

## **Application of Residual Correction Method on Hyperbolic Thermoelastic Response of Hollow Spherical Medium in Rapid Transient Heat Conduction**

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**Abstract :** In this article we uses the residual correction method to deal with transient thermoelastic problems with a hollow spherical region when the continuum medium possesses spherically isotropic thermoelastic properties. Based on linear thermoelastic theory, the equations of hyperbolic heat conduction and thermoelastic motion were combined to establish the thermoelastic dynamic model with consideration of the deformation acceleration effect and non-Fourier effect under the condition of transient thermal shock. The approximate solutions of temperature and displacement distributions are obtained using the residual correction method based on the maximum principle in combination with the finite difference method, making it easier and faster to obtain upper and lower approximations of exact solutions. The proposed method is found to be an effective numerical method with satisfactory accuracy. Moreover, the result shows that the effect of transient thermal shock induced by deformation acceleration is enhanced by non-Fourier heat conduction with increased peak stress. The influence on the stress increases with the thermal relaxation time.

**Keywords :** maximum principle, non-Fourier heat conduction, residual correction method, thermo-elastic response

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