COMPARISON GEOMETRY AND ISOPERIMETRIC INEQUALITIES

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A Cartan-Hadamard space is a complete geodesic metric space that satisfies a 'slimness' condition on geodesic triangles. These spaces naturally occur in geometric group theory or in Riemannian geometry as universal covers of complete Riemannian spaces with sectional curvature bounded from above by zero. The slimness condition is also stable under gluing along a totally geodesic subset, and many examples of interest, such as infinite-dimensional Hilbert spaces, are non-proper.

The slimness condition is often difficult to verify directly. Indeed, this essentially requires the analysis of all the geodesics in the metric space. However, a Euclidean isoperimetric inequality is at times easier to verify, and in the proper case, equivalent to the slimness condition by a seminal theorem by Lytchak and Wenger (2018).

Jointly with Stefan Wenger, we recently extended the Lytchak-Wenger strategy to the non-proper setting. We solved the challenges in the non-proper case by developing a new ultralimit construction of Sobolev mappings suitable for calculus of variations. During the talk, we describe the Lytchak-Wenger strategy and core ideas of the ultralimit construction.

Based on joint work with Stefan Wenger.