

数学与系统科学研究院

计算数学所学术报告

报告人: **Assoc. Prof. Lili Ju**

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报告题目:

**Efficient and Stable Exponential
Time Differencing Runge-Kutta
Methods for Phase Field Elastic
Bending Energy Models**

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报告时间: 2015 年 12 月 16 日 (周三)

下午 16:00~17:00

报告地点: 科技综合楼三层

311 报告厅

Abstract:

The Willmore flow formulated by phase field elastic bending energy models has been widely used to describe the shape transformation of biological lipid vesicles. In this talk, we present some efficient and stable numerical methods for simulating the unconstrained Willmore flow and the Willmore flow with fixed volume and surface area constraints. The proposed methods can be high-order accurate and are completely explicit in nature, by combining exponential time differencing Runge-Kutta approximations for time integration with spectral discretizations for spatial operators on regular meshes. In particular, we also incorporate novel linear operator splitting techniques into the numerical schemes to improve the discrete energy stability. In order to avoid the extra numerical instability brought by use of large penalty parameters in solving the constrained Willmore flow problem, a modified augmented Lagrange multiplier approach is proposed and adopted. Various numerical experiments are performed to demonstrate accuracy and stability of the proposed methods.

欢迎大家参加！