



Instability of acoustic gravity waves in an isothermal atmosphere with varying in time wind

O.N. Savina (1) and G.I. Grigor'ev (2)

(1) Nizhny Novgorod State Technical University, 603600 Russia (savina@appl.sci-nnov.ru),

(2) Research Radiophysical Institute, Nizhny Novgorod, 603950 Russia

A two-dimensional problem of acoustic gravity waves propagation in an isothermal atmosphere with a horizontal wind varying harmonically with time has been solved. It has been shown that the parametric linear interaction occurs between the medium and waves. As a result of this interaction, the spectrum of waves propagating in such a medium has not only the fundamental frequency but also harmonics that are shifted from it in both sides by the multiples of the frequency of horizontal-wind pulsation. The polarization relations are obtained between the perturbations that occur in the pressure, density, and velocity of the medium during acoustic gravity waves propagation. The conditions of instability of internal gravity waves due to their interactions with a time-dependent wind are formulated and analysed in different limiting cases. The time growth rates of internal gravity waves are calculated and compared with the rates of internal gravity waves damping under the effect of the viscosity. The results of numerical calculated was used for internal gravity waves propagating in the altitude range from the troposphere to the lower ionosphere.