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SIMPLIFIED MATHEMATICAL MODEL OF THREE-DIMENSIONAL ELECTROMAGNETIC FIELD OF ARBITRARY CURRENT SYSTEM NEAR CONDUCTING BODY

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Abstract

Influence of current contour sections oriented at angle to the interface between media is analyzed on the base of the exact analytical solution for three-dimensional electromagnetic field problem for current flowing near conducting half-space. In the case of plane contours parallel to the boundary surface, the problem is simplified and the electromagnetic field is completely determined by the distribution of the vector potential. It is analyzed the possibility of using approximate mathematical model, in which the component of the electric intensity due to the current flow in the direction perpendicular to the surface is neglected. The error in applying the simplified mathematical model is found depending on the angle of inclination of the contour sections and the parameter that determines the distance from the surface of external sources with respect to the depth of field penetration. References 10, figures 4.

Key words: three-dimensional electromagnetic field, eddy current, analytical exact and approximate calculation methods.

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