عنوان مقاله:

Navier-type Free Vibration Analysis of Porous Smart Plates According to Reddy's Plate Theory

محل انتشار:

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خلاصه مقاله:

This paper aims to present an exact Navier solution for free vibration analysis of thick rectangular plates made of functionally graded porous materials surrounded by piezoelectric layers. Mechanical properties of the porous material vary across the thickness of plate according to two different porosity distribution. On the basis of third-order shear deformation plate theory, six governing equations of the system are obtained by using Hamilton's principle and Maxwell's equation for closed and open circuit electrical conditions. Natural frequencies are obtained for porous smart plates with simply supported edges and verified with the known results in literature. A detailed numerical study is conducted to examine the effects of porosity coefficient and piezoelectric layer thickness on natural frequencies of the plate for different thickness-length ratios, modes, electrical boundary conditions, and material properties. It is found that the effects of electrical boundary conditions and the porosity coefficient on the natural frequencies are significant.

کلمات کلیدی:

Free vibration, Third order shear deformation theory, Navier solution, Porous materials, Piezoelectric materials

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