WEIGHTED BOUNDEDNESS OF MULTILINEAR MAXIMAL FUNCTION USING DIRAC DELTAS

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Definition 1 ([2])**.** For $0 \leq \alpha < mn$, the multilinear fractional Hardy-Littlewood maximal function is defined as follows

$$\mathcal{M}_\alpha(f_1, \dots, f_m)(x) = \sup_{r>0} \prod_{i=1}^{m} \frac{1}{|B(x,r)|^{1-\frac{\alpha}{mn}}} \int_{B(x,r)} |f_i(y)| dy.$$

For $\alpha = 0$, the corresponding operator is the multilinear Hardy-Littlewood maximal operator $\mathcal{M}$ which was introduced by Lerner *et al* in [1].
In [3], Miguel de Guzmán introduced discrete methods as an alternate approach to prove weak-type $(1,1)$ boundedness of maximal convolution operators. This approach involves proving weak-type $(1,1)$ boundedness of the maximal operator by estimating its action on finite linear combination of Dirac deltas.
In this talk we discuss this method and extend the technique of Miguel de Guzmán to a certain kind of multilinear maximal convolution operators. As an application, we obtain end-point weighted boundedness of the multilinear fractional Hardy-Littlewood maximal function $\mathcal{M}_\alpha$.

References

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[2] K. Moen, *Weighted inequalities for multilinear fractional integral operators.* Collect. Math. 60 (2009), no. 2, 213-238. 42B25 (26D10).
[3] Miguel de. Guzmán, *Real variable methods in Fourier analysis.* Vol 46, North-Holland Mathematics Studies, Amsterdam, 1981.