عنوان مقاله:

Free vibration analysis of sandwich beams with auxetic core and CNT-reinforced nanocomposite face sheets using GDQ method

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خلاصه مقاله:

In the present paper, free vibration behavior of a sandwich beam consisting of an aluminum auxetic core and two polymer nanocomposite face sheets reinforced with Carbon Nanotube (CNT). The effective material properties of the face sheets and core are estimated using the extended rule of mixture and relations of the auxetic materials, respectively. Thereafter, the governing differential equations are derived based on the incorporation of first-order shear deformation theory (FSDT) and Hamilton's principle. To obtain the natural frequencies of the structure, the differential equations are solved by implementing the Generalized Differential Quadrature method (GDQ) which is a well-known numerical strategy. Also, the results are compared and validated with a reputed work in literature and a perfect agreement is achieved. Finally, the influences of various parameters such as length-to-thickness ratio, the cell inclined angle, CNT's volume fraction, various boundary conditions and core-to-face sheet ratio on the first natural frequency of the sandwich beam were investigated.

کلمات کلیدی:

Free vibration, Sandwich beam, CNT reinforced nanocomposite, auxetic core, GDQ solution method

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