

SOME CONSIDERATIONS ON DISLOCATION FOR THERMOELASTIC MICROSTRETCH MATERIALS

Marin MARIN¹, Olivia FLOREA²

Rezumat. Scopul studiului nostru este de a obține o relație de tip De Hoop-Knopoff pentru deplasarea câmpurilor în contextul corpurilor termoelastice cu microstructură. Apoi, ca o consecință, se obține o expresie explicită a sarcinii corpului echivalentă cu o dislocare seismică. Rezultatele sunt extensii ale celor din teoria clasică a corpurilor elastice.

Abstract. The aim of our study is to derive a relation of De Hoop-Knopoff type for displacement fields within the context of thermoelastic microstretch bodies. Then, as a consequence, an explicit expression of the body loadings equivalent to a seismic dislocation, is obtained. The results are extensions of those from the classical theory of elastic bodies.

Keywords: microstretch; seismic; dislocation; thermoelastic body

1. Introduction

The theory of thermo-microstretch elastic solids was first elaborated by Eringen, [4], and, briefly, this is a theory of thermoelasticity with microstructure that includes intrinsic rotations and microstructural expansion and contractions.

The purpose of this theory is to eliminate discrepancies between classical elasticity and experiments, since the classical elasticity failed to present acceptable results when the effects of material microstructure were known to contribute significantly to the body's overall deformations, for example, in the case of granular bodies with large molecules (e.g. polymers), graphite or human bones.

These cases are becoming increasingly important in the design and manufacture of modern day advanced materials, as small-scale effects become paramount in the prediction of the overall mechanical behavior of these materials.

Other intended applications of this theory are to composite materials reinforced with chopped fibers and various porous materials.

This theory can be useful in the applications which deal with porous materials as geological materials, solid packed granular materials and many others.

¹Prof., PhD, Faculty of Mathematics and Computer Sciences, Transilvania University of Brasov, Romania, (m.marin@unitbv.ro)

²Lect., PhD, Faculty of Mathematics and Computer Sciences, Transilvania University of Brasov, Romania, (olivia.florea@unitbv.ro).