

Existence of a weak solution for a dynamic adhesive Signorini's contact problem

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We consider a contact process between a viscoelastic body and a foundation. The relation between the tangential stress and the tangential displacement at the contact boundary has a form of subdifferential inclusion involving Clarke subdifferential of a locally Lipschitz potential which depends on adhesion. On the other hand, the adhesive field is modeled by an ordinary differential equation in which the right hand side depends on the displacement. The normal contact is governed by a Signorini's condition, which enforces an unbounded relation between the normal stress and normal displacement. This fact introduces the main difficulty to the analysis of the problem. To solve this issue, we approximate Signorini's condition by a normal compliance contact condition and show that the solution of approximate problem converges to a solution of the exact one as the stiffness coefficient tends to ∞ . Such convergence is possible only in a very special, weak sense, which force us to deal with a specific definition of the weak solution as was presented in [1].

References

- [1] Marius Cocou, Existence of solutions of a dynamic Signorini's problem with nonlocal friction in viscoelasticity, *Z. angew. Math. Phys.* 53 (2002) 1099-1109

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