THE MULTIDIMENSIONAL REVERSE HARDY INEQUALITIES

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Abstract. In this paper we characterize the validity of the multidimensional reverse Hardy inequalities

\[ \|gw\|_{L^p(\mathbb{R}^n)} \leq C \left\| v(t) \int_{\mathbb{R}^n \setminus B(0,t)} g(y) dy \right\|_{L^q(0,\infty)} \]

and

\[ \|gw\|_{L^p(\mathbb{R}^n)} \leq C \left\| v(t) \int_{B(0,t)} g(y) dy \right\|_{L^q(0,\infty)} \]

for non-negative measurable functions on \( \mathbb{R}^n \), where \( B(0,t) \) is the closed ball in \( \mathbb{R}^n \) centered at zero with radius \( t \), \( \mathbb{R}^n \setminus B(0,t) = B(0,t) \), \( 0 < p \leq 1 \), \( 0 < q \leq +\infty \), \( w \) and \( v \) are weight functions on \( \mathbb{R}^n \) and \( (0,\infty) \), respectively. Obtained conditions are the natural extensions of one-dimensional conditions.


Keywords and phrases: Multidimensional Hardy operator, Hardy inequality, reverse Hardy inequality, discretization.

REFERENCES