

A sparse domination for the Marcinkiewicz integral with rough kernel and applications

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Abstract. Let Ω be homogeneous of degree zero, have mean value zero and integrable on the unit sphere, and μ_Ω be the higher-dimensional Marcinkiewicz integral defined by

$$\mu_\Omega(f)(x) = \left(\int_0^\infty \left| \int_{|x-y|\leq t} \frac{\Omega(x-y)}{|x-y|^{n-1}} f(y) dy \right|^2 \frac{dt}{t^3} \right)^{1/2}.$$

In this paper, the authors establish a bilinear sparse domination for μ_Ω under the assumption $\Omega \in L^\infty(S^{n-1})$. As applications, some quantitative weighted bounds for μ_Ω are obtained.

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