

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. LUO Zhendong**

( *North China Electric Power University* )

报告题目:

**A reduced-order extrapolated  
Crank-Nicolson finite spectral  
element method based on POD for  
the 2D non-stationary Boussinesq  
equations**

邀请人: **赵旭鹰 博士**

报告时间: **2018 年 11 月 11 日 (周日)**

**下午 14:00-15:00**

报告地点: **科技综合楼三层**

**311 报告厅**

## **Abstract:**

In this work, we mainly utilize proper orthogonal decomposition (POD) to reduce the order for the coefficient vector of the classical Crank-Nicolson finite spectral element (CCNFSE) method of the two-dimensional (2D) non-stationary Boussinesq equations about vorticity-stream functions so that the reduced-order method maintains all the advantages of the CCNFSE method. Toward this end, we first present a CCNFSE format with the second-order time accuracy for the two-dimensional (2D) non-stationary Boussinesq equations about vorticity-stream functions and provide the existence, stability, and convergence of the CCNFSE solutions. And then, we present a reduced-order extrapolated Crank-Nicolson finite spectral element (ROECNFSE) method and provide the existence, stability, and convergence of the ROECNFSE solutions as well as offer the flowchart for seeking ROECNFSE solutions. Finally, we use two sets of numerical experiments to validate that the numerical computational consequences are accorded with the theoretical ones such that the effectiveness and feasibility of the ROECNFSE method are further verified. Both theory and method in this work is completely different from the existing reduced-order methods.

**欢迎大家参加！**