Hyperbolicity, injective hulls, and Helly graphs

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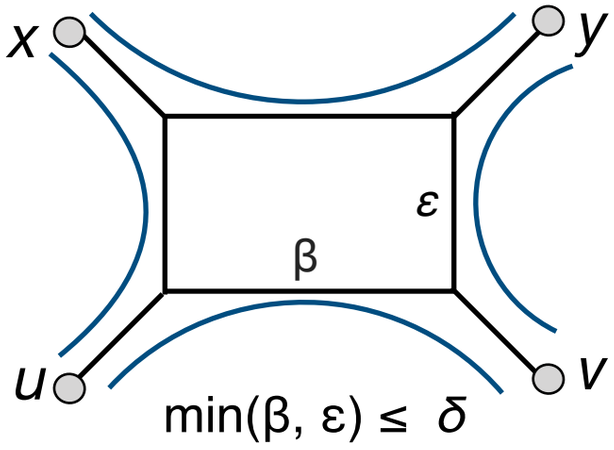
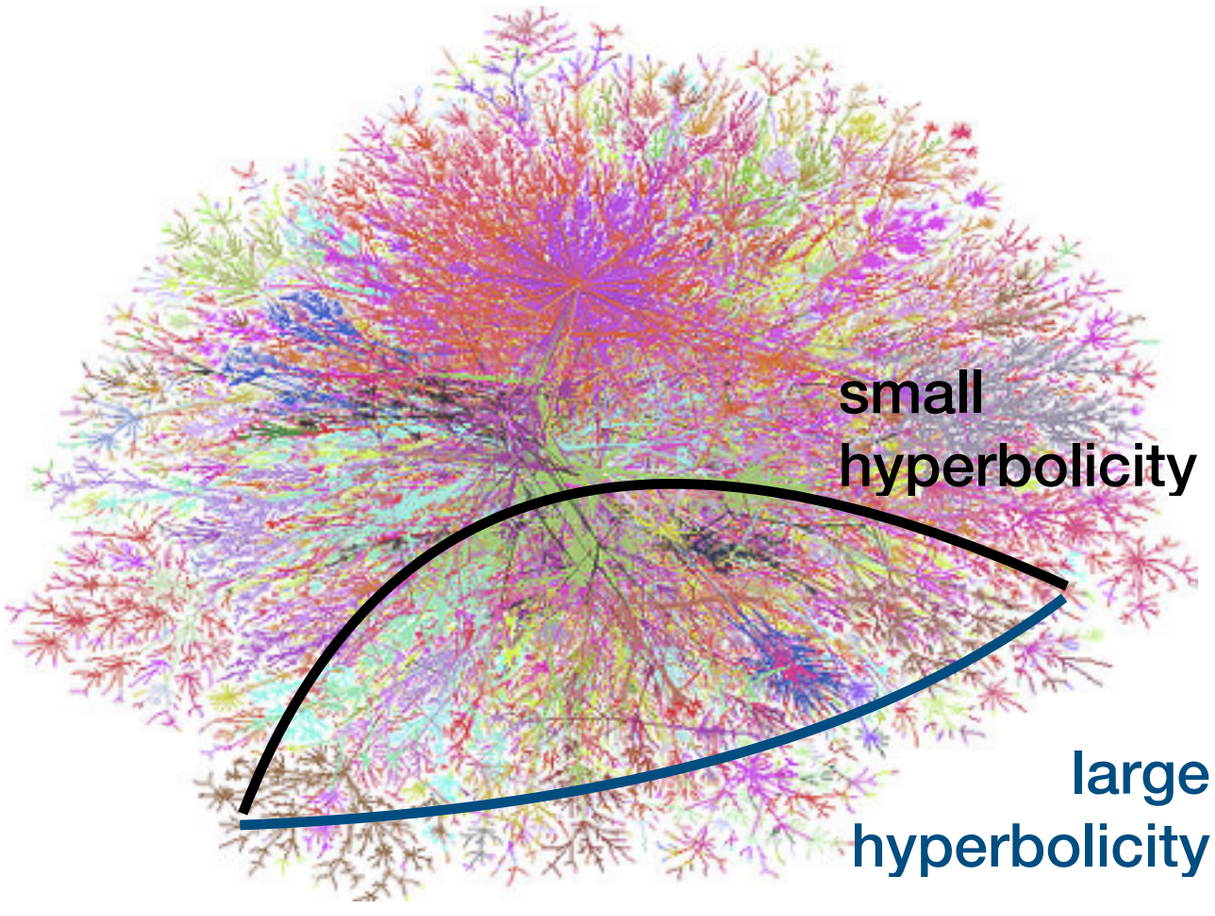
Applications of Hyperbolicity

- Many real world networks have small hyperbolicity (biological, social, collaboration, communication, etc.)
- Smaller value means the network
  - is metrically closer to a tree
  - has negative curvature



A graph is δ-hyperbolic provided for any vertices *x, y, u, v* in it, the two larger of the three sums
d(u,v) + d(x,y),
d(u,x) + d(v,y), and
d(u,y) + d(v,x) differ by at most 2δ.



Small hyperbolicity implies that the shortest path between two points curves inward towards the core of the network.