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Some features of acoustic-gravity waves propagation in the non isothermal planetary atmospheres

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The new analytical formalism, which gives the possibility to write down the non linear Riccati's equation for the linear acoustic-gravity waves impedance in the realistic models of the atmosphere of the planets with horizontal heterogeneous winds and altitude temperature profile, is developed. The novelty of formalism consists in the separation of equation for the polarization relationships, which well make agree with the natural boundary conditions in the upper atmosphere. After determination of the polarization the calculation of wave fields is reduced to the solution of linear differential first order equation. The analytical and numerical studies of the obtained nonlinear Riccati's equation are carried out. The polarization relationships for acoustic-gravity waves for the typical planetary conditions with sharp temperature changes in the atmospheres of Jupiter and Saturn are determined. Special attention paid to the waves at frequencies, close to the Väisälä-Brunt frequency. Conditions for the appearance of specific instabilities of atmospheric disturbances are discussed.