# 应用数学讲座

## Научный Семинар по Прикладной Математике

## Research Seminar on Applied Mathematics

# 应用数学报告（28）

**报告人 / Докладчик / Speaker**: 段北平 博士

**题目 / Название / Title**: High-order fully discrete energy diminishing evolving surface finite element methods for a class of geometric curvature flows

**时间 / Время / Time：12 Jan. 2022, 15:00-16:00**

**地点 / Место / Venue: 主楼 336**

**摘要 / Аннотация / Abstract**:

We concern the construction of high-order energy-decaying numerical methods for gradient flows of evolving surfaces with curvature-dependent energy functionals. The semidiscrete evolving surface finite element method is derived based on the calculus of variation of the semidiscrete surface energy functional. This makes the semidiscrete problem naturally inherit the energy decay structure. With this property, the semidiscrete problem is furthermore formulated as a gradient flow system of ODEs. The averaged vector-field collocation method is used for time discretization of the ODEs to preserve energy decay at the fully discrete level while achieving high-order accuracy in time. Extensive numerical examples are provided to illustrate the accuracy and energy diminishing property of the proposed method, as well as the effectiveness of the method in capturing singularities in the evolution of closed surfaces.

**段北平博士简介：**

段北平博士现就职于深圳北理莫斯科大学计算数学与控制联合研究中心。2019 年毕业于中南大学获理学博士学位，2016 年 9 月至 2018 年 6 月在 Texas A&M University 数学系访问。2019 年至 2021 年在中国工程物理研究院北京计算科学研究中心从事博士后研究，主要研究方向为计算几何流、Navier-Stokes 两相流等界面问题以及非光滑函数逼近问题。主要成果发表于 IMA J. Numerical Analysis, J. Scientific Computing，J. Computational Physics 等国际主流学术期刊。

*访问学者以及需要做报告的学者请联系 张晔 教授 / Всем желающим выступить с докладами на семинаре просьба обращаться к Чжану Е* ye.zhang@smbu.edu.cn