

# Harmonic Analysis Toolbox: Wavelet Decompositions

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(Tea 3:30 pm Math Lounge)

## Abstract

A major focus of modern Harmonic Analysis is the study of Calderon-Zygmund singular integral operators, with one of the classical examples being the Hilbert transform.

For applications, one needs to know continuity properties of these operators not only in well-known Lebesgue and Sobolev spaces, but also in their generalizations such as Besov and Triebel-Lizorkin spaces as well as their vector-valued analogues with matrix weights.

Some of the results are better understood if a problem is considered from a more unified prospective coming from Littlewood-Paley theory. This theory gave rise to one of the main techniques of Harmonic Analysis: wavelet decompositions. Using this approach we derive conditions for Calderon-Zygmund operators to be bounded on matrix-weighted function spaces.