

UNCERTAINTY PRINCIPLE INEQUALITIES RELATED TO LAGUERRE–BESSEL TRANSFORM

SOUMEYA HAMEM AND LOTFI KAMOUN

Abstract. In this paper, an analogous of Heisenberg inequality is established for Laguerre-Bessel transform. Also, a local uncertainty principle for this transform is investigated.

Mathematics subject classification (2010): 42B10, 44A05, 44A35, 35K08.

Keywords and phrases: Heisenberg inequality, Laguerre-Bessel transform, heat kernel, local uncertainty principle.

REFERENCES

- [1] P. C. BOWIE, *Uncertainty inequalities for Hankel transforms*, SIAM J. Math. Anal. **2** (1971), 601–606.
- [2] E. JEBBARI, M. SIFI AND F. SOLTANI, *Laguerre-Bessel wavelet transform*, Glob. J. Pure Appl. Math. **1** (2005), 13–26.
- [3] W. HEISENBERG, *Über den anschaulichen inhalt der quantentheoretischen kinematik und machanik*, Z. Phys. **43** (1927), 172–198.
- [4] A. HULANICKI, *Subalgebra of $L^1(G)$ associated with Laplacian on a Lie group*, Colloq. Math. **31** (1974), 259–287.
- [5] Z. LI AND L. LIU, *Uncertainty principles for Jacobi expansions*, J. Math. Anal. Appl. **286** (2003), 652–663.
- [6] Z. LI AND L. LIU, *Uncertainty principles for Sturm-Liouville operators*, Constr. Approx. **21** (2005), 193–205.
- [7] R. MA, *Heisenberg inequalities for Jacobi transforms*, J. Math. Anal. Appl. **332** (2007), 155–163.
- [8] R. MA, *Heisenberg uncertainty principle on Chébli-Trimèche hypergroups*, Pacific J. Math. **235** (2008), 289–296.
- [9] S. OMRI AND L. T. RACHDI, *Heisenberg-Pauli-Weyl uncertainty principle for the Riemann-Liouville operator*, J. Inequal. Pure Appl. Math. **9**, 3 (2008), 1–23.
- [10] J. F. PRICE, *Inequalities and local uncertainty principles*, J. Math. Phys. **24** (1983), 1711–1714.
- [11] J. F. PRICE, *Sharp local uncertainty principles*, Studia Math. **85** (1987), 37–45.
- [12] M. RÖSLER, *An uncertainty principle for the Dunkl transform*, Bull. Austral. Math. Soc. **59** (1999), 353–360.
- [13] M. RÖSLER AND M. VOIT, *An uncertainty principle for Hankel transforms*, Proc. Amer. Math. Soc. **127** (1999), 183–194.
- [14] N. SHIMENO, *A note on the uncertainty principle for the Dunkl transform*, J. Math. Sci. Univ. Tokyo **8** (2001), 33–42.
- [15] E. M. STEIN, *Singular integrals and differentiability properties of functions*, Princeton University Press Princeton, New Jersey, 1970.
- [16] H. WEYL, *Gruppentheorie und Quantenmechanik*, S. Hirzel, Leipzig, 1928. Revised English edition: *The Theory of Groups and Quantum Mechanics*, Methuen, London, 1931; reprinted by Dover, New York, 1950.