

Liu Bie Ju Centre for Mathematical Sciences
City University of Hong Kong

Mathematical Analysis and its Applications Colloquium

Organized by Prof. Ya Yan LU and Prof. Wei Wei SUN

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

by

Professor Klaus Böhmer

Philipps-University Marburg, Germany

Date : Nov 05, 2013 (Tuesday)

Time : 4:30 pm to 5:30 pm

Venue: Room B6605 (College Conference Room)
Blue Zone, Level 6, Academic 1 (AC1)
City University of Hong Kong

ABSTRACT:

This lecture is an appetizer 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 Böhmer, 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. 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. As examples we present the meshless method for a simple nonlinear and a fully nonlinear elliptic problem of second order. Numerical examples are added for illustration.

Light refreshments will be provided at Room B6605 before the colloquium from 4:00 pm to 4:30 pm. Please come and join us!

** All interested are welcome **

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