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A GN model for thermoelastic interaction in an unbounded fiber-reinforced anisotropic medium with a circular hole

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Abstract

In this work, we have constructed the equations for generalized thermoelasticity of an unbounded fiber-reinforced anisotropic medium with a circular hole. The formulation is applied in the context of Green and Naghdi (GN) theory. The thermoelastic interactions are caused by (I) a uniform step in stress applied to the boundary of the hole with zero temperature change and (II) a uniform step in temperature applied to the boundary of the hole which is stress-free. The solutions for displacement, temperature and stresses are obtained with the help of the finite element procedure. The effects of the reinforcement on temperature, stress and displacement are studied. Results obtained in this work can be used for designing various fiber-reinforced anisotropic elements under mechanical or thermal load to meet special engineering requirements.

Keywords

Green and Naghdi theory; Fiber-reinforced; Finite element method

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