

## 理学论坛第一百七十四次学术活动（李治林报告）

**报告题目：A Novel method for Anisotropic Interface Problems**

报告人：李治林教授

报告人单位：北卡罗来纳州立大学数学系（NCSU）

时间：2019年12月23日 15:00–16:00

地点：教2-314室

主办单位：理学院

**报告内容：** Anisotropic elliptic interface problems are important but hard to solve.

There is limited literature on numerical methods based on structured meshes. Finite element methods are often preferred but the average error estimates cannot guarantee accuracy of the solution near or at the interface. Using a finite difference discretization, the coefficient matrix of the resulting linear system of equations is neither an SPD nor an M-matrix. In this work, we combine a finite element discretization at regular grid points whose coefficient part matrix is an SPD, while at irregular grid points, a finite difference discretization based on the maximum principle preserving method whose coefficient part matrix is an M-matrix. A multigrid method based a nine-point stencil is employed to solve the linear system of equations. A scaling strategy along the interface is proposed along with the discretization. Error analysis show that the global error is nearly second order accurate in the L-infinity norm except a fact of  $|\log h|$ . Numerical examples including an application of flow past anisotropic materials will be presented.

**报告人简介：**

李治林现为美国北卡罗莱纳州立大学数学系终身教授并负责该系的国际合作与交流。李治林获得美国华盛顿大学（西雅图）硕士及博士学位。同时有美国加州大学洛杉矶(UCLA) 博士后的工作经历。

李治林的研究领域包括：含有自由界面和移动界面的偏微分方程数值方法研究，不规则区域问题求解，有限差分方法及有限元方法研究，计算流体力学，生物流体力学及其应用等。