数学与系统科学研究院

计算数学所学术报告

报告人：Prof. Junping Wang

（ National Science Foundation, USA ）

报告题目：

Primal-Dual Weak Galerkin Finite Element Methods

邀请人： 周爱辉 研究员

报告时间：2019 年 10 月 31 日（周四）

上午 10:00-11:00

报告地点： 数学院南楼六层

602 教室

Abstract:

The weak Galerkin (WG) finite element method is a generic numerical method for partial differential equations. The essence of WG is to reconstruct differential operators in the usual variational forms for partial differential equations (PDE) through a framework that mimics the theory of distributions for piecewise polynomials. The regularity requirements (such as H^1, H^2, H(div), or H(curl) etc) for the underlying approximating functions are compensated by some carefully-designed stabilizers. This framework produces discrete weak differential operators (e.g., weak gradients, weak curl, weak Laplacian etc) which are employed for PDE discretization. The computation of the discrete differential operators involves the solution of inexpensive problems defined locally on each element. Due to the structural flexibility, the WG finite element method is well suited to most PDEs by providing the needed stability and accuracy in mathematics. The resulting numerical scheme often conserves the important physical quantities such as mass and/or energy that the system models. In this talk, the speaker will discuss a primal-dual framework in the weak Galerkin context (PD-WG) for some model PDE problems for which the usual numerical methods are difficult to apply. The speaker will first demonstrate the basic ideas of PD-WG by using a linear transport problem, and will then apply the method to other PDEs including nonlinear PDEs and the div-curl systems with tangential or normal boundary conditions.

欢迎大家参加！