Chapter 1 of the book is devoted to rational approximations of numbers with a main goal consisting of a methodologically new proof of Roth's theorem. Chapter 2 deals with Padé approximants and orthogonal polynomials. The authors describe the main links between these notions, including continued fractions and the moment problem. The last sections in this chapter give applications to operator theory and some problems of mathematical physics. Chapter 3 presents asymptotic properties of orthogonal polynomials with a modern proof of the well-known Szegő asymptotic formula. In Chapter 4 the Hermite–Padé approximants are treated, from the classical results of Hermite and multidimensional continued fractions up to the latest achievements in this field. Chapter 5 contains the necessary background of modern potential theory required for the study of the asymptotics of rational and Hermite–Padé approximants. The book is a comprehensive introduction for students and future researchers to topics that are nowadays undergoing intensive development.

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CHARLES K. CHUI, *An Introduction to Wavelets*, Wavelet Analysis and Its Applications, Vol. 1, Academic Press, 1992, x + 264 pp.

Wavelet theory emerged only recently as a distinguished piece of abstract and of applied mathematics. For quite a while, Fourier analysis has been an essential tool in signal processing and many other applications for that matter. The Fourier transform (continuous or discrete) decomposes the function (signal) in a range of low to high frequency components, corresponding to the smooth to highly oscillating parts of the function. Fourier analysis has the essential property that functions which have a narrow support in one domain (e.g., a pulse) will have a broad support in the transform domain (e.g., a sine wave). One of the basic ideas of wavelet analysis is to have basis functions with compact support in both domains.

The deficiency of classical Fourier analysis led signal processing engineers to concepts like short term Fourier transforms, filter banks, etc., while the abstract harmonic analyst ventured in the Calderón–Zygmund theory, the theory of frames, and the like. Wavelet theory is where their divergent trails met again in perfect harmony. Multiresolution analysis forms a natural tool, both for the applications and for the theory. To cover the whole space of signals, some "scaling function" with compact support and with a limited frequency content is translated (to cover the whole time axis) and scaled or dilated (to cover all frequencies) and together they form a basis. The scaling factor is a parameter that allows one to zoom in or out on the high frequency components of the signal.

Several books and long and excellent survey papers on the subject are already available at the moment. However, many of the books are proceedings or a collection of papers presenting different angles of approach to the subject. The present volume is one of the first to give a self-contained introduction, not only to the subject itself and the related topics mentioned above, but also to the essential building blocks like Fourier and spline analysis. Splines are not essential for wavelets, but as a most elegant tool to represent locally supported functions, it is not surprising that spline–wavelets are a natural breed. The author has put in this volume the emphasis on this type of wavelets. An important impetus for the breakthrough of wavelet theory was the discovery of the fact that the wavelet idea could be married with the fact that the basis of dilations and translations could be made orthonormal (or some weaker form of this) with the preservation of all the nice properties one had before. This aspect is studied in the last chapter of the book.

The book can safely be recommended to the wavelet illiterate when he has some basic knowledge of real analysis and function theory. The development is strongly biased towards the spline wavelets though. The applications are always right below the surface, but the material in the book is essentially mathematics.

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