Chebyshev, and weak Chebyshev systems are particular cases, obtained by choosing $\mathscr{F}$ to be an appropriate set of n-tuples of point evaluation functionals. These definitions are so general that, as the author points out, any system of linearly independent elements of a real vector space E is an $H_{\mathscr{F}}$-system for some $\mathscr{F}$. This chapter also gives examples of these systems and the spaces they generate, and discusses various relationships among them. The examples discussed include interpolating spaces, spaces of step-functions, and various classes of Chebyshev and weak Chebyshev systems. This chapter also introduces spaces that will be discussed in later chapters. For instance Stečkin's AC-spaces, i.e., the subspaces G of a normed space E, having the property that those elements of E that do not have a unique element of best approximation in G form a set of the first category in E, and $C_0(X)$, which is the set of all functions continuous in the Hausdorff space X, having the property that for each $\varepsilon > 0$, the set $\{x \in X : |f(x)| \geq \varepsilon\}$ is compact.

Chapter 2 discusses characterizations of various classes of AC, Chebyshev, and weak Chebyshev spaces defined in $C[a, b]$, $C(\mathbb{R})$ or $C_0(Q)$, where Q is a locally compact subset of $\mathbb{R}$. All these spaces are endowed with the norm of the supremum, and the characterizations that are discussed include properties of elements of best approximation, length of alternations, existence of interpolations, and decompositions of $\mathbb{R}^2$, among others. The material presented includes work of Deutsch *et al.*, Jones and Karlowitz, Feinerman and Newman, Blatter, Morris and Wulbert, Stockenberg, and the author.

Chapter 3 studies properties of Chebyshev and weak Chebyshev spaces defined on compact intervals. The topics discussed include properties of spaces of derivatives, relationships between AC spaces and oscillation spaces, integral representation of ECT and Markov systems (without proofs), existence of adjoined functions, best L^1 approximation, and density of infinite Markov systems. Unfortunately, the recent and important work of P. Borwein *et al.* (cf. *J. Approx. Theory* **63** (1990), 56–64) on the last-named topic, is not mentioned. The material presented in this chapter is based mostly on work of Cheney and Wulbert, Gierz and Shekhtman, Hobby and Rice, Karlin and Studden, Micchelli, Pinkus, Kroó, Schmidt and Sommer, Strauss, Zielke, Zwick, the author, and the reviewer. The proof of Theorem 3.3.5 can be shortened by using a result of the reviewer (*J. Approx. Theory* **22** (1978), 356–359).

Chapter 4 studies approximation by monotone increasing or convex functions defined on intervals, with values in an ordered Banach space. Topics discussed include properties of spaces of functions of bounded variation, and best approximation by monotone increasing or convex functions, including existence and uniqueness of best approximants, and conditions that guarantee the existence of continuous or differentiable best approximants. These results depend on the type of Banach space considered, which may be reflexive, uniformly convex, Hilbert, etc. This chapter includes work of Barbu and Precupanu, Darst and Huotari, Darst and Sahab, Kamthan and Gupta, and the author.

Chapter 5 deals with approximation by spaces of step functions. Jackson-type theorems are obtained. The material in this chapter is based on work of Feinerman, Feinerman and Newman, and the author. Appendix 1 (Dirichlet tilings) and Appendix 2 (minimum diameter property) are related to topics discussed in this chapter.

The author is to be commended for presenting in coherent fashion many results that had never appeared in book form, and for his effort to give credit to the many authors whose work he cited.

RICHARD A. ZALIK

Proceedings

ANNIE CUYT, Ed., *Nonlinear Numerical Methods and Rational Approximation*, II, Mathematics and Its Applications **296**, Kluwer Academic Publishers, Dordrecht, 1994, xviii + 446 pp.

An international conference on *Nonlinear numerical methods and rational approximation* was held at the University of Antwerp (Belgium), September 5–11, 1993. This book contains 33 papers which were fully refereed. The conference and these proceedings focus on five fields of numerical analysis, each with a main speaker and a number of contributed talks. These five fields are *Orthogonal Polynomials* (D. S. Lubinsky and eight contributions), *Rational Interpolation* (M. Gutknecht and two contributions), *Rational Approximation* (E. B. Saff and three contributions), *Padé Approximation* (ten contributions, but unfortunately not the contribution of A. A. Gonchar who was the main speaker), and *Continued Fractions* (W. B. Jones and six contributions).

CH. FEFFERMAN, R. FEFFERMAN, AND S. WAINGER, Eds., *Essays on Fourier Analysis in Honor of Elias M. Stein*, Princeton Mathematical Series **42**, Princeton University Press, 1995, vii + 384 pp.

This book contains the lectures presented at a conference held at Princeton University (May 1991) in honor of Elias M. Stein's sixtieth birthday. There are fifteen lectures, including a survey article of Charles Fefferman on the scope and originality of Eli Stein's contributions to analysis. Other topics treated are: conformally invariant inequalities (W. Beckner), oscillatory integrals (J. Bourgain and C. E. Kenig), analytic hypoellipticity (M. Christ), wavelets (R. R. Coifman, Y. Meyer, and V. Wickerhauser), elliptic partial differential equations (R. A. Fefferman), nodal sets of eigenfunctions (D. Jerison), removable sets for Sobolev spaces in the plane (P. W. Jones), nonlinear dispersive equations (C. E. Kenig), bilinear operators and renormalization (R. R. Coifman, S. Dobyinsky, and Y. Meyer), holomorphic functions on wedges (A. Boggess and A. Nagel), singular Radon (and related) transforms (D. H. Phong), Hilbert transforms (A. Carbery, J. Vance, S. Wainger, and D. Watson), Besov and other function spaces (Y. Han and G. Weiss), and counterexamples with harmonic gradients in $\mathbb{R}^3$ (T. H. Wolff).

J. D. BROWN, M. T. CHU, D. C. ELLISON, AND R. J. PLEMMONS, Eds., *Proceedings of the Cornelius Lanczos International Centenary Conference*, SIAM, Philadelphia, PA, 1994, lxv + 644 pp.

The North Carolina State University at Raleigh, North Carolina, held an international conference (December 12–17, 1993) in honor of Cornelius Lanczos (1893–1974), reflecting the wide range of interests of Lanczos in (computational) mathematics and (theoretical) physics and astrophysics. These proceedings contain a collection of plenary talks and minisymposium papers. For mathematics there are 11 plenary presentations dealing with the fast Fourier transform, the Lanczos algorithm for matrix eigenvalue problems, and the tau method for the numerical solution of differential equations. In addition there are 12 mathematics minisymposia on eigenvalue computations, moments in numerical mathematics, iterative methods for linear systems, least squares, the tau method, Chebyshev polynomials, the fast Fourier transform, and wavelets. Of special interest is a section about the life and works of Cornelius Lanczos (65 pages). This section contains a photographic essay, a list of published papers and books of Lanczos, and contributions of Barbara Gellai, Peter D. Lax, George Marx, and John Todd regarding the life of Cornelius Lanczos.