Asymptotic behaviour of the Poisson transform for hyperboloids

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ABSTRACT

The study of the asymptotics of the Poisson transform at infinity is well-known to play an important role in harmonic analysis on semisimple symmetric spaces G/H (the asymptotics of spherical functions, Eisenstein series etc.). Recently still one application was discovered: it is a necessary tool for studying of the so-called canonical and associated boundary representations (V.F.Molchanov with collaborators). The latter problem originated from Berezin quantization. An important subclass of the spaces mentioned above is formed by real hyperbolic spaces, i.e. hyperboloids $X = G/H$ with $G = SO_0(p,q)$, $H = SO_0(p, q-1)$. We determine the full asymptotics of the Poisson transform for these hyperboloids X for arbitrary (not necessarily K-finite) functions on the boundary of X. The expansion is given by asymptotic series in powers of some functions ψ. For ψ we take some functions connected with X in a natural way. For the one-sheeted hyperboloids ($p = 1$), the following remarkable fact is discovered: there exists a function ψ such that coefficients of the expansion are given by intertwining operators for representations of G associated with a cone.

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