

The IRI model residual difference and the new method of $N(h)$ -profile determination

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Abstract

The effectiveness of performance of the HF radio communication systems depends in many aspects on the accuracy of description of ionospheric conditions. One of possibilities of such a description is to use the IRI model. In the paper it is shown that discrepancies of the model $N(h)$ -profile shape and the real shape can make a contribution to errors of description of ionospheric conditions by means of the IRI model. A residual difference (RD) remains even after adjusting the IRI model to the real-time parameters of $foF2$ and $hmF2$. These differences are estimated for the $N(h)$ -profiles calculated from ionograms by the traditional method POLAN and the new method NeXtYZ. Estimates are given for the influence of these differences on the prediction accuracy of such parameters as the maximum usable frequency and the distance D between transmitters and receivers. An attempt was made to decrease the residual difference along the HF path by means of an analytical function approximating RD.

Key words: ionosphere, $N(h)$ -profile, HF radio propagation.