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The mixed boundary value problem for the inhomogeneous Cimmino system. (English)

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Summary: In this article, we first propose a kind of mixed boundary value problem for the inhomogeneous Cimmino system, which consists of first order linear partial differential equations in \mathbb{R}^4 . Then, by using the one-to-one correspondence between the theory of quaternion valued hyperholomorphic functions and that of Cimmino system's solutions, we transform the problem as stated above into a problem related to the ψ -hyperholomorphic functions in quaternionic analysis. Moreover, we show the boundedness, Hölder continuity, and generalized derivatives of a kind of singular integral operator ${}^\psi T_{\mathbb{C}^2}[g]$ related to ψ -hyperholomorphic functions in quaternionic analysis. Lastly, the solution of the mixed boundary value problem for the inhomogeneous Cimmino system is explicitly described.

MSC:

35F05 Linear first-order PDEs

Cited in 4 Documents

Keywords:

cimmino system; quaternionic analysis; ψ -hyperholomorphic functions; Cimmino singular integral operator; mixed boundary value problem

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