PHYSICAL AND MATHEMATICAL MODELLING OF DYNAMICS OF IONOSPHERIC WAVE PRECURSORS OF EARTHQUAKES

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Abstract

In the present article a new standpoint is proposed on the theoretical modelling of transference of interaction from underground and overground perturbation sources to the above lying layers of atmosphere.

The new nonlinear mechanism of transformation of long-wave-length acoustic waves (of natural or artificial origin) into electromagnetic ones in ionospheric F-layer is suggested. It is shown that the acoustic wave involves in collective motion the charged particles of media by means of collisions. The relative motion of charged particles excites the alternating current with an arbitrary phase and, consequently, there happens the parametric generation of electromagnetic fields in the ionospheric layers.

Nonlinear propagation of the lowfrequency seismic origin acoustic-gravity (AG) perturbations in a nonuniform ionospheric E-layer has been investigated. Analytically calculated amplification of the night-sky green line intensity stipulated by nonlinear AG vortexes spreading has been compared with observed green radiation intensity increase of the night sky before the earthquake. Well matching of these data suggests that ionospheric AG vortexes can be considered as the wave forerunner of the strong earthquakes.

The results of investigation indicate the leading role of the acoustic channel of connection between lithosphere-ionosphere-magnetosphere.

Key words and phrases: Weighted Sobolev space, Bending of an orthotropic cusped plate.

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