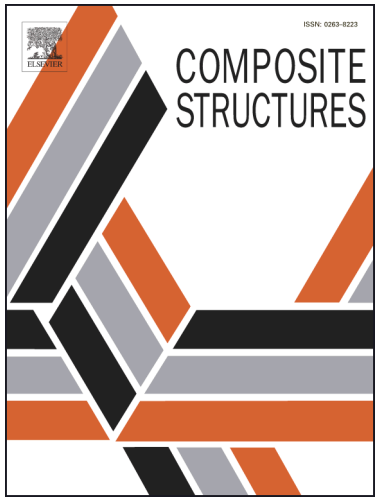

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Size-dependent isogeometric analysis of functionally graded carbon nanotube-reinforced composite nanoplates

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ABSTRACT

This paper presents an effective and simple computational formulation based on isogeometric Analysis (IGA) and generalized higher-order shear deformation theory (GHSDT) to study size-dependent analysis of functionally graded carbon nano-reinforced composite (FG-CNTRC) nanoplates. The material properties of FG-CNTRC are assumed to be graded through the thickness direction according to four special distributions of carbon nanotubes (CNTs). The differential nonlocal equations are utilized to take into account size effects. The nonlocal governing equations are approximated according to IGA based on GHSDT, which satisfies naturally the higher-order derivatives continuity requirement in weak form of FG-CNTRC nanoplates. Carbon nanotube volume fraction and nonlocal effects on responses of FG-CNTRC nanoplates with different volume fractions are studied. Numerical results prove high accuracy and reliability of the present method in comparison with other available numerical approaches.

Keywords: Isogeometric Analysis (IGA), functionally graded carbon nanotube-reinforced composite plates, generalized higher-order shear deformation theory, nonlocal theory, small scale effect.

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