Anosov representations and counting in some $\mathrm{PSO}(p,q)$-symmetric spaces.

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For positive integers p and q consider a quadratic form on $\mathbb{R}^{p+q}$ of signature (p,q) and let $\mathrm{O}(p,q)$ be its group of linear isometries. We study counting problems in the Riemannian symmetric space of $\mathrm{PSO}(p,q)$ and in the pseudo-Riemannian hyperbolic space of signature $(p,q-1)$. The space X of q-dimensional subspaces of $\mathbb{R}^{p+q}$ on which the quadratic form is negative definite is the Riemannian symmetric space of $\mathrm{PSO}(p,q)$. Let

$$\rho : \Gamma \longrightarrow \mathrm{PSO}(p,q)$$

be a projective Anosov representation and $S \subset X$ be a totally geodesic copy of the Riemannian symmetric space of $\mathrm{PSO}(p,q-1)$. For certain choices of S we prove that

$$\#\{\gamma \in \Gamma : \quad d_X(S, \rho\gamma \cdot S) \leq t\} \tag{1}$$

is finite for all $t \geq 0$ and show a purely exponential asymptotic of (1) as t goes to infinity. We provide an interpretation of this result in the pseudo-Riemannian hyperbolic space of signature $(p,q-1)$, as the counting of lengths of space-like geodesic segments in the orbit of a point.

References

[1] Carvajales, L. , *Counting problems for special-orthogonal Anosov representations* , Preprint, arXiv:1812.00738 [math.GR].