

## Wavelet Methods for Pointwise Regularity and Local Oscillations of Functions (Memoirs of the American Mathematical Society)

By Stephane Jaffard, Yves Meyer



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Currently, new trends in mathematics are emerging from the fruitful interaction between signal processing, image processing, and classical analysis.

One example is given by "wavelets", which incorporate both the know-how of the Calderon-Zygmund school and the efficiency of some fast algorithms developed in signal processing (quadrature mirror filters and pyramidal algorithms.)

A second example is "multi-fractal analysis". The initial motivation was the study of fully developed turbulence and the introduction by Frisch and Parisi of the multi-fractal spectrum. Multi-fractal analysis provides a deeper insight into many classical functions in mathematics.

A third example---"chirps"---is studied in this book. Chirps are used in modern radar or sonar technology. Once given a precise mathematical definition, chirps constitute a powerful tool in classical analysis.

In this book, wavelet analysis is related to the 2-microlocal spaces discovered by J. M. Bony. The authors then prove that a wavelet based multi-fractal analysis leads to a remarkable improvement of Sobolev embedding theorem. In addition, they show that chirps were hidden in a celebrated Riemann series.

Features:

Provides the reader with some basic training in new lines of research.

Clarifies the relationship between pointwise behavior and size properties of wavelet coefficients.

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