



深圳北理莫斯科大学

УНИВЕРСИТЕТ МГУ-ППИ В ШЭНЬДЖЭНЕ

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 (70)

报告人 / Докладчик / Speaker: 吕锡亮 教授 (武汉大学)

题目 / Название / Title: Convergence Analysis of Finite Element Method for Inverse Potential Problem

时间 / Время / Time: 21 Nov. 2022, 10:00-12:00

地点 / Место / Venue: 腾讯会议: 864-464-486 会议密码: 221121

摘要 / Аннотация / Abstract:

In this talk we analyze the inverse problem of recovering the space-dependent potential coefficient in an elliptic/parabolic problem from distributed observation. We establish a weighted conditional stability estimates under very mild conditions on the problem data. Then we provide an error analysis of a standard reconstruction scheme based on the standard output least-squares formulation with Tikhonov regularization by  $H^1$ -seminorm penalty, which is then discretized by the continuous piecewise linear finite elements in space, and also backward Euler method in time for parabolic problems. We present a detailed analysis of the discrete scheme, and provide convergence rates in a weighted  $L^2$  norm for discrete approximations with respect to the exact potential. The error bounds are explicitly dependent on the noise level, regularization parameter and discretization parameter. Under suitable conditions, we also derive error estimates in the standard  $L^2$  and interior  $L^2$  norms. Several numerical experiments are given to complement the theoretical analysis.

吕锡亮教授简介:

吕锡亮, 教授, 博士生导师, 青年长江学者; 本科毕业于北京大学, 并于新加坡国立大学获得硕士、博士学位, 现为武汉大学数学与统计学院教授; 2007年1月至6月, 赴美国马里兰大学做访问学者, 2007年8月至2010年7月, 在奥地利科学院RICAM研究所从事博士后研究, 2017年入选教育部长江学者奖励计划青年学者; 研究方向为偏微分方程数值解、偏微分方程最优控制、反问题理论和计算无穷维或非光滑优化、有限元分析以及计算流体力学。

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