Journal of Lie Theory 28 (2018) 805–828

A. Boussejra
Department of Mathematics, Faculty of Sciences, University Ibn Tofail, Kenitra, Morocco
boussejra.abdelhamid@uit.ac.ma

N. Ourchane
Department of Mathematics, Faculty of Sciences, University Ibn Tofail, Kenitra, Morocco
nadia.ourchane20@gmail.com

Characterization of the L^p-Range of the Poisson Transform on the Octonionic Hyperbolic Plane

Let $B(\mathbb{O}^2) = \{x \in \mathbb{O}^2, |x| < 1\}$ be the bounded realization of the exceptional symmetric space $F_{4(-20)}/Spin(9)$. For a non-zero real number λ, we give a necessary and a sufficient condition on eigenfunctions F of the Laplace-Beltrami operator on $B(\mathbb{O}^2)$ with eigenvalue $-(\lambda^2+\rho^2)$ to have an L^p-Poisson integral representations on the boundary $\partial B(\mathbb{O}^2)$. Namely, F is the Poisson integral of an L^p-function on the boundary if and only if it satisfies the following growth condition of Hardy-type:

$$\sup_{0\le r<1}(1-r^2)^{\frac{-\rho}{2}}\left(\int_{\partial B(\mathbb{O}^2)}|F(r\theta)|^p d\theta\right)^{\frac{1}{p}} < \infty.$$

This extends previous results by the first author et al. for classical hyperbolic spaces.

Keywords: Octonionic hyperbolic plane, Poisson transform, eigenfunctions, Calderon-Zygmund estimates.

MSC: 43A85, 42B20