

Banach frames for multivariate α -modulation spaces

The α -modulation spaces $M_{p,q}^{s,\alpha}(\mathbb{R}^d)$, $\alpha \in [0, 1]$, form a family of spaces that include the Besov and modulation spaces as special cases. This paper is concerned with construction of Banach frames for α -modulation spaces in the multivariate setting. The frames constructed are unions of independent Riesz sequences based on tensor products of univariate brushlet functions, which simplifies the analysis of the full frame. We show that the multivariate α -modulation spaces can be completely characterized by the Banach frames constructed, and as an application we consider Jackson-type estimates for m -term nonlinear approximation.