

Rough Oscillatory Singular Integrals on \mathbb{R}^n

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Abstract : In this paper we establish sharp bounds for oscillatory singular integrals with an arbitrary real polynomial phase P . Our kernels are allowed to be rough both on the unit sphere and in the radial direction. We show that the bounds grow no faster than $\log(\deg(P))$, which is optimal and was first obtained by Parissis and Papadimitrakis for kernels without any radial roughness. Among key ingredients of our methods are an $L^1 \rightarrow L^2$ estimate and extrapolation.

Keywords : oscillatory singular integral, rough kernel, singular integral, Orlicz spaces, Block spaces, extrapolation, L^p boundedness

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