

数学与系统科学研究院

计算数学所系列报告

报告人: **Prof. Sergio Blanes**

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报告题目:

**Introduction to Geometric  
Numerical Integration: Splitting and  
compositions methods**

邀请人: 孙雅娟 研究员

报告时间:

**I. 2015 年 8 月 5 日 (周三) 上午 10:00-12:00**

**II. 2015 年 8 月 6 日 (周四) 上午 10:40-12:30**

**III. 2015 年 8 月 7 日 (周五) 上午 10:00-12:00**

报告地点: 科技综合楼三层

**301 小报告厅**

## **Abstract:**

An important number of differential equations are originated from as diverse research areas as celestial mechanics, quantum mechanics, Hybrid Monte Carlo, molecular dynamics, etc., Although diverse, all these differential equations have one important common feature, namely that they all preserve some underlying geometric structure which influences the qualitative nature of the phenomena they produce. The design and analysis of numerical integrators preserving this structure constitutes the realm of Geometric Numerical Integration. In short, in geometric integration one is not only concerned with the classical accuracy and stability of the numerical algorithm, but the method must also incorporate into its very formulation the geometric properties of the system. This gives the integrator not only an improved qualitative behavior, but also allows for a significantly more accurate long-time integration than with general-purpose methods. In the analysis of the methods a number of techniques from different areas of mathematics, pure and applied, come into play, including Lie groups and Lie algebras, formal series of operators, differential and symplectic geometry, etc.

In this short course we present an introduction to Geometric Integration with examples for Hamiltonian systems (symplectic integrators) and consider in some more detail splitting and composition methods and we conclude mainly focusing in our recent works on splitting and composition methods for the previous problems.

**欢迎大家参加！**