CALCULATION OF PLASMA TRANSPORT VELOCITY IN F2-REGION OF IONOSPHERE ON ION AND ELECTRON TEMPERATURES AND ELECTRON DENSITY, MEASURED BY THE INCOHERENT SCATTER METHOD

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The actual problem is a theoretical calculation of plasma transport velocity on electron density data, measured by incoherent scatter method. Comparison of profiles of transport velocity vertical component $v_z(h)$, theoretically calculated and directly measured by incoherent scatter method, would allow to draw a conclusion of compliance of measured ionospheric parameters in the frameworks of F2-region aeronomy theory. It would confirm correctness of measurement of mentioned ionoshperic parameters by incoherent scatter method.

The continuity equation $\frac{\partial n_i}{\partial t} = q - L - \frac{\partial (n_i v_z)}{\partial h}$ of space-time distribution of O^+ ions allows to calculate plasma transport velocity $v_z(h)$ on known ion and electron temperatures T_i, T_e and electron density $n_e(h)$. Ion O^+ density n_i is calculated from electron density n_e on the assumption of the balance of ion-molecular reactions in F2-region. Ion production q and recombination rate L are defined from corresponding model conceptions about photochemical reactions, a solar ultraviolet spectrum, neutral atmosphere parameters. At midday, when $\frac{\partial n_i}{\partial t} = 0$, the decision of the continuity equation $q - L - \frac{d(n_i v_z)}{dh} = 0$ is set by the formula: $v_z(h) = \frac{1}{n_i(h)}\left(F_u - \int_h^{h_u} (q - L)\, dh \right)$, where F_u=10^8 $cm^{-2}s^{-1}$ – a flux of O^+ ions on the upper border (h_u=600 km) of selected height interval.