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Ю.М. ВАСЕЦКИЙ

**ТРЕХМЕРНОЕ
КВАЗИСТАЦИОНАРНОЕ
ЭЛЕКТРОМАГНИТНОЕ ПОЛЕ
ТОКА, ПРОТЕКАЮЩЕГО ВБЛИЗИ
ЭЛЕКТРОПРОВОДНОГО ТЕЛА**

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THE INSTITUTE OF ELECTRODYNAMICS

Yu. M. VASETSKY

**THREE-DIMENSIONAL QUASI-STATIONARY
ELECTROMAGNETIC FIELD OF THE
CURRENT NEAR CONDUCTING BODY**

Kyiv
2019

This book is devoted to the further development of the theory for solving of a certain class of three-dimensional quasi-stationary electromagnetic field problems. The electromagnetic systems under examination include the contour of arbitrary spatial configuration with sinusoidal and pulse current located near conducting magnetizing half-space with induced eddy currents. The exact analytical solution is obtained without restrictions on the contour configuration, electrophysical properties of media and field frequency. For the strong skin effect the approximate solution in the form of expansion into an asymptotic series is also found. The general properties of field formation are revealed (the current density component perpendicular to the interface between the media is equal to zero; the more quick attenuation of inhomogeneous field in conducting medium in comparison with homogeneous field). The concept of a strong skin effect is expanded. The skin effect is considered to be strong, when the depth of field penetration is small compared to not only the characteristic dimensions of the conductive body, but also with the minimum distance from the field sources to the interface. The approximate impedance boundary condition is generalized to the interaction of inhomogeneous field with conductive medium.

The book is intended for the researchers, postgraduate students and students specialized in theory and calculations of electromagnetic fields.

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