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The Effect of the Irregularity of the Rectangular Protrusion of the Rod on the Characteristics of the NRD-waveguide

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Abstract. The development of radio communication systems and positioning devices for navigation systems is directly related to the use and development of new EEE components and manufacturing technologies for various functional units. At the same time, special attention should be paid to identifying the phenomena and properties of wave processes occurring on irregular sections of transmission lines, as well as the shapes and features of the irregularities being studied. This work is aimed at studying the characteristics of a none-radiative waveguide (NRD-waveguide) with irregularity such as a symmetrical rectangular protrusion. As part of the study, the characteristics of the node were analyzed using a physical experiment on a mock-up of the node with an irregular section, as well as using methods of numerical modeling of the field distribution. In the work, patterns of changes in the S parameters of the NRD-waveguide in the Ka- range from the height of the protrusion are obtained and an assessment of the processes occurring in the waveguide path is proposed. Based on the results obtained in the work, it can be concluded that the roughness of the transfer characteristic increases with an increase in the height of the protrusion, which is associated with the reflection of the wave incident on an irregular section. The obtained research results can be used in the construction of filters based on the periodic structure of the NRD-waveguide with irregularity in the form of a symmetrical rectangular protrusion.
Keywords: irregularity, NRD-waveguide, small losses, engineering calculation, regular lines, shift
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