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The convergence analysis of a 2D Keller-Segel-Navier-Stokes system with fast signal diffusion

报告人：向昭银 教授（电子科技大学）

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链接入会：https://meeting.tencent.com/s/IuoRZXLxT90L

报告摘要： In this talk, we consider the convergence of the fully parabolic-parabolic-fluid (PP-fluid) system to the corresponding parabolic-elliptic-fluid (PE-fluid) system as $\ep\rightarrow0$ in a bounded domain $\Om\subset\mathbb{R}^2$ with smooth boundary. Under the natural volume filling hypothesis |S(x,\nep,\cep) | \leq \f{C_S}{ (1+\nep)^{\alpha}}with $\al>0$ for some positive constant C_S, we first show the global classical solutions $(n_\ep,c_\ep,u_\ep,P_{\ep})$ of the full PP-fluid system will converge to the solution (n, c, u, P) of the corresponding PE-fluid system as $\epsilon\to 0$. As a byproduct, we obtain the global well-posedness of the PE-fluid system for general large initial data. Then we establish so me new exponential time decay estimates of $(n_\ep,c_\ep,u_\ep,P_{\ep})$ uniformly in $\ep$ for suitable small initial data, which in particular ensure an improvement of convergence rate on time t. To further e xplore the convergence behavior on $\ep$ and t, we carry out three numerical examples of different type s: the nontrivial and trivial equilibriums, and the rotating aggregation. The simulation results illustrate the p ossibility to achieve the optimal $O(\ep)$-convergence, and show the vanishment of the deviation between t he PE-fluid system and PP-fluid system over t for the equilibriums, and the drastic fluctuation of error fo r the rotating solution. This is a joint work with Dr Min Li and Professor Guanyu Zhou.

报告人简介：

向昭银，电子科技大学数学科学学院教授、博士生导师、副院长，2006 年博士毕业于四川大学，主要从事偏微分方程的研究；在 CVPDE、IMRN、JFA、Math Z、M3AS 等期刊上发表学术论文 60 余篇；主持国家自然科学基金、中国博士后科学基金、教育部留学回国人员科研启动基金等.

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西北大学数学学院

2020 年 11 月 25 日