数学与系统科学研究院

计算数学所学术报告

报告人：　**Prof. Zhilin Li**

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报告题目：

The Immersed Finite Element Method and Singularity Removal Strategy

邀请人：　陈志明研究员

报告时间：**2011** 年 **5** 月 **31** 日（周二）

上午 **9:00～12:00**

报告地点：科技综合楼三层 **311**

计算数学所报告厅

Abstract:

I am going to divide my last talk into three parts. The first part is about the Immersed Finite Element Method (IFEM) for one and two dimensional elliptic interface problems (Poisson and elasticity systems) involving discontinuities in the coefficients and in the solution. The triangulations in IFEM do not need to fit the interfaces. The basis functions are constructed to satisfy the interface jump conditions either exactly or approximately. Both non-conforming and conforming finite element spaces are considered. In either approach, the structure is preserved and the degree of the freedom remains. Error estimate for the corresponding interpolation functions and the solution are also provided.

For problems with non-homogeneous jump conditions, we have developed a new strategy to transform the original interface problem to a new one with homogeneous jump conditions using the level set function representation. In the second part of my talk, I will give an introduction to the level set method.

The third part is devoted to a source removal technique. In this approach, we use the level set function representation to construct a function that has the same jump conditions as the original one. Then we can transform the original problem with delta function singularities into one with homogeneous jump conditions. Such a technique has been applied to bot finite difference and finite element formulations. This approach may leads to a second order discrete delta function for some problems.

The rest of time, if there is any, will be devoted to more applications, such as an inverse problem in shape identification, non-linear interface problems such as weighted minimal surface problem, and MR-fluid with iron particles.

欢迎大家参加！