

数学与系统科学研究院

计算数学所学术报告

报告人: **Dr. Zhao Xuan**

(*Department of Mathematics, Southeast University, China*)

报告题目:

**Application of hierarchical matrices to
adaptive finite element method for the
multi-term fractional differential
equations**

邀请人: **唐贻发 研究员**

报告时间: **2017 年 2 月 16 日 (周四)**

下午 14:30-15:30

报告地点: **数学院南楼九层**

902 教室

Abstract:

We develop a fast solver for the fractional differential equations (FDEs) involving multi-term Riesz/Riemann-Liouville fractional derivatives. It is based on the use of hierarchical matrices for the representation of the stiffness matrix resulting from the finite element discretization of the multi-term FDE and employs a geometric multigrid method for the solution of the algebraic system of equations. The combination of hierarchical matrices and algebraic multigrid leads to linear computational complexity. We also propose an adaptive algorithm based on a posteriori error estimation for multi-term fractional derivatives to deal with general-type singularities arising in the solution of the FDE. The proposed method resolves boundary singularities at linear complexity while maintaining full second-order accuracy. Several numerical examples are considered aiming to demonstrate the validity and applicability of the proposed techniques.

欢迎大家参加！