Dedicated to Professor LAZĂR DRAGOŞ on his 75th birthday

Finite Element Discretization of Some Variational Inequalities Arising 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 the obtained diagonal blocks matrices, contain coefficients of the same size order. For the saddle point formulation of the problem, using static condensation, we obtain a quadratic programming problem.

Key words and phrases : Contact problem with Coulomb friction, dual mixed formulation, mixed finite element, saddle point problem, quadratic programming, Schur complement

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