

N. KORNEICHUK, *Exact Constants in Approximation Theory*, Cambridge University Press, 1991, 452 pp.

This book, which constitutes Volume 38 of the *Encyclopedia of Mathematics and its Applications*, for the first time outlines a general approach to one of the classical problems in approximation theory, namely the determination of optimal constants in various error estimates. It is written by one of the great experts in the field; in fact it nicely surveys the substantial achievements obtained by the Russian school of approximation during the last decades. The book is well organized and self-contained. Accordingly, the first three chapters on best approximation and duality in extremal problems, on polynomial and spline functions as approximating tools, and on comparison theorems and inequalities for the norms of functions and their derivatives, present the foundations of the subject matter very carefully. The next four chapters are devoted to explicit applications and deal with polynomial and with spline approximations of classes of functions with bounded  $r$ th derivatives (in  $L_p$ ), with exact constants in various Jackson inequalities, and with the approximation of classes of functions, determined by abstract moduli of continuity. Chapter 8 completes these main lines by solving extremal problems in connection with  $N$ -widths of some classes of functions. Each chapter ends with sections on comments, giving some hints to the literature, and on other results and exercises. This attractive book certainly presents a very important and valuable addition to the literature.

ROLF J. NESSEL

GUIDO WALZ, *Spline-Funktionen in Komplexen*, BI-Wissenschaftsverlag, 1991, 190 pp.

Auf Ahlberg, Nilson, und Walsh geht die Theorie der Splines zurück, die auf Jordan-Kurven in der komplexen Ebene leben. Viele Sätze wie Interpolationssätze, Approximationssätze vom Jackson-Typ, und Basisdarstellungen bis hin zu B-Splines haben ein Pendant im Reellen. Die komplexe Struktur zeigt sich dann z.B. in der Aussage, daß die analytische Fortsetzung von polynomialen Splines [auf Kreisbögen] logarithmische Singularitäten aufweisen. Im zweiten Teil des Buches werden die planaren Splines behandelt, die auf Gebieten in der Ebene definiert sind und aus stückweise einfachen Funktionen wie z.B. aus Polynomen in  $z$  und  $\bar{z}$  zusammengesetzt sind. Die Splineräume, die durch lokale Interpolationsbedingungen charakterisiert sind, stehen den Finiten Elementen näher als den mehrdimensionalen Splines. Das Buch wendet sich an Leser, denen Motivationen der Resultate wichtiger als Beweise sind.

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#### *Proceedings*

W. DAHMEN, M. GASCA, AND C. A. MICHELLI, EDs., *Computation of Curves and Surfaces*, Kluwer Academic, 1990, 536 pp.

A collection of articles based on lectures at the NATO Advanced Study Institute held at Puerto de la Cruz, Tenerife, Spain in July, 1989. There are 15 articles, divided into four main groupings, the contents of which "address mathematical and computational issues pertaining to the display, modeling, interrogation, and representation of complex geometrical objects in various scientific and technical environments."