Lecture in WS 08/09 (2+2SWS)

p- and *hp*- Finite Element Methods

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http://www.ins.uni-bonn.de/teaching/vorlesungen/hpfem_ws08/

Description

The course gives a comprehensive introduction into numerical analysis of *p*- and *hp*- Finite Element methods. In contrast to the classical *h*-version FEM in these techniques convergence is achieved by increasing polynomial degree rather than by mesh refinement. This is advantageous for certain, but frequently appearing in engineering problems like elliptic BVP with analytic data in polyhedral domains. The participants of the course should become familiar with the foundations of the *p*- and *hp*- FEM and with several advanced topics such as

- *p*-version of Sparse Grids for elliptic problems in higher dimensions
- Application to elliptic problems with random parameters
- *p*- and *hp*- Boundary Element Methods
- Numerical quadrature for functions with singularities in higher dimensions
- Practical exercises involving MATLAB (or Octave) implementation

Requirements

Bachelor, Master, Diploma and PhD students are welcome in the course. The exact program will be defined in the first week of the semester. The background knowledge of the participants will be taken into account. The course is self-contained. Desired is:

- Basic experience in Finite Element Method
- Basic experience in programming (not necessarily in MATLAB or Octave)

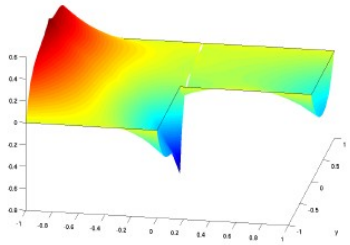
The course will be held in German or in English language, depending on the participants.

Registration

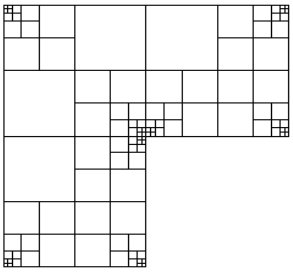
via e-mail: `alexey.chernov@hcm.uni-bonn.de` of phone: 0228-73-622-46

Time

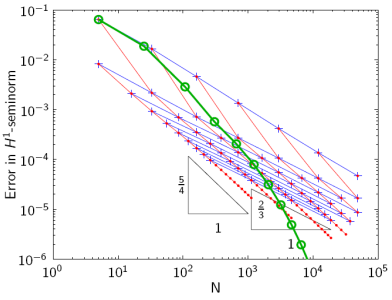
will be arranged at the first lecture on Thursday, 16 October, c.t. 10-12h in Seminarraum G (near Wolfgang-Paul-Hörsaal, Kreuzbergweg 28)



Corner singularities



Adaptive mesh with *hp*-FEM



Superior convergence of hp-FEM