数学与系统科学研究院

计算数学所学术报告

报告人： **Prof. Klaus Bohmer**

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报告题目：

A Convergence Theory for Mesh-free Methods for a Nonlinear Second Order Elliptic Equation

邀请人： 石钟慈 院士

报告时间：**2013** 年 **10** 月 **28** 日（周一）

下午 **16:00**

报告地点： 科技综合楼三层 **301**

计算数学所小报告厅

Abstract:

The two lectures of totally 90 minutes are appetizers for my two Volumes in OUP: Numerical Methods for Nonlinear Elliptic Differential Equations, A Synopsis, 2010 and 2014: Numerical Methods for Bifurcation and Center Manifolds in Nonlinear Elliptic and Parabolic Differential Equations.

We extend for the first time the linear discretization theory of Schaback, developed for meshfree methods, to nonlinear operator equations, relying heavily on methods of Bohmer, Vol I. There is no restriction to elliptic problems nor to symmetric numerical methods like Galerkin techniques.Trial spaces can be arbitrary, but have to approximate the solution well, and testing can be weak or strong. We present Galerkin techniques as an example. As example problems we present the meshless method for a simple nonlinear and a fully nonlinear elliptic problem of second order. On the downside, stability is not easy to prove for special applications, and numerical methods have to be formulated as optimization problems. Results of this discretization theory cover error bounds, convergence rates of discrete solutions and Newton methods. Following the general theory in the first part, we consider next the two above examples, in particular the proof of stability for the first application. Numerical examples are added for illustration.

欢迎大家参加！