

Institut für Geometrie

Mathematisches Kolloquium

23.11.2012, 14:30 (Kaffee Institut f. Geometrie), 15:00 (Vortrag Hörsaal A)

HS A, Kopernikusgasse 24, 1. Stock

Integral Geometry and Isoperimetric Inequalities

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This lecture presents some of the fascinating developments which happened in Integral Geometry in the last years, establishing connections to Differential Geometry and Functional Analysis. The concept of *valuation* is central to this development, which means functions ϕ on the set of convex bodies (or of more general subsets of \mathbb{R}^n) which have values in a certain abelian semigroup and which enjoy the property

$$\phi(K) + \phi(L) = \phi(K \cup L) + \phi(K \cap L)$$

whenever all of K , L , $K \cup L$ are convex. Valuations, as generalizations of measures, have long played an important role in geometric analysis, starting with Dehn's solution of Hilbert's third problem and the theory of dissections of polytopes. In the last 5 to 10 years strong connections between affine geometry and valuations emerged: A series of fundamental operators on convex bodies, like the projection body and intersection body, could be classified in terms of the valuation property and compatibility with affine mappings. These results have been applied to the theory of affine isoperimetric inequalities and in particular were used to significantly sharpen several classical inequalities of Euclidean geometry.

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