

On the interaction of composite plate having a vibration-absorbing covering with incident acoustic wave

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Abstract

© Allerton Press, Inc., 2015. We formulate the coupled problem of planar acoustic wave propagation through the composite plate which contains in its second layer a damping material possessing large logarithmic decrement. Aero-hydrodynamical interaction between plate and external acoustic environment is defined by three-dimensional wave equations, whilst mechanical behavior of double-layered plate is examined with a model based on classical Kirchhoff–Love’s hypothesis. Exact analytical solutions were given for plates with simply supported edges. Based on given solutions we find parameters for second layer which lead to substantially damping of plate vibrations in the case of acoustic loading at resonant modes.

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Keywords

Acoustic wave, Acoustoelasticity, Analytical solution, Double-layered plate, Internal damping, Logarithmic decrement, Resonance, Vibration damping, Wave equation