This book, a translation of the original Russian *Elementiy Teorii Funktsii* published in 1963 by Fizmatgiz in Moscow, should prove useful to people working in approximation theory.

The material comprises definitions, theorems and discussions. There are no proofs. The book has the strength and the weaknesses of the survey format.

Chapter I (pp. 1–85) was written by R. S. Guter and is entitled "Functions of a Real Variable." It is pretty much what you get in Natanson's book on that topic.

Chapter II (pp. 86–169), "Interpolation and Approximation," was written by L. D. Kudryavtsev and has the flavor of Natanson's book on Constructive Function Theory. However, mention is made of numerous recent results (particularly those concerned with the degree of approximation) by such authors as Favard, Stechkin, Akhiezer, Kreĭn, Timan, Dzyadyk, Nikolsky, and Kolmogorov. The theory of entropy is touched on, but nothing much is done with it.

Chapter III (pp. 170–205), written by B. M. Levitan, is on almost periodic functions.

The referencing is meager. One really wants a better job in a book of this kind. The translation is good. Names, of course, continue to give trouble. No great damage is done when H. Rademacher goes into two black translational boxes and comes back out as G. Radmacher, but what can the uninformed do when our own John Mairhuber goes in and comes back out as Mèrkh'yuber?

The numerical analysis or computational aspects of approximation theory are not treated.

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2 [2.05, 2.35, 3, 4, 5, 6].—LOTHAR COLLATZ, *Functional Analysis and Numerical Mathematics*, translated by Hansjörg Oser, Academic Press, New York, 1966, xx + 473 pp., 24 cm. Price $18.50.

The purpose of this book is to indicate the role and utility of the concepts of functional analysis in numerical mathematics. The first major section (200 pages) is primarily devoted to developing the necessary functional analysis background. The treatment covers the usual elementary topics as well as partially ordered spaces, pseudo-metric spaces (the metric takes its values in a partially ordered linear space), and thirty pages on vector and matrix norms. A generous portion of examples, many from numerical analysis, are interwoven. The remainder of the book deals almost exclusively with the solution of linear and nonlinear operator equations with primary application to differential and integral equations (and associated eigenvalue problems), and secondary application to approximation problems. Topics given the most prominence are: constructive fixed-point theorems, the Gauss-Seidel and Jacobi iterations for linear and nonlinear systems of equations, Newton's method and the secant method for nonlinear operator equations and, especially, the setting of partially ordered spaces with discussion of monotone convergence of the Newton iterates, monotone operators and problems of monotone kind. Again, numerous general and concrete examples are interwoven into the development. The emphasis throughout is on obtaining error bounds.

Although the book is primarily concerned with the numerical analysis of nonlinear equations, it is not, and is not claimed to be, a definitive study of this topic. The development is based primarily on the contributions of the author, his students, and colleagues, and the relevant Russian and American work receives considerably less attention.

The translation reads well, and relatively few misprints were noted. There are 26 exercises.

J. M. O.

3 [2.05, 2.10, 2.20, 2.55, 3, 4].—Gerard P. Weeg & Georgia B. Reed, *Introduction to Numerical Analysis,* Blaisdell Publishing Co., Waltham, Mass., 1966, vii + 184 pp., 24 cm. Price $7.50.

This book is intended to serve as a text for a one-term introductory course in numerical analysis for sophomore and junior level students; the prerequisites are courses in calculus and introductory differential equations. The material is presented in eight chapters: (1) computational errors; (2) roots of algebraic and transcendental equations; (3) finite differences and polynomial approximation; (4) numerical integration; (5) numerical solution of ordinary differential equations; (6) linear algebraic equations; (7) least-squares approximation; (8) Gaussian quadrature. The level of sophistication is in accord with the stated prerequisites.

In recent years many good textbooks having essentially the same goals and prerequisites as this text, have appeared; among these are the books by W. Jennings and N. Macon. For this reason, a new textbook must justify itself either by presenting different or more recent material than is offered in other standard texts (à la Romberg integration) or by giving an outstandingly lucid and enlightening exposition. In the reviewer's opinion, this textbook does not completely justify itself in either respect. Although the material is basic and in accord with most standard texts, the book has some important defects in arrangement and emphasis. For example, Lagrange interpolation is introduced for the first time in Chapter 8, whereas Chapter 3 is devoted entirely to the Newton-Gregory form of the interpolation polynomial. The most serious drawback of this text lies in its manner of presentation. Many common methods and concepts, such as iteration, and approximation of functions, are hastily and inadequately developed. Similarly, one finds some basic theoretical results avoided, to the detriment of the student; thus from remarks on pp. 63 and 69, the reader would be led to think that only round-off errors might limit the use of an interpolation polynomial of high order in approximating a function on an interval; this is not true, and Runge's famous example should be mentioned.

In general, this book is not as readable and instructive as is required for an introductory text.

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