

Metric reconstruction via optimal transport

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Given a sufficiently dense sample of points in a Riemannian manifold, the manifold can be reconstructed up to homotopy equivalence as the Čech or Vietoris--Rips complex of the sample. I will discuss extensions of this beyond Riemannian manifolds and how optimal transport seems to be the correct point of view for metric reconstruction of metric spaces in addition to recovering the homotopy type. I will also explain how understanding homotopy types of Čech complexes of circular point sets paired with the knowledge of the face lattice of cyclic polytopes has applications in harmonic analysis.

This is joint work in progress with Michał Adamaszek and Henry Adams.