Kolloquium Angewandte Mathematik
Prof. Thomas Apel (BauV1)
Prof. Matthias Gerdts (LRT1)
Prof. Joachim Gwinner (LRT1)
Prof. Markus Klein (LRT1)

Universität der Bundeswehr München

Vortragsankündigung

Am **Mittwoch, den 02.12.2015,** hält **um 17:00 Uhr**

Herr **Matthias Gsell**
(TU Graz)

einen Gastvortrag über das Thema

The mortar finite element method and its application to nonlinear transmission problems.

Der Vortrag findet im **Raum 1116** in **Gebäude 150** statt.

Vortragszusammenfassung

In this talk we consider quasilinear boundary value problems with nonlinearities of a certain structure. Such problems can be variants of the Richards equation

$$n\frac{\partial\theta(p)}{\partial t} - \nabla\cdot\Big(k_r\big(\theta(p)\big)\,\frac{1}{\mu}\,K\,\nabla\big(p-\varrho\,g\,z\big)\Big) = f,$$

which is used to compute the flow of water in porous media, or the heat equation

$$\frac{\partial u}{\partial t} - \nabla\cdot\big(k(u)\,\nabla u\big) = f,$$

where the thermal conductivity k depends on the unknown quantity. Due to the special structure of the nonlinearity the application of the Kirchhoff transformation (cf. [1]) results in a system of linear equations but with nonlinear transmission conditions. We derive the corresponding variational formulation and discuss unique solvability of the nonlinear transmission problem. For the spatial discretization we consider the mortar finite element method (cf. [2]) to allow locally different meshes. After discussing the derived discrete variational formulation numerical examples are presented.

Literatur

[1] Heiko Berninger. *Domain Decomposition Methods for Elliptic Problems with Jumping Nonlinearities and Application to the Richards Equation*. PhD thesis, Freie Universität Berlin, 2008

[2] Barbara I. Wohlmuth. *Discretization methods and iterative solvers based on domain decomposition*, volume 17 of *Lecture Notes in Computational Science and Engineering*. Springer-Verlag, Berlin, 2001.

Alle Interessierten sind dazu herzlich eingeladen.