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. Pengtao Sun

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报告题目：

Numerical Methodology for Moving Interface Problems and Applications to Fluid-Structure Interactions (FSI)

邀请人：　张晨松　副研究员

报告时间：2019 年 6 月 6 日（周四）

上午 9:00-11:00

报告地点：　数学院南楼九层

902 教室

Abstract:

In this series of lectures, I will present our recent numerical methodology studies for unsteady moving interface problems and applications to dynamic fluid-structure interaction (FSI) problems. Numerical methodologies to be discussed include the body-fitted mesh method — arbitrary Lagrangian−Eulerian (ALE) method and the body-unfitted mesh method — fictitious domain (FD) method. Both methods are popular and practical in applications to realistic FSI problems with moving interfaces and jump coefficients, and take different effects due to their significantly distinct features in the theoretical background as well as in the numerical implementations. In my lectures, both the numerical analysis and the algorithm development will be emphasized in terms of a monolithic mixed finite element method, where, the numerical analysis will focus on analyzing properties of the well-posedness, the stability and the convergence of the developed finite element approximation in both semi- and fully discrete schemes; and the algorithm development will concentrate in the implementation of ALE method and FD method in the finite element frame for unsteady interface problems with distinct governing equations on either side of the moving interface such as FSI problems.

My lectures will be grouped into the following four topics and given in four sessions, respectively, as displayed below.

1. Introduction to the arbitrary Lagrangian Eulerian (ALE) - finite element method (FEM)
1.1 The ALE approach in conservative and non-conservative formulation
1.2 A linear advection diffusion problem and Geometric Conservation Law (GCL)
1.3 Stability analysis of the conservative ALE scheme
1.4 Stability analysis of the non-conservative ALE scheme

欢迎大家参加！