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On the Generalized Poisson Transform on the Quaternionic Hyperbolic Space

Let $B(\mathbb{H}^n) = Sp(n,1)/Sp(n) \times Sp(1)$ be the quaternionic hyperbolic space. We consider a generalized Poisson transform $\mathcal{P}_{\lambda,l}$ associated with a character of a class of irreducible representations of $Sp(n) \times Sp(1)$. In this paper, we show that if f is a hyperfunction on the boundary of $B(\mathbb{H}^n)$, then f belongs to the space $L^p(\partial B(\mathbb{H}^n))$ if and only if either its generalized Poisson transform $\mathcal{P}_{\lambda,l}f$ satisfies a Hardy-type condition, or the modified admissible maximal function of $\mathcal{P}_{\lambda,l}f$ belongs to $L^p(\partial B(\mathbb{H}^n))$. In addition, we study the admissible convergence of the generalized Poisson transform $\mathcal{P}_{\lambda,l}f$ for $f \in L^1(\partial B(\mathbb{H}^n))$.

Keywords: Generalized Poisson transform, hypergeometric function, quaternionic hyperbolic space.

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