

ON THE SOLVABILITY OF DYNAMIC ELASTIC-VISCO-PLASTIC CONTACT PROBLEMS WITH ADHESION*

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Abstract

We consider a dynamic contact problem between an elastic-viscoplastic body and an obstacle, the so-called foundation. The contact is frictionless and is modelled with normal compliance of such a type that the penetration is restricted with unilateral constraint. The adhesion of contact surfaces is taken into account and the evolution of the bonding field is described by a first-order differential equation. We provide a weak formulation of the contact problem in the form of an integro-differential system in which the unknowns are the displacement, the stress and the bonding fields, then we present an existence result for the solution. We consider a sequence of penalized problems which have a unique solution, derive *a priori* estimates and use compactness properties to obtain a solution to the original model, by passing to the limit as the penalization parameter converges to zero.

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