

# 数学与系统科学研究院

## 计算数学所学术报告

报告人: **Prof. Hermann Brunner**

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报告题目:

**The numerical analysis of systems of  
Volterra integral-algebraic equations**

邀请人: 龚伟 博士

报告时间: **2015 年 6 月 16 日 (周二)**

**下午 16:00~17:00**

报告地点: 数学院南楼七层

**702 会议室**

## **Abstract:**

A system of  $d \geq 2$  Volterra integral equations of the form

$$B(t)u(t) + \int_0^t K(t,s)u(s)ds = f(t), t \in [0, T],$$

where  $B(t)$  and  $K(t; s)$  are nontrivial  $d \times d$  matrices with  $\det B(t) = 0$  and  $\text{rank} B(t) = r \geq 1$  on  $[0; T]$ , is called a system of Volterra integral-algebraic equations (IAEs). Since the system (1) contains an inherent subsystem of (ill-posed) first-kind Volterra integral equations (VIEs), the numerical analysis (e.g. of collocation solutions based on piecewise polynomials) has to deal with two challenges: (i) How to identify this subsystem of first-kind VIEs (and its degree of ill-posedness), and (ii) how to establish the optimal order of convergence of the numerical method.

In addition to discussing the current state of the numerical analysis of IAEs, I will also briefly describe two IAE systems that arise as mathematical models of physical phenomena.

The talk is based on joint work with Dr. Liang Hui (Heilongjiang University, Harbin).

# 欢迎大家参加！