UDC 517.95+517.98
DOI: 10.17377/mattrudy.2018.21.107

MATEMATICHESKIE TRUDY
2018, V. 21, N 1, 155–192

A RIEMANN–HILBERT PROBLEM FOR THE MOISIL–TEODORESCU SYSTEM

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In a bounded domain with smooth boundary in $\mathbb{R}^3$ we consider the stationary Maxwell equations for a function u with values in $\mathbb{R}^3$ subject to a nonhomogeneous condition $(u, v)_x = u_0$ on the boundary, where v is a given vector field and u_0 a function on the boundary. We specify this problem within the framework of the Riemann–Hilbert boundary value problems for the Moisil–Teodorescu system. This latter is proved to satisfy the Shapiro–Lopatinskij condition if an only if the vector v is at no point tangent to the boundary. The Riemann–Hilbert problem for the Moisil–Teodorescu system fails to possess an adjoint boundary value problem with respect to the Green formula, which satisfies the Shapiro–Lopatinskij condition. We develop the construction of Green formula to get a proper concept of adjoint boundary value problem.

Key words and phrases: Dirac operator, Riemann–Hilbert problem, Fredholm operators.

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Received
September 1, 2017
Revised
January 17, 2018
Accepted
March 22, 2018

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Translated into English:
Siberian Advances in Mathematics, V. 28, N 3, 207–232 (2018).
DOI: 10.3103/S1055134418030057