

DISTRIBUTIONAL ESTIMATES FOR MULTILINEAR OPERATORS

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ABSTRACT

We prove that if a multilinear operator and all its adjoints map $L^1 \times \cdots \times L^1$ to $L^{1/m, \infty}$, then the distribution function of the operator applied to characteristic functions of sets of finite measure has exponential decay at infinity. These estimates are based only on the boundedness properties and not the specific structure of the operator. The result applies to multilinear Calderón-Zygmund operators and several maximal operators.

We have also obtained similar distributional estimates for the bilinear Hilbert transform, which reflect the exponential decay of the distribution function at infinity and also, up to a logarithmic factor, cover the endpoint cases of the region treated by Lacey and Thiele. Such estimates imply boundedness of the operator on other rearrangement invariant spaces.