The historical origin of this emerging field can be traced to several sources. Most notable among these are windowed Fourier transforms and the Wigner-Ville distribution in signal processing, the Paley-Littlewood-Calderón theory in harmonic analysis, the work of Morlet and Grossman in geophysics, Gabor's work in physics using coherent states, and the work of Marr in vision. Independently of these efforts, mathematicians working in approximation theory and in numerical solutions of PDEs had come up with ideas such as spline analysis and multigrid methods, which can now be seen as part of a larger picture, namely multiresolution analysis. This framework, thanks to the work of Mallat and Meyer, is now rich enough to incorporate and unify all of these areas of research.

These pioneering efforts all resulted from attempts to get around the inherent difficulty associated with the time-honored Fourier analysis of signals—the impossibility of localizing the analysis of a signal in both time and frequency.

Wavelet theory has combined some of the best ideas from many previously disparate fields, and in so doing has already rendered a useful service to science and technology by encouraging communication among the practitioners of several disciplines. As with any other successful merger of different traditions, however, it is natural that each group finds its own approach preferable to those of other groups. It is therefore noteworthy that both of these books do a good job of avoiding provincialism, thus providing the reader with a rather full picture of the field.

The book by Daubechies, who is one of the main developers of the theory, is the result of an intensive short course. The presentation is completely engrossing; it is like reading a good, thick Russian novel. Daubechies has a real knack for making the material appealing and lively, and there is a definite "slowing down for details" at the points that require further elucidation. The opening chapter gives a very readable overview of the main problems considered in the book without getting bogged down in details. Subsequent chapters discuss fully the theoretical and practical aspects of wavelet theory, including wavelet transforms, orthonormal bases of wavelets, and characterization of functional spaces by means of wavelets. The closing chapter presents several topics under active investigation, such as multidimensional wavelets, wavelet packet bases, and a construction of wavelets tailored to decompose functions defined in a finite interval. This book can be used for many different purposes, from individual reading to graduate-level coursework, and it will likely become a classic.

The book by Chui is more modest in scope and could serve as a textbook for a one-semester course at the senior undergraduate level or more likely at the beginning graduate level in engineering or applied mathematics programs. For this purpose, it would have been useful to include (as I understand the author plans for a forthcoming second edition) problems that are designed to ensure that the student gets a hands-on understanding of the subject. Topics covered in the book include Fourier analysis, wavelet transform and time frequency analysis, and scaling functions and wavelets. Chui is among the people responsible for making the previously existing theory of (cardinal) splines fit within the framework of multiresolution analysis, and so spline analysis is also prominently featured.

The two books should make it easier for workers in different fields to acquire the keys to this useful tool kit. In the hands of an insightful worker, wavelet theory should be of great benefit in the acquisition, manipulation, and interpretation of data. It certainly provides a fertile ground for interactions among the fields of mathematics, the sciences, and technology.

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Recent Collections on Wavelets

Wavelets and Their Applications. Mary Beth Ruskai, Gregory Beylkin, Ronald Coifman, Ingrid Daubechies, Stephane Mallat, Yves Meyer, and Louise Raphael, Eds. Jones and Bartlett, Boston, 1992. xiv, 474 pp., illus. $48.75. Books in Mathematics.

Eighteen papers covering the topics Signal Analysis (six papers), Numerical Analysis (three papers), Other Applications (four papers), and Theoretical Developments (five papers). Contributors include M. Vetterli, B. K. Alpert, A. Arneodo, and H. G. Feichtinger.

Wavelets. A Tutorial in Theory and Applications. Charles K. Chui, Ed. Academic Press, San Diego, CA, 1992. x, 723 pp., illus. $69.95. Wavelet Analysis and Its Applications, vol. 2.

Twenty-two chapters arranged under the headings Orthogonal Wavelets (three papers), Semi-orthogonal and Nonorthogonal Wavelets (four papers), Wavelet-like Local Bases (three papers), Multivariate Scaling Functions and Wavelets (three papers), Short-time Fourier and Window-Radon Transforms (two papers), Theory of Sampling and Interpolation (three papers), and Applications to Numerical Analysis and Signal Processing (four papers). Contributors include D. Pollen, G. Battle, B. K. Alpert, W. R. Madych, H. G. Feichtinger, J. J. Benedetto, and S. Jaffard. Bibliography included.

