

A Dynamic Unilateral Contact Problem for a Cracked Body

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In this work we investigate a class of dynamic contact problems for cracked viscoelastic and elastic bodies, when Signorini's conditions between the two faces of the crack are considered. Firstly, using a penalty method we study a variational formulation of a unilateral contact problem with nonlocal friction for a cracked viscoelastic body. Several estimates on the penalized solutions are obtained which enable us to analyze the time and spatial discretizations of the problem. Then we consider the corresponding elastic problem, for which a fictitious domain formulation is proposed with Lagrange multipliers representing the normal jump of the displacements. Numerical examples, based on the fictitious domain method for solving the diffraction of elastic waves by cracks, are presented.

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