

数学与系统科学研究院

计算数学所学术报告

报告人: Prof. Xiaofeng Yang

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报告题目:

**Efficient schemes with
unconditionally energy stabilities for
gradient flow models with strong
anisotropy: S-IEQ and S-SAV
approaches**

邀请人: 毛士鹏 副研究员

报告时间: 2018 年 6 月 11 日 (周一)

上午 10:00-11:00

报告地点: 科技综合楼三层

311 报告厅

Abstract:

We consider numerical approximations for gradient flow models with strong anisotropy by taking the anisotropic Cahn-Hilliard/Allen-Cahn equations with their applications to the faceted pyramids on nanoscale crystal surfaces and the dendritic crystal growth problems, as special examples. The main challenge of constructing numerical schemes with unconditional energy stabilities for these type of models is how to design proper temporal discretizations for the nonlinear terms with the strong anisotropy. We combine the recently developed IEQ/SAV approach with the linear stabilization approach, where some linear stabilization terms are added. These terms are shown to be crucial to remove the oscillations caused by the anisotropic coefficients, numerically. The novelty of the proposed schemes is that all nonlinear terms can be treated semi-explicitly, and one only needs to solve some coupled/decoupled, but linear equations at each time step. We further prove the unconditional energy stabilities rigorously, and present various 2D and 3D numerical simulations to demonstrate the stability and accuracy.

欢迎大家参加！