EXCITation OF surface WAVES by the incident NON-UNIFORM ELECTROMAGNETIC WAVE falling ON the PLASMA boundary

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In work the exaltation of E-type waves by a cylindrical source in the system consisting of the dielectric and plasma half-spaces separated by a vacuum layer with thickness  is considered. The permittivity of system has an appearance

  (1)

where  is plasma frequency,  is collision frequency.

The choice of such system is dictated by those reasons that exaltation of the surface wave on a boundary plasma-vacuum by an external source is impossible in view of impossibility of synchronization of phase velocities of bulk and surface waves. When incident electromagnetic wave propagates from a dielectric to the interface dielectric-vacuum at an angle more critical, the wave does not get into a vacuum but exponential attenuates and there is possible a synchronization of this wave with the surface plasmon on the interface plasma-vacuum. Moreover, in case of a cylindrical or spherical source there always is a group of plane waves in expansion of the field of a source providing efficient exaltation of the surface plasmon. At the same time, in the considered geometry the surface plasmon is not any more eigenwave of electrodynamic system therefore in the work waves for the geometry determined by Eq. (1) are considered. Solution of the problem is performed, both by means of numerical solving of contour integrals, and by means of a saddle point method integral calculation. In particular, dispersion dependencies and a spatial distribution of the waves excited in system are obtained. It is shown that even in non-dissipative system () the surface wave attenuates by means of reradiation in a dielectric half-space. At the same time its excitation happens not in all range of frequencies but only at .