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Thermal Buckling Analysis of Functionally Graded Beams with Various Boundary Conditions

Authors : Gholamreza Koochaki

Abstract : This paper presents the buckling analysis of functionally graded beams with various boundary conditions. The first order shear deformation beam theory (Timoshenko beam theory) and the classical theory (Euler-Bernoulli beam theory) of Reddy have been applied to the functionally graded beams buckling analysis The material property gradient is assumed to be in thickness direction. The equilibrium and stability equations are derived using the total potential energy equations, classical theory and first order shear deformation theory assumption. The temperature difference and applied voltage are assumed to be constant. The critical buckling temperature of FG beams are upper than the isotropic ones. Also, the critical temperature is different for various boundary conditions.

Keywords : buckling, functionally graded beams, Hamilton's principle, Euler-Bernoulli beam
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