DYNAMIC STABILITY STUDY ON AN EXPONENTIALLY TAPERED ROTATING ASYMMETRIC SANDWICH BEAM UNDER THE ACTION OF A PULSATING AXIAL LOAD WITH VARIABLE TEMPERATURE GRADIENT

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Abstract

In this research article stability study of an exponentially tapered rotating sandwich beam having different elastic parameters in temperature environment has been done. The sequential steps followed up to reach the goal are extended Hamilton's principle, non-dimensionlization of equations, selection of shape functions for the mathematical modeling of the system from the past research work depending upon the boundary conditions, use of general Galerkins method, help of modal matrix and finally the use of Saito-Otomi conditions. Here the effects of variable thermal gradient, on the Young's modulus of the elastic layers have been considered in place of constant thermal gradient as earlier. Consideration of effect of variable thermal gradient, while analyzing the stability of the system is the most significant contribution of this research article to the society as non-uniform elastic layers are considered here. The influence of different parameters on the regions of instability are studied and presented graphically. Comparison of the results with uniform and variable thermal gradient is carried out.

Keywords: Rotation Parameter, Rotating Sandwich Beam, Non-uniformity Parameter, Temperature Gradient