$\mu_f(r) = \max\{|a_{nm}|r_1^n r_2^m \colon n, m \geqslant 0\}, M_f(r) = \max\{|f(z)| \colon |z_1| = r_1, |z_2| = r_2\}$.

Let $\mathcal{K}(f,\theta) = \{f(z,t) = \sum_{n+m=0}^{+\infty} a_{nm} \exp\{2\pi i \theta_{nm} t\} r_1^n r_2^m \colon t \in \mathbb{R}\}$, where $\{\theta_{nm}\}$ is a sequence of positive integers such that its arrangement $\{\theta_k^*\}$ by increasing, i.e. $\{\theta_{nm} \colon (n,m) \in \mathbb{Z}_+^2\} = \{\theta_k^* \colon k \geqslant 0\}$, $\theta_{k+1}^* > \theta_k^*$, satisfies the condition $\theta_{k+1}^*/\theta_k^* \geqslant q > 1$ $(k \geqslant 0)$.

Let $\mathcal{A}_0^2$ be the class of analytic functions $f \in \mathcal{A}^2$ such that $\frac{\partial}{\partial z_2} f(z_1, z_2) \not\equiv 0$ in T. We say that a subset E of $\mathbb{R}^2$ is a *asymptotically finite logarithmic measure* $E \in \mathcal{E}$ if E is the Lebesque measurable in $\mathbb{R}_+^2$ and there exists an $r_0 \in \mathbb{R}_+^2$ such that $E \cap \Delta_{r_0}$ is a set of *finite logarithmic measure*, i.e.

$$\ln_2 - \operatorname{meas}(E \cap \Delta_{r_0}) := \iint\limits_{E \cap \Delta_{r_0}} \frac{dr_1 dr_2}{(1 - r_1) r_2} < +\infty, \ (E \in \mathcal{E}).$$

Theorem 1 ([1]). *Let $f \in \mathcal{A}_0^2$. For every $\delta > 0$ there exists a set $E = E(\delta, f) \subset T, E \in \mathcal{E}$ such that for all $r \in T \backslash E$ we obtain*

$$M_f(r) \leqslant \frac{\mu_f(r)}{(1 - r_1)^{1+\delta}} \ln^{1+\delta} \frac{\mu_f(r)}{1 - r_1} \cdot \ln^{1/2+\delta} r_2.$$

Theorem 2. *Let $f \in \mathcal{A}_0^2$, $f(z,t) \in \mathcal{K}(f,\theta)$. Then almost surely for $t \in \mathbb{R}$ there exist $r_0 \in \mathbb{R}_+^2$ and a set $E \in \mathcal{E}$ such that for all $r \in \Pi(R) \backslash E$ we have*

$$M_f(r,\omega) = \max\{f(z,\omega) \colon |z| = r\} \leqslant \frac{\mu_f(r)}{(1 - r_1)^{1/2+\delta}} \ln^{1/2+\delta} \frac{\mu_f(r)}{1 - r_1} \cdot \ln^{1/4+\delta} r_2.$$

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QUASI-ELLIPTIC FUNCTIONS

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Denote $\mathbb{C}^* = \mathbb{C} \backslash \{0\}$.

Definition. *A meromorphic in $\mathbb{C}$ function g is called* **quasi-elliptic**, *if there exist $\omega_1, \omega_2 \in \mathbb{C}^*$, $Im\frac{\omega_2}{\omega_1} > 0$, and $p \in \mathbb{C}^*$, $q \in \mathbb{C}^*$, such that for every $u \in \mathbb{C}$*

$$g(u + \omega_1) = pg(u), \ \ g(u + \omega_2) = qg(u).$$

For this class of functions we construct analogues of classic $\wp$, ζ and σ Weierstrass functions. Also a connection between quasi-elliptic and p-loxodromic [1] functions is obtained.

References

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SOME GENERALIZATIONS OF p-LOXODROMIC FUNCTIONS

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Denote $\mathbb{C}^* = \mathbb{C}\setminus\{0\}$ and let $q, p \in \mathbb{C}^*$, $|q| < 1$.

Definition. *[1] A meromorphic in $\mathbb{C}^*$ function f is said to be p-***loxodromic of multiplicator** *q if for every $z \in \mathbb{C}^*$*

$$f(qz) = pf(z).$$

For $z \in \mathbb{C}^*$ consider the equation of the form

$$f(qz) = p(z)f(z), \tag{1}$$

where $p(z)$ is some function. If $p(z) \equiv const$, then meromorphic solution of this equation is p-loxodromic function. In particular, if $p(z) \equiv 1$, we have classic loxodromic function. It was studied in the works of O. Rausenberger [2], G. Valiron [3] and Y. Hellegouarch [4]. The class of loxodromic functions is denoted by $\mathcal{L}_q$.

For certain functions $p(z)$ holomorphic solutions of equation (1) are found. These solutions will be some generalizations of p-loxodromic functions.

First, consider the functional equation of the form

$$f(qz) = \frac{1}{1-z}f(z),\ z \in \mathbb{C}^*. \tag{2}$$

Define the entire function with the zero sequence $\{q^{-n}\}$, where $n \in \mathbb{N} \cup \{0\}$, $0 < |q| < 1$,

$$H(z) = \prod_{n=0}^{\infty}(1 - q^n z).$$

Theorem 1. *Every holomorphic in $\mathbb{C}^*$ solution of (2) has the form $f(z) = CH(z)$, where C is a constant.*