

Littlewood-Paley Estimates for Sums of Almost-Orthogonal Functions

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Suppose $f = \sum \lambda_I \phi_{(I)}$ is a finite linear sum, indexed over the dyadic cubes, where the $\phi_{(I)}$'s satisfy certain weak decay, smoothness, and cancellation (almost-orthogonality) conditions. We describe a novel stopping-time argument that yields Littlewood-Paley estimates for f in terms of the coefficients λ_I . If time permits, we will also describe how our argument can be extended to some non-Euclidean settings (such as homogeneous spaces) and its applications to gradient estimates for harmonic functions on Lipschitz domains.