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Stability Analysis of a Coupled System of Two Nonlinear Differential Equations with Boundary Conditions

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Abstract: We study the antiplane frictional contact models for electro-viscoelastic materials. The material is assumed to be electro-viscoelastic and is modelled by a slip rate dependent friction law and the foundation is assumed to be electrically conductive. First, we give the mathematical model of our phenomena. Second, we describe the classical formulation for the antiplane problem and we give the corresponding variational formulation which is given by a method of coupling of an evolutionary variational quality for the displacement field and a time-dependent variational equation for the electric potential field. Then we prove the existence of a unique weak solution to the model.

Keywords: *nonlinear system; electro-viscoelastic material; contact problem; weak solution; boundary condition.*

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