

Public Abstract

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Distributional estimates for multilinear operators

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We develop a method that allows us to obtain distributional estimates for a large class of multilinear operators. In particular, we prove that if an m -linear operator and of all its adjoints are of weak type $(1,1,\dots,1,1/m)$, then the distribution function of the operator applied to characteristic functions of sets of finite measure has exponential decay at infinity. We also extend these results to certain maximal operators. Such distributional estimates yield boundedness of the operator on rearrangement invariant spaces.

We also prove estimates of similar nature for the bilinear Hilbert transform, extending the results of Lacey and Thiele concerning this operator. These estimates recover the range of exponents treated in the aforementioned work, but also, up to a logarithmic factor, give information on the endpoint cases that were not treated by these authors. Our results are in the spirit of Hunt's extension of the celebrated theorem of Carleson on the almost everywhere convergence of Fourier series. We also explore the connection between the bilinear Hilbert transform and the summability of the bilinear Fourier series.