

Piezoelectric transformer: Comparison between a model and an analytical verification

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Abstract: In this paper, a study comparing a model of a composite piezoelectric transformer, based on the corresponding electrical equivalent circuit, and the direct calculation solving the mechanical fundamental equations constrained by the appropriate boundary conditions is presented. The approach is simplified considering vibrations only along one direction, neglecting the coupling phenomena existing along the other directions. The electrical equivalent circuit of the transformer is obtained from the equivalent circuit referred for the isolated piezoelectric oscillators. In this paper, each electrical equivalent circuit is placed on a cascade in order to conserve the continuity of displacements and stress at the junction.

Keywords : Piezoelectricity, Transformer, Modeling; Equivalent circuit, Analytical verification, Voltage gain, Boundary conditions