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# **Buckling and vibro-acoustic response of the clamped composite laminated plate in thermal environment**

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## **Abstract**

Composite structures are extensively applied in aircraft and marine industries because of their high stiffness-to-weight ratios and other advantages. The composite structures in the hypersonic aircraft are usually exposed to the thermal and noise environment. The paper is focused on the buckling and vibro-acoustic response of the clamped composite laminated plate excited by a concentrated harmonic force in the thermal environment. The analytical solution of vibration and acoustic response for fully clamped boundary condition is derived in the paper. Meanwhile, the natural frequencies and buckling temperatures of the plate in uniform temperature environment are also derived by applying the classical laminate theory (CLT) and first order shear deformation theory (FOSDT). The vibration response is obtained by applying the mode superposition method, while the sound pressure and radiation efficiency are calculated by Rayleigh integral in sequence. The accuracy of the presented method is verified by the numerical simulations. The structural and acoustic response affected by the thermal load is demonstrated through a numerical example.

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