Books Received

Air Pollution. With contributions by C. Gries *et al.* Springer-Verlag, New York, 1992. xii, 185 pp., illus. $98. Handbook of Environmental Chemistry, vol. 4, part c.

Air Pollution Modeling. Theories, Computational Methods and Available Software. Paolo Zannetti. Van Nostrand Reinhold, New York, 1992. xii, 444 pp., illus. $62.95.

Airpower in the Gulf. James P. Coyne. Air Force Association, Arlington, VA, 1992. viii, 224 pp., illus. Paper, $21.

America's Renewable Resources. Historical Trends and Current Challenges. Kenneth D. Frederick and Roger A. Sedjo, Eds. Resources for the Future, Washington, DC, 1992. xvi, 296 pp., illus. $22.95; paper, $19.95.

American Physicians in the Nineteenth Century. From Sects to Science. William G. Rothstein. Johns Hopkins University Press, Baltimore, MD, 1992. xxii, 362 pp. Paper, $18.95. Reprint, 1972 ed.

The Amygdala. Neurobiological Aspects of Emotion, Memory, and Mental Dysfunction. John P. Aggleton, Ed. Wiley, New York, 1992. xii, 615 pp., illus. $125.

Analysis with Local Census Data. Portraits of Change. Dowell Myers. Academic Press, San Diego, CA, 1992. xii, 369 pp., illus. Paper, $42.50.

Bioprocess Monitoring and Control. Marie-Noëlle Pons, Ed. Hanser, Munich, Germany, 1992 (U.S. distributor, Oxford University Press, New York). xviii, 365 pp., illus. $95. Hanser Series in Biotechnologie.

Biosensors and Chemical Sensors. Optimizing Performance Through Polymeric Materials. Peter G. Edelman and Joseph Wang, Eds. American Chemical Society, Washington, DC, 1992. xii, 332 pp., illus. $79.95. ACS Symposium Series, 487. From a symposium, Atlanta, GA, 1991.

Biotechnology of Cell Regulation. Roberto Verna and Yasutomi Nishizuka, Eds. Raven, New York, 1992. xii, 472 pp., illus. $150. Advances in Experimental Medicine, 4. From a symposium, Siena, Italy, June 1991.

The Bronchial Circulation. John Butler, Ed. Dekker, New York, 1992. xx, 806 pp., illus. $185. Lung Biology in Health and Disease, vol. 57.

Butterflies of the Bululo-Wau Valley. Michael Parsons. Bishop Museum Press, Honolulu, HI, 1992. viii, 280 pp., illus., + plates. Paper, $34.95.

Catalysis Looks to the Future. National Research Council. National Academy Press, Washington, DC, 1992. x, 86 pp., illus. Paper, $19.

The Chemical Bond. Structure and Dynamics. Ahmed Zewail, Ed. Academic Press, San Diego, CA, 1992. xviii, 313 pp., illus. $49.95. Based on a symposium, Pasadena, CA, Feb. 1991.

Codes, Puzzles, and Conspiracy. Dennis Shasha. Freeman, New York, 1992. xiv, 241 pp., illus. $17.95; paper, $11.95.

Cognitive Psychology. An Overview for Cognitive Scientists. Lawrence W. Barsalou. Erlbaum, Hillsdale, NJ, 1992. xii, 410 pp., illus. $79.95; paper, $36. Tutorial Essays in Cognitive Science.

Colloidal Dispersions. W. B. Russel, D. A. Saville, and W. R. Schowalter. Cambridge University Press, New York, 1992. xviii, 525 pp., illus. $110; paper, $39.95. Reprint, 1989 ed.

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Compendium of Organic Synthetic Methods. Vol. 7. Michael B. Smith. Wiley, New York, 1992. xx, 547 pp., illus. $59.95.

The Complete C++ Primer. Keith Weiskamp and Bryan Flamig. 2nd ed. Academic Press, San Diego,