Nonlinear problems in fluid mechanics and related problems

Organizers: Lars Diening[1] and Michael Růžička[2]

[1]Bielefeld University, Germany, lars.diening@uni-bielefeld.de
[2]University of Freiburg, Germany, rose@mathematik.uni-freiburg.de

Short Description

In this minisymposium we focus on non-linear problems arising in the context of non-Newtonian fluids, non-linear elasticity or related problems with non-linear growth (also orthotropic or non-local). Solving such problems numerically is a challenging task. In particular, the case of degeneracy or singularity of the nonlinear elliptic term causes significant, numerical problems. We are interested in a variety of different questions:

- approximation by finite elements conforming as well as DG methods

- mixed methods and other methods based on duality

- non-linear approximation of the solution and related quantities (e.g. flux)

- iterative, linear methods that approximate efficiently the solution of the non-linear problem

- implementation aspects

- rate of convergence of all method

- adaptive methods (AFEM) and possible optimality