the effectiveness of interpolation polynomials in the least-square and least-first-power sense. The end of the chapter discusses cubic splines. Existence of a cubic spline interpolant is proved as well as extremal properties. The use of splines for least-square and uniform approximation is discussed and an error estimate is given in the uniform norm.

Chapter 5. This last chapter discusses the characterization of rational approximation and interpolation on finite intervals and finite point sets. The author also treats numerical procedures for these problems.

A series of exercises increases the usefulness of this excellent textbook.

OLOF WIDLUND

Courant Institute of Mathematical Sciences
New York University
New York, New York 10012

23[2.05, 2.10, 2.55, 4, 5, 13.05]. – L. COLLATZ, G. MEINARDUS & H. UNGER, Editors, *Numerische Mathematik, Differentialgleichungen, Approximationstheorie*, Birkhäuser Verlag, Basel, 1968, 401 pp., 25 cm. Price SFR 48–.

Functional analysis, as a unifying agent, has become of increasing significance in many disciplines of mathematics, numerical mathematics being no exception. The