
Definition of a direction-finding panorama of signals from the rarefied radio radiators

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Materials of the article treat radio direction finding. Such technical results are obtained as receiving an angular range (a direction-finding panorama) sources of a radio emission, reduction of bearings calculation time and increase of direction finding accuracy at one-stage reception of radio signals from several sources of the radio emission working at one frequency, using of the antenna systems consisting of weakly directional elements (vibrators), and also receiving interval estimates of bearings. Increase of direction finding accuracy is reached due to introduction of the redefined basis and the solution of the received system of linear algebraic equations by means of the created functionality by the maximum likelihood method in the assumption that results of measurements comply with Poisson distribution. The point of a minimum of functionality defines dot estimates of an intermediate variable. Point search minimum functionality was carried out by method of interfaced gradients. Then the redefined system of the algebraic equations with three unknowns from which received estimates of amplitude (power) of a signal, azimuthal and elevation bearings and an initial phase of signals are solved.

According to the maximum likelihood method an assessment of required values can be received from a condition of maximum of logarithm of joint density of probability of results of measurements. Interval estimates of bearings turn out on the basis of Kramer — Rao theorem — by calculation of the return matrix made of the second derivatives of minimized functionality, and confidential intervals of the found estimates — from the analysis of distribution law of the logarithm of joint density of probability of the results of the measurements or it is approximated by means of the return matrix of the second derivative of the logarithm of joint density of probability of the results of measurements.

Keywords: bearing, antenna systems, iterative process, the inverse matrix.

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