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Approximation with wave packets generated by a refinable function

Abstract: We consider best m -term approximation in $L_p(\mathbb{R}^d)$ with wave packets generated by a single refinable function. The main examples of wave packets are orthonormal wavelets, or more generally wavelet frames based on a multiresolution analysis (so-called framelets). The approximation classes associated with best m -term approximation in $L_p(\mathbb{R}^d)$ for a large class of wave packets are completely characterized in terms of Besov spaces.

As an application of the main result, we show that for m -term approximation in $L_p(\mathbb{R}^d)$ with elements from an oversampled version of a framelet system with compactly supported generators, the associated approximation classes turn out to be (essentially) Besov spaces.