Johann Radon Institute for Computational and Applied Mathematics Austrian Academy of Sciences (ÖAW)

Group Seminar

Computational Methods for PDEs

A semismooth* Newton Method for Coulomb Friction Problems

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Abstract

We are interested in a situation, where an elastic body is put onto some surface, and force is acting on it. Due to the deformation the contact with the surface will lead to frictional forces, which are modelled with the so called coulomb friction. We are then looking for the displacements.
Coulomb Friction problems have a structure that leads to numerical difficulties, it is therefore hard to find fast algorithms for solving them. For example one could solve them as a complementarity constrained feasibility problem, however this kind of constraints are very hard to handle.
Recently, Gfrerer and Outrata have developed a general newton type scheme for solving generalized equations, i.e. find x satisfying $0 \in F(x)$ for a set valued mapping F, which leads to local superlinear convergence under relatively weak conditions.
Apparently, one can apply that general scheme for the Lagrangian in the Coloumb problem, and obtain a locally superlinear convergent algorithm, for this challenging type of problem.
We will present numerical as well as theoretical results.