عنوان مقاله:

Comparison of Two Kinds of Functionally Graded Cylindrical Shells with Various Volume Fraction Laws for Vibration Analysis

نویسندگان:

M.R Isvandzibaei - Department of Mechanical Engineering, Sinhgad College of Engineering, University of Pune

P.J Awasare - Department of Mechanical Engineering, Sinhgad College of Engineering, University of Pune

خلاصه مقاله:

In this paper, a study on the vibration of thin cylindrical shells made of a functionally gradient material (FGM) composed of stainless steel and nickel is presented. The effects of the FGM configuration are taken into account by studying the frequencies of two FG cylindrical shells. Type I FG cylindrical shell has nickel on its inner surface and stainless steel on its outer surface and Type II FG cylindrical shell has stainless steel on its inner surface and nickel on its outer surface. The study is carried out based on third order shear deformation shell theory (TSDT). The objective is to study the natural frequencies, the influence of constituent volume fractions and the effects of configurations of the constituent materials on the frequencies. The properties are graded in the thickness direction according to the volume fraction power-law distribution. The analysis is carried out with strains-displacement relations from Love's shell theory. The governing equations are obtained using energy functional with the Rayleigh-Ritz method. Results are presented on the frequency characteristics and the influences of constituent various volume fractions for Type I and II FG cylindrical shells and simply supported boundary conditions on the frequencies.

کلمات کلیدی:

Vibration, Functionally gradient material, Third order shear deformation shell theory, Rayleigh-Ritz method