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Vibration of quadrilateral embedded multilayered graphene sheets based on nonlocal continuum models using the Galerkin method

Babaei H., Shahidi A. R.

Department of Mechanical Engineering, Isfahan University of Technology, Isfahan 8415683111, Iran

Abstract Free vibration analysis of quadrilateral multilayered graphene sheets (MLGS) embedded in polymer matrix is carried out employing nonlocal continuum mechanics.The principle of virtual work is employed to derive the equations of motion. The Galerkin method in conjunction with the natural coordinates of the nanoplate is used as a basis for the analysis. The dependence of small scale effect on thickness,elastic modulus, polymer matrix stiffness and interaction coefficient between two adjacent sheets is illustrated.The non-dimensional natural frequencies of skew, rhombic,trapezoidal and rectangular MLGS are obtained with various geometrical parameters and mode numbers taken into account, and for each case the effects of the small length scale are investigated.

Keywords: Small scale Free vibration Quadrilateral multilayered graphene sheet Polymer matrix Nonlocal elasticity theory

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