Adomian's Decomposition Method to Generalized Magneto-Thermoelasticity

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Abstract : Due to many applications and problems in the fields of plasma physics, geophysics, and other many topics, the interaction between the strain field and the magnetic field has to be considered. Adomian introduced the decomposition method for solving linear and nonlinear functional equations. This method leads to accurate, computable, approximately convergent solutions of linear and nonlinear partial and ordinary differential equations even the equations with variable coefficients. This paper is dealing with a mathematical model of generalized thermoelasticity of a half-space conducting medium. A magnetic field with constant intensity acts normal to the bounding plane has been assumed. Adomian's decomposition method has been used to solve the model when the bounding plane is taken to be traction free and thermally loaded by harmonic heating. The numerical results for the temperature increment, the stress, the strain, the displacement, the induced magnetic, and the electric fields have been represented in figures. The magnetic field, the relaxation time, and the angular thermal load have significant effects on all the studied fields.

Keywords : Adomian's decomposition method, magneto-thermoelasticity, finite conductivity, iteration method, thermal load

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