数学与系统科学研究院

计算数学所学术报告

报告人：　　陈艳萍 教授

（ 华南师范大学 ）

报告题目：

Analysis of two-grid methods for miscible displacement problem by mixed finite element methods

邀请人：　　毛士鹏 副研究员

报告时间：**2017** 年 **6** 月 **15** 日（周四）

上午 **11:00-12:00**

报告地点：　　科技综合楼三层

311 报告厅

Abstract:

The miscible displacement of one incompressible fluid by another in a porous medium is governed by a system of two equations. One is elliptic form equation for the pressure and the other is parabolic form equation for the concentration of one of the fluids. Since only the velocity and not the pressure appears explicitly in the concentration equation, we use a mixed finite element method for the approximation of the pressure equation. In order to find a stable finite element discretization method method, we use different discretization method for the concentration equation, such as finite element method with characteristic; mixed finite element method with characteristic; expanded mixed finite element method with characteristic etc. To linearize the discretized equations, we use one (two) Newton iterations on the fine grid in our methods. Firstly, we solve an original non-linear coupling problem. Then, solve a linear system on the fine grid and while in second method we make a correction on the coarse grid between one (two) Newton iterations on the fine grid. We obtain the error estimates of two-grid method, it is shown that coarse space can be extremely coarse and we achieve asymptotically optimal approximation. Finally, numerical experiment indicates that two-grid algorithm is very effective.

简介:

陈艳萍，华南师范大学二级教授、中国工业与应用数学学会油水资源数值方法专业委员会副主任。广东省计算数学学会副理事长。2008 年被聘为广东省高等学校珠江学者特聘教授，2005 年享受国务院颁发的政府特殊津贴，2012 年获广东省科学技术二等奖、 2011 年获湖南省自然科学一等奖、2008 年获教育部自然科学一等奖、2004 年获湖南省科学技术进步二等奖。入选爱思唯尔 2014 年、2015 年和 2016 年中国高被引学者榜单。连续主持 6 项国家自 然科学基金面上项目和 1 项国家自然科学基金重大研究计划 “高性能科学计算的基础算法与可计算建模”培育项目。

欢迎大家参加！