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Dorin Ervin Dutkay* (ddutkay@math.uiowa.edu), 417 Hawkeye Drive, Iowa City, IA 52246.

Multiresolution super-wavelets.

We construct compactly supported multiresolution wavelets in spaces bigger than $L^2(\mathbb{R})$. We prove that the compactly supported normalized tight frame wavelets of $L^2(\mathbb{R})$ are in fact projections of orthonormal super-wavelet bases. We give a characterization of super-wavelets and a refinement of the $N \times$ oversampling result of Chui and Shi showing that this type of oversampling gives rise to super-wavelets. The dimension function and spectral function are defined for the super-wavelets to characterize the ones coming from multiresolutions. (Received January 03, 2004)