About sedately growing solutions of one generalized Cauchy-Riemann system

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Abstract: In this paper the existence of only zeroth sedately growing solution of the generalized Cauchy-Riemann system is proved in the case when the coefficients of the generalized Cauchy-Riemann system do not belong to the class $L_{p,2}(E)$, $p > 2$, namely $A(z) = az$, $B(z) = b\overline{z}$, where a, b are constants.

Consider the following problem: it is required to find regular solutions of the system

$$\partial w/\partial \bar{z} + azw + b\bar{z}\bar{w} = 0 \tag{1}$$

(where a, b are complex numbers), that in the neighborhood of the point of infinity satisfy the following condition

$$|w| < K|z|^N, \tag{2}$$

where N is an arbitrary nonnegative number and K is an arbitrary real number.

The problem, when coefficients of the system (1) from class $L_{p,2}(E)$, $p > 2$, (function $f(z)$ at point $z = x + iy$ belongs to the class $L_{p,2}(E)$, if

$$L_{p,2}(E) = \|f\|_{p,2} = \Big\{ \iint\limits_{|z|\le 1} |f(z)|^p dx\; dy \Big\}^{\frac{1}{p}} + \Big\{ \iint\limits_{|z|\le 1} \Big| z^{-2} f(\frac{1}{z}) \Big|^p dx\; dy \Big\}^{\frac{1}{p}}$$

have been studied by I.N.Vekua [1], and when coefficients are constants - by V.S.Vinogradov [2]. In our case, coefficients do not belong to the class $L_{p,2}(E)$, $p > 2$. We will try to find the solution of equation (1) in the form of representation [3]: $f(z) = F(z)e^{if(z)} + G(z)e^{ig(z)}$, where $F(z)$, $G(z)$ are arbitrary analytic functions, and $f(z)$, $g(z)$ are continuous functions.

Theorem 0.1. *If in a system* (1) *the coefficient a is a real number, then the problem* (1) , (2) *has only trivial solution.*

Keywords: Generalized Cauchy-Riemann system, sedately growing solutions

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