Convergence Theories of the Mean Curvature Flow

Yizi Wang
The Chinese University of Hong Kong

yzwang@math.cuhk.edu.hk

Abstract

The last few decades have witnessed a significant development in the field of geometric flow, which leads to many remarkable accomplishments in geometry, topology, physics, and computer vision. Among various geometric flows, the Mean Curvature Flow is one of the most important geometric flows for submanifolds of Riemannian manifolds.

This thesis concerns convergence theories of the mean curvature flow in various settings, which falls into four major topics. We first provide a background discussion, including PDE analysis and geometric properties of mean curvature flow. In the second part, we sketch a proof for Huisken's seminal result in 1984 concerning the convergence of convex hypersurfaces in Euclidean spaces to a round point. The third topic focuses on the convergence theory for higher-codimension submanifold under mean curvature flow. The final part centers around the introduction to the free boundary condition and discussions on two convergence theories of mean curvature flow with free boundary.

Keywords

Geometric analysis, Partial differential equation, Mean curvature flow