

Effect of surface stress on magneto-elastic surface waves in finitely conducting media

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Abstract

This paper deals with the investigation of the effect of surface stress and conductivity on the propagation of surface wave in isotropic, homogeneous, elastic media under the action of a primary magnetic field. Formulation of the general surface wave propagation problem has been made, and the corresponding frequency equation has been derived. Frequency equations for Rayleigh wave, surface shear wave and Stoneley wave have been deduced from that of general surface wave as special cases. The effects of surface stress and magnetic field on the wave velocities and attenuation factors of Rayleigh wave and surface shear wave are shown by numerical calculations and graphs. Some important wave velocity equations, as obtained by other authors, have been deduced as special cases from the wave velocity equation for Stoneley wave. It is found that the combined effect of surface stress and magnetic field modulates the wave velocity ratios and attenuation factors of Rayleigh wave and surface shear wave to a considerable extent.

Key words: surface stress, magneto-elastic surface waves, magnetic field, Rayleigh waves, surface shear waves, Stoneley waves.