STRESS-DISPLACEMENT FORMULATIONS FOR HYPERELASTIC MATERIALS: ADAPTIVE MIXED FE APROXIMATION

Gerhard Starke

Leibniz Universität Hannover, Hannover, Germany

e-mail: `gcs@ifam.uni-hannover.de`

Joint work with Benjamin Müller

Abstract

First-order system formulations for nonlinear elasticity with hyperelastic material models are studied in this talk. The novelty of this approach is that, in addition to the displacements, the full Piola-Kirchhoff stress tensor is approximated in suitable finite element spaces, e.g. using Raviart-Thomas elements. The performance of an adaptive implementation of the method is illustrated as well as the behavior of the nonlinear solution strategies for some examples of finite strain elasticity. In particular, the computation of critical load values is investigated.