Subdifferential Inclusions for Elastic Unilateral Contact Problems with Unilateral Constraints

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Abstract: We study a class of static multivalued inequalities in Banach spaces. We obtain the existence result using the Kakutani fixed point theorem. Moreover, we present the dual variational formulation of the problem and we prove the equivalence result between both formulations. The abstract results are applied to the contact problem in elasticity, where we take into account nonmonotone slip-dependent friction condition, nonmonotone multivalued normal compliance condition, and the Signorini condition. For such problem we apply the proposed formalism to construct the primal and dual weak formulations, in terms of displacements and stresses, respectively. For the two formulations, by applying the abstract results, we prove the existence and equivalence theorems.