Simulation of Piezoelectric Transformers with COMSOL

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Abstract

In this work COMSOL is utilized to obtain the Mason lumped parameter model for a piezoelectric transformer (PT) design. The Mason lumped parameters are relevant in the design process of power converters. The magnitude of the impedance is simulated for a specific interleaved multilayer thickness mode PT. The PT design has been prototyped and the measurements results are compared with simulations. Two methods for simplifying the PT model are given in order to decrease the simulation time. This paper aims to aid electrical engineers with less knowledge within the field of mechanics, to be able to simulate a PT design with COMSOL and extract the key electrical parameters.

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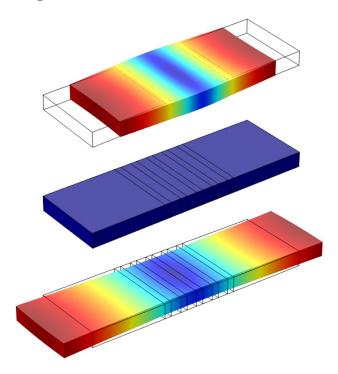
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Figures used in the abstract

Figure 1: Simulation of displacement at first resonance mode 53.0 kHz at phase 0̂ (top), 90̂ (middle) and 180̂ (bottom). Displacement is scaled by a factor of 10e8.