
COMPLEX POTENTIALS SOLUTIONS FOR ISOTROPIC COSSERAT BODIES WITH VOIDS

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ABSTRACT

The aim of this paper is to obtain solutions in terms of complex potentials structure for the plain strain problem, of an elastic micropolar, homogeneous and isotropic body with pores within the equilibrium theory. Using the constitutive equations geometric equations, and the equilibrium equations without body forces, the focus is on addressing the fundamental boundary value problems of plane strain theory. Subsequently, a depiction of the displacement of microrotations and pores is derived using complex analytical functions and two real functions, based on the homogeneous Helmholtz equations. In the next part of the work, the structure of the potential functions for several domains of interest is studied, and the method of complex variables without the introduction of stress functions is applied to solve the Kirch problem. The last section is dedicated to the numerical study, where the corresponding complex potential plots and stress and displacement distributions are obtained in a porous micropolar isotropic material.

Keywords Complex · Potentials · Isotrop · Elasticity · Strain · Micropolar

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