Propagation of Elastic Waves in Prestressed Media

INDER SINGH GUPTA

Department of Mathematics, J.V.M.G.R.R. College, Charkhi Dadri 127306,India
e-mail: is_ gupta@yahoo.com

In fact, the Earth is a prestressed media, due to many physical causes i.e gravity variation,weight of material resting its layer,temperature difference etc.Therefore, these problems are of much interest to sesimologists due to its application in mineral prospecting and prediction of earthquakes.

Biot has shown that an otherwise isotropic elastic material may possess an apprant or induced anisotropy if the initial static stress is taken in to account. In this paper i study the 3-D solutions of the dynamical equations in the presence of external forces for a homogeneous,prestressed medium.2-D plane waves solutions in a presressed elastic solid with incremental elastic cofficients possessing orthotropic symmetry are obtained from gernal solution and shown that,there exists two types of plane waves namely quasi-P waves and quasi-SV waves.

Expressions for slowness surfaces and apparent velocities for these waves are derived analytically as well as numerically and represented graphically and compared with the results obtained by SIDHU and SINGH(1984). Again these results are compared without initial stressed media. The study shows that velocities of these waves are highly affected by the initial stresses present in the medium as well as the direction of wave propgation.