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Abstract

For $\alpha \in (-\infty, \infty)$, let $Q_\alpha$ be the space of all measurable functions $f$ on the real line $R$ with

$$\sup_I |I|^{2\alpha - 1} \int_I \int_I \frac{|f(x) - f(y)|^2}{|x - y|^{1+2\alpha}} \, dx \, dy < \infty,$$

where the supremum is taken over all finite intervals $I$ of $R$. These spaces are new subspaces of BMO. In particular, if $\alpha \in (-\infty, 0)$, then $Q_{\alpha} = BMO$. The main purpose of this lecture is to discuss representation theorems for the $Q$ spaces via: Poisson extension, Carleson like measures, square mean oscillation, wavelet coefficients, and dyadic counterpart.