

A quadratic programming method for saddle point formulations in contact problems with friction

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ABSTRACT. The paper is concerned with the numerical solution of the quasi-variational inequality modelling a contact problem with Coulomb friction. After discretization of the problem by mixed finite elements and with Lagrangian formulation of the problem by choosing appropriate multipliers, the duality approach is improved by splitting the normal and tangential stresses. The novelty of our approach in the present paper consists in the splitting of the normal stress and tangential stress, which leads to a better convergence of the solution, due to a better conditioned stiffness matrix. This better conditioned matrix is based on the fact that these blocks diagonal matrices obtained, contain coefficients of the same size order. For the saddle point formulation of the problem, using static condensation, we obtain a quadratic programming problem. We use Gauss-Seidel iterations to approximate the solution of this problem.

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