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# Thermoelastic behavior of advanced composite sandwich plates by using a new 6 unknown quasi-3D hybrid type HSDT

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## Abstract

This paper presents an analytical solution for the thermoelastic bending analysis of advanced composite sandwich plates by using a new quasi-3D hybrid type HSDT with 6 unknowns which is based on a generalized formulation. In addition, the nonlinear term of the temperature field is included in the generalized mathematical formulation in such way that it can be freely chosen and if desired can be different from the shear strain shape functions of the displacement field. So, infinite quasi-3D hybrid type HSDTs with just 6 unknowns can be derived from the present generalized formulation. The thermoelastic bending governing equations are obtained through the principle of virtual works and solved via Navier Method. Interesting results are obtained and compared with quasi-3D and 2D HSDTs. Transverse shear stress results are strongly influenced by nonlinear temperature field and for different HSDTs different results are produced. Therefore should be further discussed in the literature.

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Further, the HSDTs can be developed using polynomial[9,10] or nonpolynomial kinematics[11][12][13][14][15][16][17][18][19][20]. The thermoelastic problem of FG sandwich plates was studied by Houari et al. [21], Zenkour and Alghamdi[22] and Mantari and Granados[23] using a HSDT with thickness stretching effect and a nonlinear thermal distribution. Carrera unified formulation was formulated by Carrera for laminated plates and shells[24][25][26], which offers a procedure to implement several plate and shell theories by expanding the displacement variables in the thickness coordinate using generic functions, originally Taylor's expansions of  $N$ -order.

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