

WEIGHTED NORM INEQUALITIES FOR THE g -LITTLEWOOD-PALEY OPERATORS ASSOCIATED WITH LAPLACE-BESSEL DIFFERENTIAL OPERATORS

A. AKBULUT, V. S. GULIYEV AND M. DZIRI

Abstract. In this work we define and study Poisson integral associated with Laplace-Bessel differential operators. We establish weighted inequalities with a general weight for the g -Littlewood-Paley functions and the commutator $g_{b,k}$ defined by (1.2) associated with Laplace Bessel differential operator.

Mathematics subject classification (2010): Primary 42B20, 42B25, 42B35.

Keywords and phrases: Fourier transform, g -function, dilation, maximal function, Poisson integral.

REFERENCES

- [1] A. ACHOUR, K. TRIMECHE, *La g -fonction de Littlewood-Paley associée à un opérateur différentiel singulier sur $(0, \infty)$* , Ann. Inst. Fourier, Grenoble **33** (1983), 203–226.
- [2] J. ALVAREZ, R. BADGY, D. KURTZ AND C. PÉREZ, *Weighted estimates for commutators of linear operators*, Studia Math. **104** (1993), 195–209.
- [3] J. J. BETANCOR, A. J. CASTRO, AND J. CURBELO, *Harmonic analysis operators associated with multidimensional Bessel operators*, Arxiv (2010).
- [4] R. COIFMAN AND Y. MEYER, *Au déla des opérateurs pseudo-différentiels*, Astérisque **57** (1978), 1–185.
- [5] V. S. GULIEV, *On the maximal function and fractional integral associated with the Bessel differential operator*, Math. Inequal. Appl. **6**, 2 (2003), 317–330.
- [6] V. S. GULIEV, N. N. GARAKHANOVA, AND YU. ZEREN, *Pointwise and integral estimates for the B -Riesz potential in terms of B -maximal and B -fractional maximal functions*, Siberian Mathematical Journal **49**, 6 (2008), 1008–1022.
- [7] E. V. GULIEV, *Weighted inequality for fractional maximal functions and fractional integrals, associated with the Laplace-Bessel differential operator*, Trans. Natl. Acad. Sci. Azerb. Ser. Phys.-Tech. Math. Sci. **26**, 1 (2006), Math. Mech., 71–80.
- [8] E. STEIN, *Topics in harmonic analysis related to the Littlewood-Paley theory*, Ann. of math. Studies No. **63**, Princeton Univ. Press, N. J., 1970.
- [9] E. STEIN AND G. WEISS, *Introduction to Fourier analysis on Euclidean spaces*, Princeton Univ. Press, Princeton, N. J., 1971.
- [10] E. STEIN AND S. WAIGNER, *Problems in harmonic analysis related to curvature*, Bull. Amer. Math. Soc. **84** (1978), 1239–1295.
- [11] E. STEIN, *Harmonic Analysis Real-variable Methods, Orthogonality, and Oscillatory Integrals*, Princeton University Press, Princeton, NJ, 1993.
- [12] K. STEMPAK, *La théorie de Littlewood-Paley pour la transformation de Fourier-Bessel*, C. R. Acad. Sci. Paris, Serie I, Math. **303** (1986), 15–18.
- [13] K. TRIMÈCHE, *Transformation intégrale de Weyl et théorème de Paley-Wiener associés à un opérateur différentiel singulier sur $(0, \infty)$* , J. Math Pures. Appl (9) **60** (1981), 51–98.
- [14] K. TRIMÈCHE, *Inversion of the Lions transmutations operators using generalized wavelets*, Applied and computational Harmonic Analysis **4**, 1 (1997), 97–112.

- [15] G. N. WATSON, *A treatise on the theory of Bessel functions*, Cambridge University Press, Cambridge, 1996.