Sparse bounds for maximally truncated oscillatory singular integrals

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Abstract. For a polynomial $P(x, y)$, and any Calderón-Zygmund kernel K, the operator below satisfies a $(1, r)$ sparse bound, for $1 < r \leq 2$:

$$\sup_{\epsilon > 0} \left| \int_{|y| > \epsilon} f(x - y) e^{2\pi i P(x,y)} K(y) \, dy \right|.$$

The implied bound depends upon $P(x, y)$ only through the degree of P. We derive from this a range of weighted inequalities, including weak type inequalities on $L^1(w)$, which are new, even in the unweighted case. The unweighted weak-type estimate, without maximal truncations, is due to Chanillo and Christ (1987).

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