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：

Using Rocket Science Concepts for Systems Biology Research: Mathematical and Statistical Challenges

邀请人： 袁亚湘 院士

报告时间：**2013 年 9 月 9 日（周一）**

上午 11:00-12:00

报告地点： 科技综合楼三层 **311**

计算数学所报告厅

Abstract：

Many systems in engineering and physics such as a rocket system can be represented by differential equations, which can be derived from well-established physics laws and theories. However, currently no laws or theories exist to deduce exact quantitative relationships and interactions among the elements in a biological system. It is unclear whether the biological systems follow a mathematical representation such as differential equations, similar to that for a man-made physics or engineering system. Fortunately, recent advances in cutting-edge biomedical technologies allow us to generate intensive high-throughput data to gain insights into biological systems. It is badly needed to develop mathematical models and statistical methods to test whether a biological system follows a mathematical representation based on experimental data. In this talk, I will present and discuss how to construct data-driven differential equations (ODE) to describe biological systems, in particular for dynamic gene regulatory network systems. We propose to combine the high-dimensional variable selection approaches and ODE model estimation methods to construct the ODE models based on experimental data. We apply the proposed approaches to study how our immune system responds to influenza infections based on the time course high-throughput experimental data.

欢迎大家参加！