ABSTRACT

The present thesis is concerned with a theoretical investigation of the parametric instability of sandwich beams with viscoelastic cores having various configurations and subjected to axial pulsating loads. The equations of motion have been derived using Hamilton's principle. Use of the general Galerkin method reduces the non-dimensional equations of motion to a set of Hill's equations with complex coefficients. Hsu's as well as Bolotin's method, modified for the complex case, are used to obtain the zones of instability for simple and combination resonances. Numerical results are obtained and these are presented graphically. The influence of various parameters such as core loss, core thickness, shear, pre-twist, core density etc. on the zones of parametric instability are studied. In addition, the effects of various relevant parameters on the system loss factor as well as static buckling loads are presented.

KEY WORDS :

boundary conditions, combination resonance, coordinate functions, dual core, dynamic stability, end constraint, generalized coordinates, higher order effects, loss factor, multilayer, parametric excitation, parametric instability, partial cover, pre-twist, sandwich beam, shape functions, shear parameter, simple resonance.