数学与系统科学研究院

计算数学所学术报告

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报告题目：

A fourth-order compact ADI scheme for 2D nonlinear space fractional Schr\"{o}dinger equation

邀请人： 唐贻发 研究员

报告时间： 2014 年 7 月 10 日（周四）

下午 **16:00-17:00**

报告地点： 科技综合楼三层 **311**

计算数学所报告厅

Abstract：

In this paper, a novel compact operator is derived for the approximation of the Riesz derivative with order $\alpha\in(1,2].$ The compact operator is proved with the fourth-order accuracy. Combining the compact operator in space discretization, a linearized difference scheme is proposed for a 2D nonlinear space fractional Schr\"{o}dinger equation. It is proved that the difference scheme is uniquely solvable and convergent with order $O(\tau^2+h^4)$, where τ is the time step size, $h=\max\{h_1,h_2\}$ and $h_1\,,h_2$ are space grid sizes in x direction and y direction respectively. Based on the linearized difference scheme, a compact alternating direction implicit (ADI) scheme is presented and analyzed. Numerical results demonstrate that the compact operator does not bring in extra computational cost but improve the accuracy of the scheme greatly.

欢迎大家参加！