数学与系统科学研究院

计算数学所学术报告

报告人： **Prof. Hui Liang**

（ Harbin Institute of Technology, Shenzhen ）

报告题目：

Collocation methods for integro-differential algebraic equations with index-1

邀请人： 毛士鹏 研究员

报告时间：**2019 年 4 月 25 日（周四）**

下午 14:00-15:00

报告地点： 科技综合楼三层

311 报告厅

Abstract：

The notion of the tractability index based on the ν-smoothing property of a Volterra integral operator is introduced for general systems of linear integro-differential algebraic equations (IDAEs). It is used to decouple the given IDAE system of index 1 into the inherent system of regular Volterra integro-differential equations (VIDEs) and a system of second-kind Volterra integral equations (VIEs). This decoupling of the given general IDAE forms the basis for the convergence analysis of the two classes of piecewise polynomial collocation methods for solving the given index-1 IDAE system. The first one employs the same continuous piecewise polynomial space $S_m^{(0)}$ for both the VIDE part and the second-kind VIE part of the decoupled system. In the second one the VIDE part is discretized in $S_m^{(0)}$ but the second-kind VIE part employs the space of discontinuous piecewise polynomials $S_{m-1}^{(-1)}$. The optimal orders of convergence of these collocation methods are derived. For the first method, the collocation solution converges uniformly to the exact solution if and only if the collocation parameters satisfy a certain condition. This condition is no longer necessary for the second method: the collocation solution now converges to the exact solution for any choice of the collocation parameters. Numerical examples illustrate the theoretical results.

欢迎大家参加！