



Analysis of Dynamic Frictional Contact Problem for Electro-Elastic Materials

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Abstract: In this paper, we study a dynamic frictional contact problem for a piezoelectric body and an electrically conductive foundation. The frictional contact is modeled by a normal compliance condition that depends on both the interpenetrations and the electrical potential difference between the body and the foundation on the contact interface, coupled with a version of Coulomb's law of dry friction with a slip dependent friction coefficient and regularized normal stress, and with an electrical contact condition in which the electrical conductivity coefficient depends on the normal velocity. First, we consider our frictional electro-elastic model and after introducing a convenient functional framework, we derive its weak formulation. Next, we establish the existence and uniqueness result for the weak solution to the problem. Finally, we study the continuous dependence of the weak solution on the data and prove a first convergence result.

Keywords: *piezoelectric material; dynamic frictional contact; variational inequality; history dependent variational inequality; fixed point arguments; existence and uniqueness result; dependence and convergence results.*

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