Modeling of Electromagnetic Signal Propagation in Random Discrete Absorbing Media Inclusive a Semitransparent Spherical Object

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The necessity of analysis of electromagnetic signal with arbitrary frequency spectrum propagation in the three-dimensional random discrete media requires the development of new methods of computation. In this paper we consider the stochastic model of electromagnetic signal multiple interaction with discrete inhomogeneities chaotically disposed in the stratified media. The media consist of the five layers and inclusive a spherical object, moving with constant velocity.

The method of solving this problem is based on the stochastic modeling of wave interaction with random discrete media (V.G. Spitsyn, *IEEE AP-S International Symposium*, 1, 288-291, 2002). Here is assumed that the wavelength of the wave is less than the sizes of the layers and scattering occurs incoherently by an image on statistically independent discrete inhomogeneities. The oscillator of electromagnetic signal is presented as a source of photons with corresponding diagram of radiation. The type of photons interaction with discrete inhomogeneities is determined according to set cross sections of absorption and scattering. There is computed the Doppler shift of electromagnetic signal frequency conventional of signal scattering on the moving discrete inhomogeneities (V.G. Spitsyn, *Modeling of radiowave scattering on the ionospheric plasma disturbances, created of space vehicle*, Tomsk: Publishing House "STT", 2002). In the result of computer imitation of researched process we receive the distributions in space of coordinates of energy scattering signal and energy of absorption signal into media. In addition to we received the transformation of electromagnetic signal frequency spectrum after multiply interaction with moving discrete inhomogeneities, contained in a semitransparent spherical object

Thus in the paper the stochastic model concerning electromagnetic wave propagation in the three-dimensional random discrete media is offered. The problem about passage of the wave through the random media with five layers and moving spherical object is solved. Dependencies of frequency spectrum and energies of scattering and absorption signals from the factors, describing the nonuniform of the structure of random discrete media are investigated.