

STATISTICAL METHOD FOR DETERMINING CHARACTERISTICS OF THE DYNAMICS OF THE RADIO SIGNAL INTERFERENCE PATTERN

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A statistical method is proposed for determining the characteristics of the radio signal interference pattern dynamics by measuring variations of phase derivatives with respect to time, and spatial coordinates as a function of time or frequency. These data are used to calculate corresponding values of the velocity vector. Subsequently, velocity and direction distributions are constructed and analyzed to verify the hypothesis of the presence of a predominant displacement. If it exists, then the pattern can be considered to be travelling, and the mean travel velocity can be determined from the velocity distribution. The use of this method is exemplified by an investigation of medium-scale travelling ionospheric disturbances (MSTIDs) and small-scale irregularities (SSI) from simultaneous polarization, angle-of-arrival and scintillation measurements of the ETS-2 radio signal at 136 MHz made in Irkutsk (52°N, 104°E) during December 1989 to December 1990. Method may be useful both in experiments with ionosphere-reflected radio waves and in transionospheric radio sounding operations. The new avenues for remote diagnostics of TIDs are based on exploiting standard measurements of transionospheric radio signal characteristics and coordinate-time measurements using multichannel receivers of the Global Positioning System (GPS).

Keywords: interference pattern; ionosphere; transionospheric sounding,

travelling ionospheric disturbances; vertical incidence sounding