

Counting loxodromics for hyperbolic actions

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Let G be a hyperbolic group acting on a hyperbolic metric space X . We show that the set of elements of G which act as loxodromic isometries of X is generic. That is, for any finite generating set of G , the proportion of X -loxodromics in the ball of radius n about the identity in G approaches 1 as n tends to infinity.

We also establish several results about the behavior in X of the images of typical geodesic rays in G ; for example, we prove that they make linear progress in X and converge to the Gromov boundary of X . Our techniques make use of the automatic structure of G , Patterson-Sullivan measure, and the ergodic theory of random walks for groups acting on hyperbolic spaces. We discuss various applications, in particular to mapping class groups, $\text{Out}(F_N)$, and right-angled Artin groups.

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