عنوان مقاله:

An Axisymmetric Contact Problem of a Thermoelastic Layer on a Rigid Circular Base

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خلاصه مقاله:

We study the thermoelastic deformation of an elastic layer. The upper surface of the medium is subjected to a uniform thermal field along a circular area while the layer is resting on a rigid smooth circular base. The doubly mixed boundary value problem is reduced to a pair of systems of dual integral equations. The both system of the heat conduction and the mechanical problems are calculated by solving a dual integral equation systems which are reduced to an infinite algebraic one using a Gegenbauer's formulas. The stresses and displacements are then obtained as Bessel function series. To get the unknown coefficients, the infinite systems are solved by the truncation method. A closed form solution is given for the displacements, stresses and the stress singularity factors. The effects of the radius of the punch with the rigid base and the layer thickness on the stress field are discussed. A numerical application is also considered with some concluding results.

کلمات کلیدی:

Axisymmetric thermoelastic deformation, Doubly mixed boundary value problem, Hankel integral transforms, Infinite algebraic system, Stress singularity factor