



深圳北理莫斯科大学

УНИВЕРСИТЕТ МГУ-ППИ В ШЭНЬЧЖЭНЕ

SHENZHEN MSU-BIT UNIVERSITY

应用数学讲座

Научный Семинар по Прикладной Математике
Research Seminar on Applied Mathematics

应用数学报告 (79)

报告人 / Докладчик / Speaker: 毛士鹏 研究员 (AMSS, Chinese Academy of Sciences)

题目 / Название / Title: Energy stable numerical methods for a fully coupled multiphysics model of ferrofluids

时间 / Время / Time: 4 June. 2023, 9:00-11:00, 14:00-17:00

地点 / Место / Venue: 主楼336

摘要 / Аннотация / Abstract:

The ferrofluids models frequently-used in the computation are usually obtained under the assumption of static magnetic field and non-conductive fluid, which are quite difficult to design energy stable numerical methods and establish the corresponding convergence theory. In this work, we consider a fully coupled multiphysics ferrofluids model composed of the incompressible Navier-Stokes equation, magnetization equation and Maxwell equation, which allows it to cover more kinds of magnetic fluids and possess a higher model accuracy than the ferrofluids equation commonly used in traditional computation. We show the energy law based on the appropriate variational model of the fully coupled ferrofluids and propose a fully discrete finite element scheme with unconditional energy stability. The existence theory and convergence analysis for the numerical solutions are established. Finally, we test the influence of a physical parameter on the fluid flow and simulate that the applied magnetic field can drive the ferrofluid flow in three-dimensional case.

毛士鹏研究员简介:

毛士鹏, 中国科学院数学与系统科学研究院研究员。2008年获中国科学院数学与系统科学研究院理学博士学位, 然后留所工作至今, 期间于2008-2012年分别在法国的INRIA以及在瑞士苏黎世联邦理工学院(ETH Zurich)做博士后。主要研究工作有限元方法及其应用, 磁流体力学计算等方面, 至今已在在 Numer. Math.、Math. Comp., SIAM. J. Numer. Math., SIAM J.Sci.Computing, M3AS等杂志上发表论文60余篇。曾入选中科院青年创新促进会会员和获得中科院朱李月华优秀教师奖。

访问学者以及需要做报告的学者请联系 张晔 教授 / Всем желающим выступить с докладами на семинаре просьба обращаться к Чжану Е ye.zhang@smbu.edu.cn