Disturbance due to Mechanical Sources in a Micropolar Thermoelastic Solid with Diffusion

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ABSTRACT

The present investigation deals with the deformation in an isotropic micropolar thermoelastic diffusion solid due to mechanical sources. Concentrated force, normal source have been taken as an application of the approach. Potential functions are used to simplify the problem. Laplace and Fourier transform techniques are employed to solve the problem. The integral transform have been inverted by using a numerical technique to obtain the displacement, stresses, microrotation, temperature, microstretch and mass concentration. Some particular cases of interest also have been discussed. Impact of some sources are depicted graphically. The study of phenomenon of thermoelastic diffusion is used to improve the conditions of oil extractions to form. Dynamics mechanical loading may produce severe deformation in a thin zone near the Half- space surface & thereby cause excessive wear & even cracking near the contact zone. Therefore it is useful to analyse these types of problems by using the formulation that is exact as possible & to provide results for surface & / or near surface field quantities (displacement, micro-rotation, stress, temperature) that may be required for design purpose. It is useful in the field of geo-mechanics where the interest is about the various phenomenon occurring in the earthquake.

Keywords: Thermoelastic diffusion, microstretch, thermal source, mass concentration, normal force, Laplace and Fourier transforms