

Gastvortrag

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HS 421

Manuel Schlierf
Universität Ulm

Gradient flow dynamics for cell membranes in the Canham-Helfrich model

Abstract:

The Canham-Helfrich model for the shape of lipid bilayers (e.g. red blood cells) is one of the most prominent applications of the variational study of Willmore-type bending energies. We study the energetically most efficient way how a deformed red blood cell regains equilibrium. This is mathematically described by the gradient flow of the Canham-Helfrich functional, including a spontaneous curvature and the conservation of surface area and enclosed volume along the evolution.

For the resulting non-local fourth-order degenerate-parabolic quasi-linear evolution equation, we prove global existence and convergence of smooth solutions for spheres and axisymmetric tori, provided the initial energy lies below explicit thresholds.

Eingeladen von Simon Blatt