Sommersemester 2025

Lecture series

Ausgewählte Themen zu Evolutionsgleichungen für Untermannigfaltigkeiten

Lecturer: Prof. Dr. Gerhard Huisken

Start: Friday, 25th April 2025

Time: Fridays, 10:00-12:00

Place: C4H33 (C-Building Mathematik/Physik)

Study programs: Master in Mathematics and in Mathematical Physics

Modul number: MAT- 60-11; 3 ECTS points

Description:

The course treats the deformation of hypersurfaces along their mean curvature vector in Euclidean space and in Riemannian manifolds. We investigate the interplay between geometric structures and the analytical properties of systems of quasi-linear parabolic partial differential equations. We develop various techniques for the establishment of estimates on the behavior of solutions, for example curvature estimates, density estimates and long-term asymptotical behavior of special solutions. The course will also discuss which results remain valid when other more non-linear evolution equations are considered.

Prerequisites:

Bachelor degree or equivalent; equivalent of one course in PDEs and one course in Differential Geometry

Literature:

- B. Andrews, B. Chow, C. Günther, M. Langford, Extrinsic Geometric Flows, AMS Graduate Studies in Mathematics 206, (2020)

- Klaus Ecker, Regurlarity theory of mean curvature flow, Birkhäuser Basel (2004).

- Richard Hamilton, Three-manifolds with positive Ricci-curvature, J. Diff. geom. 17 (1982) 255-306.

- Richard Hamilton, Four-manifolds with positive Curvature Operator, J. Diff. Geom. 24 (1986) 153-179.

- Gary Lieberman, Second order parabolic differential equations, World Scientific (1996).

Exam: Written or oral exam depending on course size.