Algebra/Topology Seminar

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Regular Languages for Contracting Geodesics in Groups

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1:15 p.m. in ES-143

ABSTRACT. A celebrated theorem due to Cannon states that for any finite generating set S of a hyperbolic group, the language consisting of all geodesics in $\mathrm{Cay}(G,S)$ is a regular language. This theorem has many interesting consequences; for example, it implies that the growth function of a hyperbolic group must be a rational function, for any finite generating set S. I will speak about our theorem with Eike generalizing the above theorem to all hyperbolic-like geodesics of a finitely generated group. In other words, our theorem states that for any finitely generated group G and any finite generating set S, the language consisting of all hyperbolic-like geodesics in $\mathrm{Cay}(G,S)$ is a regular language. A geodesic c is said to be D-hyperbolic-like if there exists some $D > 0$ such that every ball disjoint from c, once projected to c, projects to a subset of diameter at most D (think about the axis of a in $F_2 = \langle a, b \rangle$). Also, a group $G = \langle S \rangle$ is hyperbolic if and only if there exists some D such that every geodesic is D-hyperbolic like, and hence our theorem recovers Cannon's theorem. The talk will be entirely self contained and accessible to everyone.