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Weighted Projection Bodies

The inequalities of Petty and Zhang are affine isoperimetric inequalities, the former of which implies that classical isoperimetric inequality and is equivalent to an affine version of the Sobolev inequality for compactly support C^1 functions, while the latter is a very strong reverse isoperimetric inequality. Each of these inequalities feature a certain class of convex bodies, called projection bodies, which may be described in terms of the cosine transform of the surface area measure of a given convex body.

In this talk, we will discuss a generalization of these bodies to the weighted setting (by replacing the surface area measure with different measures satisfying mild regularity conditions) and describe how they may be used to prove strong reverse isoperimetric inequalities. And, in addition, show how these results may be used to imply a reverse form of the isoperimetric inequality for certain classes of measures on the n -dimensional Euclidean space.

This is based on a joint work with D. Langharst and A. Zvavitch.