

Decomposition and Reconstruction of multidimensional signals by generalized Whittle–Matérn kernels

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Our aim is to construct a multiresolution analysis of $L^2(\mathbb{R}^d)$ based on generalized kernels which are fundamental solutions of differential operators of the form $\prod_{\ell=1}^m (-\Delta + \kappa_\ell^2 I)$. We study their properties and provide a set of pre-wavelets associated with them, as well as the filters which are indispensable to perform decomposition and reconstruction of a given signal, being very useful in applied problems thanks to the presence of the tension parameters κ_ℓ .