

Felix Schulze

Nonlinear Evolution by Mean Curvature and the Isoperimetric Inequality

TIME:

13 Nov 2005, 17:00 - 19:00

LOCATION:

Freie Universität Berlin - Fachbereich Mathematik und Informatik
Arnimallee 2-6, 14195 Berlin-Dahlem (Raum 031)

Consider a family of smooth compact hypersurfaces in $\mathbb{R}^{(n+1)}$ evolving with normal speed equal to a positive power k of the mean curvature. For $k > n-1$, smooth solutions to such flows improve a certain 'isoperimetric difference'. If a smooth flow exists until the volume decreases to zero, this proves the isoperimetric inequality for the initial configuration. In general, singularities will develop before the volume goes to zero. To deal with this problem, we develop a weak level-set formulation for such flows and show that the above monotonicity is still valid. This proves the isoperimetric inequality for $n < 7$. Extending this to complete, simply connected 3-dimensional manifolds with nonpositive sectional curvature, we give a new proof for the Euclidian isoperimetric inequality on such manifolds.

Contact:

Humboldt-Universität zu Berlin . Institut für Mathematik
SFB 647 . Unter den Linden 6 . 10099 Berlin
Tel. +49 30 2093 1804 . Fax. +49 30 2093 2727
sfb647@math.hu-berlin.de