数学与系统科学研究院

计算数学所学术报告

(博士后定期学术报告)

报告人： **Priscilla Tse (ICMSEC)**

报告题目：

Symplectic and multisymplectic methods for Maxwell's equations

合作导师： **Prof. Jialin Hong**

报告时间： **2008 年 9 月 10 日(周三)**

下午 2:00—3:00

报告地点： **科技综合楼三层 301**

计算数学所报告厅

Abstract：

It is well–known that the preservation of structures found in PDEs by numerical methods

is of fundamental importance. In many cases, a geometric integrator is designed to preserve a certain structure of the PDE and hence the method guarantees numerical solutions that capture the associated qualitative behaviour found in the exact solution of the same PDE. This often has the additional benefit of producing numerical methods with good long–time stability.

But if the PDE has multiple geometric structures which are mathematically equivalent, how well do different geometric integrators (designed to preserve different structures) perform for the same PDE? What techniques can we use to compare the geometric integrators aside from studying the associated discrete conservation laws?

In this seminar we address such questions for the Maxwell's equations. The system of Maxwell's equations in simple medium has multiple symplectic and multisymplectic

structures. Each structure has associated with it local/global conservation laws. In particular we investigate the behaviour of four numerical finite difference methods which are symplectic/multisymplectic for Maxwell's equations. First we verify by numerical experiments some of the

well–known theoretical results related to symplectic/multisymplectic PDEs. Then we discuss the insights for four geometric integrators which we can extract from techniques in numerical PDE such as stability, dispersion and backward error analysis.

欢迎大家参加！