

SOME HARDY INEQUALITIES ON HALF SPACES FOR GRUSHIN TYPE OPERATORS

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Abstract. We prove some sharp Hardy type inequalities on half spaces for Grushin type operators like $\Delta_x + (1 + \gamma)^2|x|^{2\gamma}\Delta_y$ with $\gamma > 0$.

Mathematics subject classification (2010): Primary 26D10, 35H20.

Keywords and phrases: Hardy inequality, Grushin type operators.

REFERENCES

- [1] L. D'AMBROSIO, *Hardy inequalities related to Grushin type operators*, Proc. Amer. Math. Soc. **132** (2004), 725–734.
- [2] L. D'AMBROSIO AND S. LUCENTE, *Nonlinear Liouville Theorems for Grushin and Tricomi Operators*, J. Differential Equations **193** (2003), 511–541.
- [3] J. DOU, Q. GUO, P. NIU, *Hardy inequalities with remainder terms for the generalized Baouendi-Grushin vector fields*, Math. Ineq. Appl. **13**, 3 (2010), 555–570.
- [4] B. FRANCHI, C. E. GUTIÉRREZ, R. L. WHEEDEN, *Weighted Sobolev-Poincaré inequalities for Grushin type operators*, Comm. Partial Differential Equations **19** (1994), 523–604.
- [5] S. FILIPPAS, A. TERTIKAS, J. TIDBLOM, *On the structure of Hardy-Sobolev-Maz'ya inequalities*, J. Eur. Math. Soc. **11**, 6 (2009), 1165–1185.
- [6] G. B. FOLLAND, E. M. STEIN, *Hardy spaces on homogeneous groups*, Princeton University Press, Princeton, NJ, 1982.
- [7] V. MAZ'YA, T. SHAPOSHNIKOVA, *A Collection of Sharp Dilation Invariant Integral Inequalities for Differentiable Functions*, in “Sobolev Spaces in Mathematics I: Sobolev Type Inequalities”, ed. V. Maz'ya, International Mathematical Series **8**, Springer, 2009, 223–247.