数学与系统科学研究院

计算数学所学术报告

报告人：**Prof. Shu Chi-Wang**

（ *Brown University* ）

报告题目：

IMEX time marching for discontinuous Galerkin methods

邀请人： 陈志明 研究员

报告时间：2016 年 3 月 1 日（周二）

上午 **10:00~11:00**

报告地点： 数学院南楼二层

202 会议室

Abstract：

For discontinuous Galerkin methods approximating convection diffusion equations, explicit time marching is expensive since the time step is restricted by the square of the spatial mesh size. Implicit methods, however, would require the solution of non-symmetric, non-positive definite and nonlinear systems, which could be difficult. The high order accurate implicit-explicit (IMEX) Runge-Kutta or multi-step time marching, which treats the diffusion term implicitly (often linear, resulting in a linear positive-definite solver) and the convection term (often nonlinear) explicitly, can greatly improve computational efficiency. We prove that certain IMEX time discretizations, up to third order accuracy, coupled with local discontinuous Galerkin method for the diffusion term treated implicitly, and regular discontinuous Galerkin method for the convection term treated explicitly, are unconditionally stable (the time step is upper bounded only by a constant depending on the diffusion coefficient but not on the spatial mesh size) and optimally convergent. The results also hold for drift-diffusion model in semiconductor device simulations, where a convection diffusion equation is coupled with an electrical potential equation. Numerical experiments confirm the good performance of such schemes. This is a joint work with Haijin Wang, Qiang Zhang and Yunxian Liu.

欢迎大家参加！