

A FRICTIONAL CONTACT PROBLEM WITH NORMAL COMPLIANCE FOR VISCOELASTIC MATERIALS WITH LONG MEMORY*

Abderrezak Kasri[†]

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Abstract

This paper is devoted to study a quasistatic contact problem between a viscoelastic material with long memory and a foundation. The contact is modelled with a version of Coulomb's law of dry friction and a general normal compliance condition. We derive a variational formulation of the model and, under a smallness assumption, we establish the existence of a weak solution to the problem. The proof is based on the time-discretization method, the Banach fixed point theorem and arguments of compactness, lower semicontinuity and monotonicity.

MSC: 49J40, 74A20, 74A55, 74D05.

keywords: Viscoelastic materials, long memory, quasistatic process, Coulomb's law of dry friction, normal compliance, the time-discretization method, lower semicontinuity, the Banach fixed point theorem, variational inequalities.

1 Introduction

It is well known that the Kelvin-Voigt model of viscoelasticity cannot predict the stress relaxation whereas the Maxwell model cannot adequately describe

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[†]kariabdezak@gmail.com Département de Mathématiques, Faculté des Sciences, Université 20 Août 1955 - Skikda, B.P.26 Route El-Hadaiek Skikda-Algérie.