

Lamb Waves in Plates Subjected to Uniaxial Stresses

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Abstract : On the basis of the finite deformation theory, the effect of homogeneous stress on the propagation of Lamb waves in an initially isotropic hyperelastic plate is analysed. The equations governing the propagation of small amplitude waves in the prestressed plate are derived using the theory of small deformations superimposed on large deformations. By enforcing traction free boundary conditions at the upper and lower surfaces of the plate, acoustoelastic dispersion equations for Lamb wave propagation are obtained, which are solved numerically. Results are given for an aluminum plate subjected to a range of applied stresses.

Keywords : acoustoelasticity, dispersion, finite deformation, lamb waves

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