

A RIEMANN BOUNDARY VALUE PROBLEM IN A TWO-DIMENSIONAL COMMUTATIVE BANACH ALGEBRA

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Let \mathbb{B} be a two-dimensional commutative Banach algebra over \mathbb{C} with basis $\{1, \rho\}$, where $\rho^2 = 0$, and let E be a two-dimensional real linear subspace of \mathbb{B} . A function Φ defined on a domain in E with values in \mathbb{B} is called *monogenic* if it is Gâteaux differentiable at every point of the domain.

Let γ be a rectifiable Jordan curve in E bounding a domain D^+ . We study the Riemann boundary value problem for monogenic functions: to find a monogenic function Φ in $E \setminus \gamma$ satisfying

$$\Phi^+(\tau) = G(\tau) \Phi^-(\tau) + g(\tau), \quad \tau \in \gamma,$$

where G, g are given \mathbb{B} -valued functions on γ . Under the suitable conditions, we establish analogues of Sokhotski–Plemelj formulas, obtain explicit solutions of RBVPs (jump, homogeneous, and non-homogeneous), and show that solvability and the number of linearly independent solutions are determined by the index \varkappa of G .

This work was supported by a grant from the Simons Foundation (SFI-PD-Ukraine-00014586, S.A.P., R.P.P.) The second author was also supported by the budget program “Support for the development of priority areas of research” (KPKVK 6541230).

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