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Performance Characteristics of a Plate with Shunted Piezoelectric Patches

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ABSTRACT

In this work the fundamental issues regarding the vibration characteristics of plates with shunted piezopatches were investigated. These include the effect of passive shunting of piezopatches on damping the vibration using R-L circuits, the effect of applying periodically distributed piezoelectric patches with shunted RL circuits, the effect of introducing disorder in the periodic shunting, and a spectral finite element model to predict both the vibration and damping characteristics of the structure. The validity of the developed finite element model in predicting both the vibration and the damping characteristics of the structure has been demonstrated. The use of passive R-L circuit shunting with the piezoelectric patches bonded to the surface of the plate has proven to be very effective even when using a single patch for damping. When the multiple patches were all arranged in a periodic manner, a broadband of attenuation resulted even when all the patches were tuned to attenuate the same frequency.

Keywords: *PIEZOELECTRIC PATCHES, SHUNTED R-L CIRCUITS*

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