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Pointwise Multipliers for Besov Spaces with $0 < p \leq 1$ - a Wavelet Approach

In 1992, in his famous book on wavelets, Y. Meyer gave a characterization of the set of all pointwise multipliers $M(B^0_{1,1}(\mathbb{R}^d))$ of the Besov space $B^0_{1,1}(\mathbb{R}^d)$ in terms of wavelet coefficients. We will discuss an extension of the Meyer characterization to all Besov spaces $B^s_{p,p}(\mathbb{R}^d)$, $s \in \mathbb{R}$, $0 < p \leq 1$. For $s > d\big(\frac{1}{p} - 1\big)$ several different characterizations of $M(B^s_{p,p}(\mathbb{R}^d))$ have been found by Maz'ya, Shaposhnikova ($p = 1$), Netrusov, Triebel and Nguyen, Sickel. We plan to make a short comparison. Finally, we will discuss the Fourier analytic approach. This will allow us to identify $M(B^s_{p,p}(\mathbb{R}^d))$ (in some cases) as an intersection of $L_\infty(\mathbb{R}^d)$ with certain Morrey smoothness spaces.

The talk is based on joint work with Dachun Yang and Wen Yuan (Beijing Normal University).