

数学与系统科学研究院
计算数学所网络学术报告

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报告题目:

**Structure preserving numerical
methods for phase-field equations**

邀请人: 于海军 研究员

报告时间: 2021 年 7 月 8 日 (周四)

上午 10:00-11:00

报告工具: 腾讯会议 ID: (175 441 266)

Abstract:

Phase-field equations have intrinsic structures such as energy dissipation or conservation, and/or positivity/maximum principle preserving. It is desirable, sometimes necessary, to preserve these structures in a numerical scheme. In the first part of this talk, we establish a framework of monotone schemes for the Allen-Cahn equations, in which only several concise and reasonable conditions are assumed. These conditions can guarantee both the unique solvability and the maximum principle. In the second part, we present a new approach to deal with nonlinear terms in a large class of gradient flows. The approach is not restricted to specific forms of the nonlinear part of the free energy. It leads to linear and unconditionally energy stable schemes which only require to solve decoupled linear equations with constant coefficients. Hence, these schemes are extremely efficient and very accurate when combined with higher-order numerical schemes.

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