عنوان مقاله:

Thermo-elasticity stresses analysis in thick-walled spherical FGM tanks by numerical and analytical methods

محل انتشار:

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خلاصه مقاله:

The purpose of this paper is to study thermo-elasticity stresses in spherical FGM tanks by analytical and finite element methods and to compare the methods together. Alteration in the mechanical and thermal properties through the material thickness is assumed to be a linear function of the radius of the sphere. The materials are aluminum and alumina (Al2O3). Analytical method is based on direct solution of the Navier equation in spherical coordinates by considering the temperature effects. The finite element method used the commercial ABAQUS software and the two dimensional coupled stress-heat elements. Temperature distribution and displacement are calculated in the radial direction. To compare the methods, the radial, lateral and effective stresses distributions for two types of boundary conditions are studied. The results show that the accuracy of the analytical solution decreases with increasing temperature difference. Stresses distributions for four different tank materials are calculated and compared together.

کلمات کلیدی:

FGM spherical tanks, Thermal and mechanical stresses, Navier equation, Finite element method

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