

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Yanmin Zhao**

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报告题目:

**Finite Element Approximations for  
Multi-Term Time Fractional Diffusion  
Equations**

邀请人: 唐贻发 研究员

报告时间: 2017 年 5 月 21 日 (周日)

上午 9:00-10:00

报告地点: 数学院南楼七层

714 教室

## **Abstract:**

Some diffusion processes of practical situations can be described more accurately by multi-term time fractional diffusion equations than single-term ones. We focus on numerical approximations of nonconforming and conforming FEMs for the two-dimensional multi-term time fractional diffusion equation. Firstly, two unconditionally stable fully-discrete approximate schemes are established by using a modified L1 approximation and spatial FEM. Moreover, by employing the Crouzeix-Raviart type  $EQ_1^{\text{rot}}$  nonconforming element, temporal optimal order error estimates and spatial optimal convergence rates in both  $L^2$ -norm and broken energy norm are proposed without restrictions between time step and mesh size. At the same time, the spatial global superconvergence and temporal convergence of order  $O(h^2 + \tau^{2-\alpha})$  for the original variable in  $H^1$ -norm is presented by means of properties of bilinear element and interpolation postprocessing technique, where  $h$  and  $\tau$  are the step sizes in space and time, respectively.

Finally, several numerical results have been provided to give an insight into the efficiency and reliability of the theoretical analysis.

**欢迎大家参加！**