数学与系统科学研究院

计算数学所系列学术报告

报告人： Prof. Luigi Brugnano

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报告题目：

Line Integral Methods for Conservative Problems

邀请人： 孙雅娟 研究员

报告时间及地点：

2017 年 6 月 3 日（周六）上午 10:00-12:00

2017 年 6 月 5 日（周一）上午 10:00-12:00

2017 年 6 月 6 日（周二）上午 10:00-12:00

2017 年 6 月 7 日（周三）上午 10:00-12:00

2017 年 6 月 8 日（周四）上午 9:30-11:30

2017 年 6 月 9 日（周五）上午 10:00-12:00

科技综合楼 301 小报告厅

Abstract：

Many problems deriving from applications, described by systems of differential equations, are characterized by constants of motion, representing relevant physical properties of the underlying dynamical systems, which are kept constant along the solution. In particular, Hamiltonian problems represent an important instance, and their numerical solution constitutes the core of what is nowadays named Geometric Integration.

For canonical Hamiltonian problems, the most important constant of motion is the Hamiltonian function itself, which is often referred to as the "energy" of the system. For this reason, methods which are able to conserve the Hamiltonian are usually named energy-conserving.

This short course is meant to provide a concise introduction to energy-conserving Runge-Kutta methods. The key tool exploited to devise these methods is what we have called "discrete line integral": roughly speaking, one imposes energy conservation by requiring that a discrete counterpart of a line integral vanishes along the numerical solution regarded as a path in the phase space.

The course will also cover some recent topics of research, including the numerical solution of Hamiltonian PDEs, as well as the devising of methods which are both symplectic and energyconserving.

References:

L.Brugnano, F.Iavernaro. Line Integral Methods for Conservative Problems. Chapman et Hall/CRC, Boca Raton, FL, 2016. ISBN 978-1-4822-6384-8.

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