Thermal buckling of various types of FGM sandwich plates

A.M. Zenkour [a,b,*], M. Sobhy [b]

[a] Department of Mathematics, Faculty of Science, King AbdulAziz University, P.O. Box 80203, Jeddah 21589, Saudi Arabia
[b] Department of Mathematics, Faculty of Science, Kafrelsheik University, Kafr El-Sheikh 33516, Egypt

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ABSTRACT

The sinusoidal shear deformation plate theory is used to study the thermal buckling of functionally graded material (FGM) sandwich plates. This theory includes the shear deformation and contains the higher- and first-order shear deformation theories and classical plate theory as special cases. Material properties and thermal expansion coefficient of the sandwich plate faces are assumed to be graded in the thickness direction according to a simple power-law distribution in terms of the volume fractions of the constituents. The core layer is still homogeneous and made of an isotropic material. Several kinds of symmetric sandwich plates are presented. Stability equations of FGM sandwich plates include the thermal effects. The thermal loads are assumed to be uniform, linear and non-linear distribution through-the-thickness. Numerical examples cover the effects of the gradient index, plate aspect ratio, side-to-thickness ratio, loading type and sandwich plate type on the critical buckling for sandwich plates.