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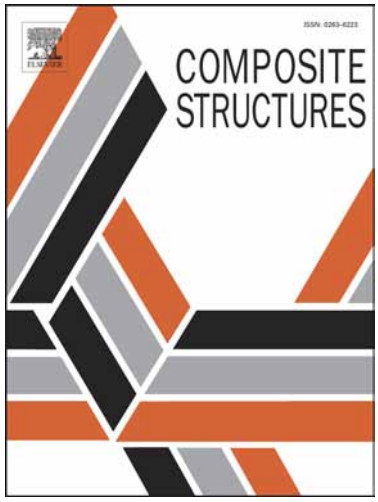

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Free vibration analysis of bilayer graphene sheets subjected to in-plane magnetic fields

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Abstract

Bilayer graphene sheets (BLGSs) have attracted increasing attention due to their unique and highly valuable properties. The present study investigates the vibration behavior of BLGSs in a magnetic field using classic plate theory combined with nonlocal elasticity theory to account for the small-scale effect. The obtained coupled partial differential equations are solved by way of the element-free kp-Ritz method. The effectiveness of the present nonlocal element-free kp-Ritz method is verified by previously published results. The effects of side length, boundary conditions, aspect ratio, nonlocal parameter and magnetic parameter on the vibration behavior of BLGSs are investigated. One interesting phenomenon is that the second interlayer vibration mode frequency is independent of the side length, boundary conditions, aspect ratio and nonlocal parameter, but is influenced by the magnetic field, which makes the first interlayer vibration mode frequency asymptotic to the second one when the magnetic parameter is sufficiently large.

Key words: Nonlocal theory, bilayer graphene sheets, magnetic field, free vibration; Ritz method

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