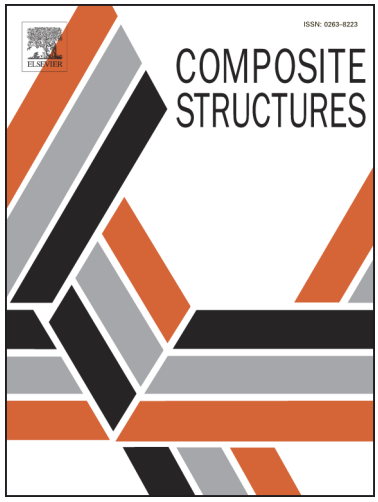

New Ritz-solution shape functions for analysis of thermo-mechanical buckling and vibration of laminated composite beams

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New Ritz-solution shape functions for analysis of thermo-mechanical buckling and vibration of laminated composite beams

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Abstract

New hybrid shape functions for buckling and vibration analysis of laminated composite beams under thermal and mechanical loads are presented in this study. The displacement field of present work is based on a higher-order shear deformation beam theory. The governing equations of motion are derived from Lagrange's equations. A Ritz solution is developed in which new hybrid shape functions based on a combination of admissible and exponential functions for various boundary conditions are proposed. Numerical results are presented to compare with those from earlier works, and to examine the influences of span-to-height ratio, boundary conditions, material anisotropy and temperature changes on the buckling load and natural frequency of laminated composite beams.

Keywords: Ritz method; Thermo-mechanical effect; Laminated composite beams.

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