

Rayleigh Wave Propagation in an Orthotropic Medium under the Influence of Exponentially Varying Inhomogeneities

Authors : Sumit Kumar Vishwakarma

Abstract : The aim of the paper is to investigate the influence of inhomogeneity associated with the elastic constants and density of the orthotropic medium. The inhomogeneity is considered as exponential function of depth. The impact of gravity had been discussed. Using the concept of separation of variables, the system of a partial differential equation (equation of motion) has been converted into ordinary differential equation, which is coupled in nature. It further reduces to a biquadratic equation whose roots were found by using MATLAB. A suitable boundary condition is employed to derive the dispersion equation in a closed-form. Numerical simulations had been performed to show the influence of the inhomogeneity parameter. It was observed that as the numerical values of increases, the phase velocity of Rayleigh waves decreases at a particular wavenumber. Graphical illustrations were drawn to visualize the effect of the increasing and decreasing values of the inhomogeneity parameter. It can be concluded that it has a remarkable bearing on the phase velocity as well as damping velocity.

Keywords : Rayleigh waves, orthotropic medium, gravity field, inhomogeneity

Conference Title : ICAMMS 2020 : International Conference on Applied Mathematics, Modelling and Simulation

Conference Location : Singapore, Singapore

Conference Dates : March 30-31, 2020