Analysis and Differential Geometry Seminar

Deformations of unbounded convex bodies and hypersurfaces

Professor Mohammad Ghomi
Georgia Institute of Technology

Abstract: We study the topology of the space $K$ of complete convex hypersurfaces of $n$-dimensional Euclidean space which are homeomorphic to a hyperplane. In particular, using Minkowski sums, we construct a deformation retraction of $K$ onto the Grassmannian space of hyperplanes. So every hypersurface in $K$ may be flattened in a canonical way. Further, the total curvature of each hypersurface evolves continuously and monotonically under this deformation. We also show that, modulo proper rotations, the subspaces of $K$ consisting of smooth, strictly convex, or positively curved hypersurfaces are each contractible, which settles a question of H. Rosenberg.

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