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Stefanie Petermichl* (stefanie.petermichl@gmail.com), Universite Paul Sabatier, 118 Route de Narbonne, 31062 Toulouse, France. *Higher order Journe commutators and multi-parameter BMO.*

We discuss an endpoint of work begun by Sarah Ferguson and Cora Sadosky - the characterisation of multi-parameter BMO spaces via boundedness of commutators.

The classical result by Nehari implies that the commutator of the Hilbert transform with symbol multiplication is bounded if and only if the symbol belongs to BMO. Already the real variable analog involving Riesz transforms required a different set of techniques (due to Coifman-Rochberg-Weiss). When passing to the two-parameter setting, natural extensions include Cotlar-Sadosky little BMO or Chang-Fefferman product BMO. The little BMO case corresponds to a commutator with tensor product Hilbert transforms (due to Ferguson-Sadosky using Toeplitz forms) while the product BMO case was an important open question settled by Ferguson-Lacey, involving so-called higher order commutators. Mixing these cases provides a characterisation of all multi-parameter BMO spaces. The Toeplitz forms in the real variable situation lead to a surprising difficulty, solved through Journe operators. (Received August 29, 2016)