

Combinatorial negative curvature

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Problem list 5

- (1) Show that the Word Problem is solvable in hyperbolic groups.
- (2) Show that the notion of quasi-convexity of subgroups depends on the word metric.
- (3) Find an example of a quasi-isometrically embedded not quasi-convex subgroup.
- (4) Show that a quasi-isometrically embedded subgroup of a hyperbolic group is quasi-convex.
- (5) Show that a quasi-isometrically embedded subgroup of a hyperbolic group is undistorted
- (6) Let u, v, w, z be vertices of a δ -hyperbolic graph with $d(u, w) = d(v, z) = k$, and $d(u, v), d(w, z) \leq a$. Show that there exists $B = B(\delta)$ such that for any two points x, y such that $d(u, x) + d(x, w) = k$, and $d(v, y) + d(y, z) = k$, we have $d(x, y) \leq Ba$.
- (7) Let S be a finite generating set of a group G . Show that $Z(g) = \bigcap_{s \in S} C(s)$.
- (8) Show that if $h^{-1}g^p h = g^q$ then $h^{-k}g^{p^k}h^k = g^{q^k}$.