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LOW FREQUENCY INTERNAL-GRAVITY WAVY STRUCTURES IN THE SHEAR FLOW DRIVEN IONOSPHERE

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The linear generation, intensification and further dynamics of internal gravity waves (IGW) in the ionosphere with non-uniform zonal wind (shear flow) is studied. In case of the shear flows the operators of linear problem are non-selfadjoint, and the corresponding Eigen functions are nonorthogonal. Thus, canonical - modal approach is of less use studying such motions. Non-modal mathematical analysis becomes more adequate for such problems. On the basis of non-modal approach, the equations of dynamics and the energy transfer of IGW disturbances in the ionosphere with a shear flow is obtained. It is revealed that the transient amplification of IGW disturbances due time does not flow exponentially, but in algebraic - power law manner. The frequency and wave-number of the generated IGW modes are functions of time. Thus in the ionosphere with the shear flow, a wide range of wave disturbances are produced by the linear effects, when the nonlinear and turbulent ones are absent. The effectiveness of the linear amplification mechanism of IGW at interaction with non-uniform zonal wind is analyzed. It is shown that at initial linear stage of evolution IGW effectively temporarily draws energy from the shear flow significantly increasing (by order of magnitude) own amplitude and energy.

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