Computations and a posteriori error estimates for some problems in continuum mechanics

Jan Valdman
Faculty of Physical Science, University of Iceland, Reykjavik, Iceland
e-mail: jan.valdman@gmail.com

ABSTRACT

Computations and a posteriori error estimates are presented for a problem in elastoplasticity and a problem with a nonlinear boundary condition. Computational plasticity problems are typically modelled as minimization problems of a certain uniformly convex but not-smooth energy functional, where unknown variables are displacement and plastic strain [1]. For a numerical solution we use finite element methods and linearize nonlinearities by a quasi-Newton methods. Each linear system is solved iteratively by a conjugate gradient method preconditioned by a geometric multigrid. We are also interested in a posteriori error analysis and adaptivity concepts. This is demonstrated on two types of error estimates, residual based [2] and functional error estimates [3]. Another application of functional estimates is the problem with the nonlinear boundary condition, where nonlinearity is located on a boundary in term of a friction condition [4]. If time allows, the question of efficient computation of functional apposteriori estimates (for linear problems) will be addressed [5].

REFERENCES