

## Structural dynamics of smart sandwich plates by finite element methods

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*Abstract:* In this work different finite element models of sandwich plates with three layers and a piezoelectric actuation at laminated composite face-sheets are evaluated. In several models of sandwich plates, the upper and lower face sheets are represented by solid or two-dimensional finite elements, but for the core a three-dimensional formulation is more applied. A complete three-dimensional finite element formulation is used in comparison with a three layer quasi-3D formulation. The aspect ratio of three-dimensional finite elements can make it rather inconvenient to use these on very thin faces of sandwich plates, which makes the number of degrees of freedom very high. The quasi-3D finite element formulation was presented as the analytical integration of the energy expressions through the sandwich plate thickness bringing the facilities of the two-dimensional mesh generation to the model. This research assesses the accuracy of the proposed models for displacements, strains and stresses on sandwich plates with piezoelectric actuation when a broad range of core stiffness is considered. The results are compared with analytical formulation for the deflection of a beam like plate under piezoelectric actuation.

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