1117-42-432   **Dario Mena*** (`dario.mena@math.gatech.edu`). *Characterization of Matrix-Valued BMO by commutators with the Hilbert transform.*

We prove that the space of two parameter, matrix-valued BMO functions can be characterized by considering iterated commutators with the Hilbert transform. Specifically, we prove that

$$\|B\|_{BMO} \lesssim \|[[M_B, H_1], H_2]\|_{L^2(\mathbb{R}^2;\mathbb{C}^d) \to L^2(\mathbb{R}^2;\mathbb{C}^d)} \lesssim \|B\|_{BMO}.$$

The upper estimate relies on Petermichl's representation of the Hilbert transform as an average of dyadic shifts, and the boundedness of certain paraproduct operators, while the lower bound follows Ferguson and Lacey's proof for the scalar case. (Received January 18, 2016)