Recurrent modeling of seismic waves in layered media.

D.Malytskyy, O.Mujla, R.Pak and E.Kozlovskyj

Carpathian Branch of Subbotin Institute of Geophysics NASU, Ukraine

E-mail:dmytro@cb-igph.lviv.ua, Fax:+380-0322-648563, Phone:+380-322-649777

Theory of seismic wave propagation in a layered medium, i.e. in the medium whose elastic properties depend only on depth, has been a main subject of research by many scientists-seismologists. Methods for horizontally stratified earth model are very important and find applications in the studies of earthquake sources and structural properties of media.

This paper is organized as follows. After a discussion of the differential equations for wave propagation in the horizontally stratified medium and of the initial and boundary conditions, we derive the displacements on the free surface of the layered medium for plane waves when a point source is located on the $s-$th imaginary boundary at the depth z_S (physical parameters of the layers s and $(s + 1)$ are put to be identical). Then, the source will be represented as a single force of arbitrary orientation and a general moment tensor point source. Further, "a primary field" for a point source will be introduced. Recurrent method for the solution of the direct seismic problem is considered basid on the matrix method of Thomson-Haskell and its modifications. We propose too a new approach for the determination of the earthquake source parameters.