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Maximal Functions With and Without Cancellation.

Given a measure-preserving transformation, T , acting on a probability space (X, \mathcal{B}, m) , define a maximal function

$$Mf = \sup_N \frac{1}{N} \sum_{n=0}^{N-1} f \circ T^n(x).$$

The traditional ergodic maximal function is then $M|f|$. In 1976, Roger Jones showed that there are functions for which $Mf \in L^1(X)$ while $M|f| \notin L^1(X)$.

In this talk, we will discuss several issues surrounding maximal functions that allow for cancellation, including how this manifests for other operators, how common this difference in behavior is, in a categorical sense, and situations (along specific sequences) in which no such discrepancy occurs. (Received August 18, 2015)