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8. Analysis

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Solution of some weight problems for the Riemann-Liouville and Weyl Operators defined on SHT

Let (X, d, μ) be a space of homogeneous type (SHT). Suppose that

$$R_\alpha f(x) = \int_{\{d(x_0,y)<d(x_0,x)\}} \frac{f(y)}{(\mu B(x, d(x,y)))^{1-\alpha}} d\mu$$

$$\left(W_\alpha f(x) = \int_{\{d(x_0,y)>d(x_0.x)\}} \frac{f(y)}{(\mu B(x, d(x,y)))^{1-\alpha}} d\mu \right)$$

be Riemann-Liouville (Weyl) transform, where $x_0 \in X$, $\alpha > 0$.
The necessary and sufficient conditions for the weight function v guaranteeing the boundedness of the operator R_α from $L^p(X)$ to $L^q_v(X)$ $(1 < p \leq q < \infty,\ \alpha > \frac{1}{p})$ are found. The appropriate problem for the operator W_α is solved.