



复旦大学数学科学学院 数学综合报告会

报告题目: Local discontinuous Galerkin method for the Keller-Segel chemotaxis model

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时间: 2021-11-02 星期二 11:00-12:00

地点: <https://uncc.zoom.us/j/97881622800>

报告摘要:

in this talk, we apply the local discontinuous Galerkin (LDG) method to 2D Keller–Segel (KS) chemotaxis model. We improve the results upon (Y. Epshteyn and A. Kurganov, SIAM Journal on Numerical Analysis, 47 (2008), 368-408.) and give optimal rate of convergence under special finite element spaces. Moreover, to construct physically relevant numerical approximations, we develop a positivity-preserving limiter to the scheme, extending the idea in (Y. Zhang, X. Zhang and C.-W. Shu, Journal of Computational Physics, 229 (2010), 8918-8934). With this limiter, we can prove the L1-stability of the numerical scheme. Numerical experiments are performed to demonstrate the good performance of the positivity-preserving LDG scheme. Moreover, it was shown that the chemotaxis model will yield blow-up solutions under certain initial conditions. We also numerically demonstrate how to find the numerical blow-up time by using the L2-norm of the numerical approximations.

This is a joint work with Professor Chi-Wang Shu from Brown University and Dr Yang Yang from Michigan Tech University.

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