

Analysis and Applied Mathematics Seminar

Martingale transform and their projection on \mathbb{Z}^d

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Abstract: Gundy and Varopoulos introduced the probabilistic representation of singular integrals and Fourier multipliers such as Hilbert transforms and Riesz transforms as conditional expectations of some stochastic integrals. Combining with the sharp martingale inequalities by Burkholder and Banuelos-Wang, the representations have played a crucial role in finding the sharp, or nearly sharp, L^p -bounds for these operators in a variety of geometric settings. Motivated by a recent breakthrough by Banuelos and Kwasnicki on the sharp ℓ^p -norm of the discrete Hilbert transform, we construct a natural collection of discrete operators in \mathbb{Z}^d which have ℓ^p -norms independent of the dimension. This collection of discrete operators include the probabilistic discrete Riesz transforms, which is the analogues of the probabilistic discrete Hilbert transform used in the paper by Banuelos-Kwasnicki. We also discuss related open problems for the ℓ^p -norm of discrete operators. This is based on joint work with Rodrigo Banuelos and Mateusz Kwasnicki.

Monday, March 7 at 4:00 PM in 636 SEO