

q -LITTLEWOOD-PALEY g -FUNCTION

AKRAM NEMRI

Abstract. The purpose of this paper is to define and study, by the virtue of the q -Hardy-Littlewood maximal function $\mathcal{M}_q(f)$ the so called L^p -boundedness of the q -Littlewood-Paley g -function when $p \in (1, 2]$.

Mathematics subject classification (2020): 42B10, 42B15, 42B25, 33D45.

Keywords and phrases: q -Poisson kernel, q -Littlewood-Paley g -function, q -Hardy-Littlewood maximal function.

REFERENCES

- [1] A. ACHOUR AND 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] H. ANNABI AND A. FITOUHI, *La g -fonction de Littlewood-Paley associée à une classe d'opérateurs différentiels sur $(0, \infty)$ contenant l'opérateur de Bessel*, C. R. Acad. Sci. Paris Ser. I Math. **9** (1986), 411–413.
- [3] J. M. DAVIS, I. A. GRAVAGNE, R. J. MARKS II, J. E. MILLER, A. A. RAMOS, *Stability of switched linear systems on nonuniform time domains*, in: IEEE Proc. of the 42nd Meeting of the Southeastern Symposium on System Theory, Texas, 2010.
- [4] L. DHAOUADI, A. FITOUHI AND J. EL KAMEL, *Inequalities in q -Fourier analysis*, J. Inequal. Pure Appl. Math. **171** (2006) 1–14.
- [5] A. FITOUHI AND F. BOUZEFFOUR, *The q -cosine Fourier transform and the q -heat equation*, Ramanujan J. **28** (2012) 443–461.
- [6] A. FITOUHI, M. HAMZA AND F. BOUZEFFOUR, *The q - j_α Bessel function*, J. Approx. Theory **115** (2002) 114–116.
- [7] A. FITOUHI AND L. DHAOUADI, *Positivity of the generalized translation associated with the q -Hankel transform*, Constr. Approx. **34** (2011) 453–472.
- [8] A. FITOUHI AND A. NEMRI, *Distribution And Convolution Product in Quantum Calculus*, Afr. Diaspora. J. Math., **7** (2008), 39–57.
- [9] R. FLOREANINI, J. LETOURNEUX AND L. VINET, *More on the q -oscillator algebra and q -orthogonal polynomials*, J. Phys. A **28** (1995), 287–293.
- [10] G. GASPER AND M. RAHMAN, *Basic hypergeometric series*, 2nd edn, Cambridge University Press, 2004.
- [11] T. H. KOORNWINDER, *q -Special functions*, a tutorial [arXiv:math/9403216v1](https://arxiv.org/abs/math/9403216v1).
- [12] T. H. KOORNWINDER AND R. F. SWARTTOUW, *On q -Analogues of the Fourier and Hankel transforms*, Trans. Amer Math. Soc. **333** (1992) 445–461.
- [13] A. B. OLDE DAALHUIS, *Asymptotic expansions for q -gamma, q -exponential and q -Bessel functions*, J. Math. Anal. Appl. **186** (1994) 896–913.
- [14] M. A. OLSHANETSKY AND V. B. K. ROGOV, *The q -Fourier transform of q -generalized functions*, (Russian) Mat. Sb. **190** (1999) 717–736.
- [15] H. MABROUK, *q -heat operator and q -Poisson's operator*, Fract. Calc. Appl. Anal. **9** (2006), 265–286.
- [16] A. NEMRI, *On the connection between heat and wave problems in quantum calculus and applications*, Math. Mech. Solids **18** (2013) 849–860.
- [17] A. NEMRI AND B. SELMI, *Lipschitz and Besov spaces in quantum calculus*, Infin. Dimens. Anal. Quantum Probab. Relat. Top. **19** (2016), no. 3, 1650021, 19 pp.

- [18] F. SOLTANI, *Littlewood-Paley g -function in the Dunkl analysis on \mathbb{R}^d* , J. Ineq. Pure Appl. Math. **6** (2005), Article 84.
- [19] E. M. STEIN, *Topics in harmonic analysis related to the Littlewood-Paley theory*, Annals of Mathematics Studies, Vol. 63. Princeton, NJ/Tokyo: Princeton University Press/University of Tokyo Press, 1970.
- [20] K. STEMPAK, *La théorie de Littlewood-Paley pour la transformation de Fourier Bessel*, C. R. Acad. Sci. Paris Ser. I Math. **303** (1986), 15–18.