

عنوان مقاله:

Dynamic Analysis of Multi-Directional Functionally Graded Panels and Comparative Modeling by ANN

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خلاصه مقاله:

In this paper dynamic analysis of multi-directional functionally graded panel is studied using a semi-analytical numerical method entitled the state-space based differential method (SSDQM) and comparative behavior modeling by artificial neural network (ANN) for different parameters. A semi-analytical approach which makes use the three-dimensional elastic theory and assuming the material properties having an exponent-law variation along the axial, radial direction or both directions, the frequency equations of free vibration of multi-directional functionally graded panels are derived. Numerical results are given to demonstrate the convergency and accuracy of the present method. Once the semi-analytical method is validated, an optimal ANN is selected, trained and tested by the obtained numerical results. In addition to the quantitative input parameters is considered as a qualitative input in NN modeling. The results of SSDQM and ANN are compared and the influence of longitude of the panel, material property graded index and circumferential wave number on the non-dimensional natural frequency of functionally graded material (FGM) panels are investigated.

کلمات کلیدی:

Panel, Multi-directional functionally graded, Artificial Neural Network, Differential quadrature method, State-space method, Dynamic Analysis

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