

Semi-smooth Newton method for solving the Stokes problem with the stick-slip boundary condition

Kučera Radek, Pacholek Jan

VŠB-TU Ostrava, 17.listopadu 15/2172, 708 33 Ostrava-Poruba, CZ
E-mail: radek.kucera@vsb.cz

Abstract: The paper deals with the Stokes flow with the monotonously increasing slip condition. Using the P1-bubble/P1 finite element approximation we arrive at an algebraic variational inequality. This variational inequality is equivalent to a minimization problem whose optimality conditions are the starting point for the algorithm. Semi-smooth Newton method implementation of the algorithm is based on active/inactive sets, where we discuss two possible options on how to create them. The algorithm is then tested in MATLAB environment. Experiments are done on squared and "L-shaped" domain, where we study the effects of the adhesive coefficient and preconditioning on the efficiency of calculations.

Keywords: semi-smooth Newton method, stick-slip condition, Stokes problem, preconditioning