Meeting: 1000, Albuquerque, New Mexico, SS 12A, Special Session on Regularity in PDEs and Harmonic Analysis

1000-35-47

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Suppose $\{\phi_{(I)}\}$ is an almost orthogonal family of funcrtions, defined on the boundary of a non smooth domain D, with minimal smoothness and decay. We prove that, for a given class of boundary measures σ, any function $f(x) = \sum \lambda_I \phi_{(I)}(x)$ verifies $\|f\|_{L^p(\sigma,\partial D)} \leq C \, \|g^* f\|_{L^p(\sigma,\partial D)}$,$0 < p < \infty$, where $g^* f(x)$ is the discrete analogue of a Littlewood-Paley function.

A major application of this result is that, following Wheeden and Wilson, we establish sufficient conditions on measures, μ on D and $\nu d\omega$ on ∂D, so that a gradient bound of the form $(\int_D |\nabla u|^q \, d\mu)^{1/q} \leq C'(\int_{\partial D} |f|^p \, \nu d\omega)^{1/p}$ holds for any solution to the Dirichlet problem, $Lu = 0$ on D, with boundary data $f \in L^\infty(\partial D)$, $1 < p \leq q$, $q \geq 2$. L can be a strictly elliptic or strictly parabolic second order divergence form operator on D. (Received August 6, 2004)