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：

Operator splitting methods for stiff convection-reaction-diffusion equations

邀请人： 卢本卓副研究员

报告时间：**2011** 年 **6** 月 **3** 日（周五）
下午 **15**：**00-16**：**00**

报告地点： 科技综合楼三层 **311**
计算数学所报告厅

Abstract：

Implicit integration factor (IIF) method, a class of ecient semi-implicit temporal scheme, was introduced recently for sti reaction-diusion equations. Advection-reaction-diusion equations are traditionally dicult to handle numerically. For reaction-diusion systems with both sti reaction and diusion terms, implicit integration factor (IIF) method and its high dimensional analog compact form (cIIF) serve as an ecient class of time-stepping methods. For nonlinear hyperbolic equations, front tracking method is one of the most powerful tools to dynamically track the sharp interfaces. Meanwhile, weighted essentially non-oscillatory (WENO) methods are a class of start-of-the-art schemes with uniform high order of accuracy in smooth regions of the solution, which can also resolve the sharp gradient in accurate and essentially non-oscillatory (ENO) fashion. In this talk, IIF/cIIF is coupled with front tracking or WENO by the second-order symmetric operator splitting approach to solve advection-reaction-diusion equations. In the methods, IIF/cIIF methods treat the sti reaction-diusion equations, and front tracking/WENO methods handle hyperbolic equations that arise from the advection part. In addition, we shall introduce a method for integrating IIF/cIIF with adaptive mesh renement (AMR) to take advantage of the excellent stability condition for IIF/cIIF. The applications of these numerical methods to fluid mixing and cell signaling will also be presented.

欢迎大家参加！