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Frames for wavelet sets and classification

The theme is the role of frames in providing effective tools to deal with large data sets. There are two case studies. The mathematical tools are wavelet theory, Fourier analysis, and frame potential energy analysis.

The first case constructs simple, smooth dyadic wavelet frames for Euclidean space from ONE wavelet. A surprising phenomenon, called a frame bound gap arises; and these gaps are analyzed and computed.

The second case designs a classification algorithm, where frames are required to balance classification with dimension reduction. The technology naturally combines frame potential energy with discrete Wiener amalgam spaces. Examples include the analysis of hyperspectral and retinal data.