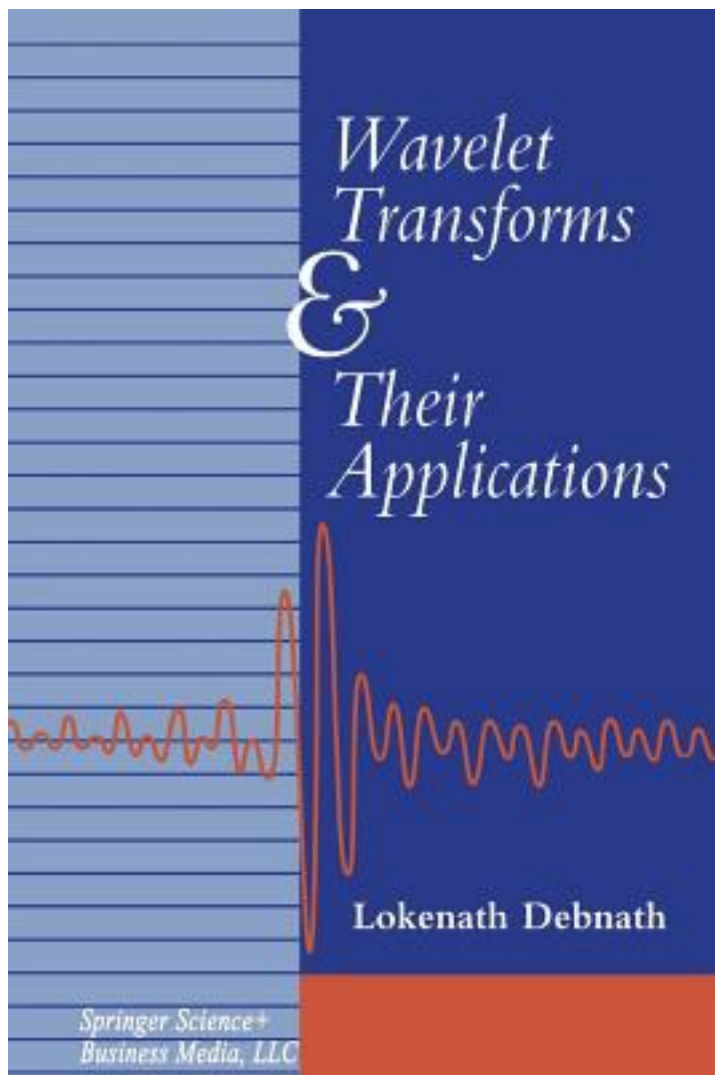


# Wavelet Transforms and Their Applications



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Wavelets allow complex information such as music, speech, images, and patterns to be decomposed into elementary forms-called the fundamental building blocks at different positions and scales-and, subsequently, reconstructed with high precision. With an increased demand for mathematical tools to provide both theory and applications for science and engineering, the utility and interest in wavelet analysis seem more clearly established than ever. Wavelet Transforms and Their Applications places a major emphasis on the logical development of fundamental ideas and systematic treatment of wavelet analysis and its applications to a wide variety of problems as encountered in various interdisciplinary areas. The book contains a large number of examples, which are either directly associated with applications or formulated in terms of the mathematical, physical, and engineering context in which theory arises. While other textbooks aim at a mathematically mature audience, this book is an introduction to wavelet transforms and accessible to a larger audience with diverse backgrounds and interests in mathematics, science, and engineering. Topics and Features: \* Presents major developments in wavelets, wavelet transforms, Gabor transforms, the Wigner-Ville distribution, multiresolution analysis, harmonic wavelets, and their applications to time-frequency signal analysis and turbulence \* Uses knowledge of Fourier transforms, some elementary ideas of Hilbert spaces, and orthonormal systems to develop the theory and applications of wavelet analysis \* Offers detailed and clear explanations of every concept and method, accompanied by carefully selected worked examples, with special emphasis given to those topics in which students typically experience difficulty \* Includes carefully chosen end-of-chapter exercises and provides answers to selected exercises for additional help. Mathematicians, physicists, computer engineers, and electrical and mechanical engineers will find this book an exceptionally complete and accessible text and reference. It is also suitable as a self-study or reference guide for practitioners and professionals.

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