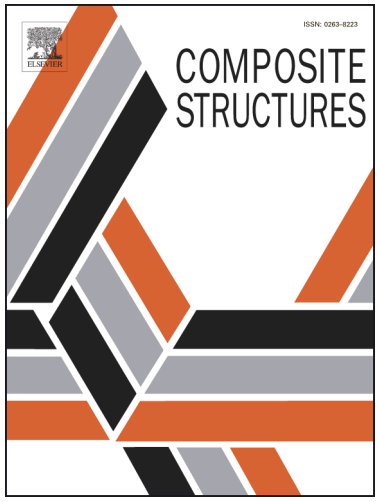

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Dynamic analysis of isotropic sandwich cylindrical shell with fractional viscoelastic core using Rayleigh-Ritz method

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Abstract

This paper presents the dynamic behavior of a sandwich circular cylindrical shell with a constrained fractional viscoelastic layer. Based on the Donnell-Moshtari theory, the structural formulation of the cylinder is obtained using the Lagrange method and the Rayleigh-Ritz method is implemented to solve the discretized governing equations. To describe the mechanical properties of the viscoelastic layer, the fractional order standard solid model is applied. The effects of variation of the governing parameters such as the length to radius ratio, the radius to total thickness ratio, ratio of core to facing thickness, fractional order parameter and the ratio of non-relaxed to relaxed modulus on the frequency and loss factor of sandwich cylindrical shells are investigated and some conclusions are outlined.

Keywords: Sandwich circular cylindrical shell, Fractional viscoelastic layer, Dynamic behavior, Fractional order constitutive relationship.

1. Introduction

Constrained Layer Damping (CLD) provides an efficient way to suppress undesirable mechanical vibration and wave propagation in different types of structures, such as beams, plates and shells. The early studies on CLD were carried out by Kerwin [1], Ross *et al.* [2], DiTaranto [3] and Mead and Markus [4] for beam and plate structures.

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