GENERALIZED WEIGHTED SOBOLEV–MORREY ESTIMATES FOR HYPOELLIPTIC OPERATORS WITH DRIFT ON HOMOGENEOUS GROUPS

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Abstract. Let $\mathbb{G} = (\mathbb{R}^N, \circ, \delta_\lambda)$ be a homogeneous group, $Q$ be the homogeneous dimension of $\mathbb{G}$, $X_0, X_1, \ldots, X_m$ be left invariant real vector fields on $\mathbb{G}$ and satisfy Hörmander’s rank condition on $\mathbb{R}^N$. Assume that $X_1, \ldots, X_m$ ($m \leq N - 1$) are homogeneous of degree one and $X_0$ is homogeneous of degree two with respect to the family of dilations $(\delta_\lambda)_{\lambda > 0}$. Consider the following hypoelliptic operator with drift on $\mathbb{G}$

$$L = \sum_{i,j=1}^{m} a_{ij} X_i X_j + a_0 X_0,$$

where $(a_{ij})$ is a constant matrix satisfying the elliptic condition in $\mathbb{R}^m$ and $a_0 \neq 0$. In this paper, for this class of operators we obtain generalized weighted Sobolev-Morrey estimates by establishing boundedness of a large class of sublinear operators $T_\alpha$, $\alpha \in [0, Q)$ generated by Calderón-Zygmund operators ($\alpha = 0$) and generated by fractional integral operator ($\alpha > 0$) on generalized weighted Morrey spaces and proving interpolation results in generalized weighted Sobolev-Morrey spaces on $\mathbb{G}$.


Keywords and phrases: Hypoelliptic operators with drift, homogeneous groups, fractional integral operator, singular integral operators, generalized weighted Morrey spaces, generalized weighted Sobolev-Morrey estimates.

REFERENCES


