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On the solution to the reverse isoperimetric problem

The classical isoperimetric problem asks which domain, among all domains with a fixed surface area, has maximal volume. The question has a long and beautiful history and has been generalized to a variety of different settings. On the other hand, one can formulate the reverse isoperimetric problem: under which conditions can one minimize the volume among all domains of a given constraint.

In this talk we consider a class of λ -concave bodies in \mathbb{R}^{n+1} ; that is, convex bodies with the property that each of their boundary points supports a tangent ball of radius $1/\lambda$ that lies locally (around the boundary point) inside the body. In this class, we solve a reverse isoperimetric problem: we show that the convex hull of two balls of radius $1/\lambda$ (a sausage body) is a unique volume minimizer among all λ -concave bodies of given surface area. This is joint work with Roman Chernov and Kostiantyn Drach.