References

[1] *Khoroshchak V.S., Khrystiyanyn A.Ya., Lukivska D.V.* A class of Julia exceptional functions // Carpathian Math. Publ. 2016, 8 (1). 172–180. doi:10.15330/cmp.8.1.172-180.

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.*

Also, we consider the functional equation of the form

$$f(qz) = \frac{1}{z} f(z),\ z \in \mathbb{C}^*. \tag{3}$$

Definition. *[1] The function*

$$P(z) = (1 - z) \prod_{n=1}^{\infty} (1 - q^n z) \left(1 - \frac{q^n}{z}\right)$$

is called the **Schottky-Klein prime function.**

Theorem 2. *Every holomorphic in* $\mathbb{C}^*$ *solution of (3) has the form* $f(z) = CP(-z)$*, where* C *is a constant.*

References

[1] *Khoroshchak V.S., Khrystiyanyn A.Ya., Lukivska D.V.* A class of Julia exceptional functions // Carpathian Math. Publ. 2016, 8 (1). 172–180. doi:10.15330/cmp.8.1.172-180.

[2] Rausenberger O. Lehrbuch der Theorie der Periodischen Functionen Einer variabeln. Druck und Ferlag von B.G.Teubner, Leipzig, 1884.

[3] Valiron G. Cours d'Analyse Mathematique, Theorie des fonctions, 2nd Edition. Masson et.Cie., Paris, 1947.

[4] Hellegouarch Y. Invitation to the Mathematics of Fermat-Wiles. Academic Press, 2002.

Category of ambiguous representations

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It is well known since the pioneering work [1] that a computer program is described by the corresponding *predicate transformer*, i.e. the mapping that transforms a valid knowledge about program input into a valid knowledge about the output. It is also commonly agreed [3] that the proper domains containing such predicates are directed complete continuous posets, and the predicate transformers are Scott continuous. Hence a viable choice for description of *deterministic* programs is the category $\mathcal{S}\mathrm{em}_0$ of all continuous semigroups [2] with bottom elements and their Scott continuous bottom-preserving (not necessarily meet-preserving) mappings.

Unfortunately this category is inappropriate for *nondeterministic* programs, or, equivalently, for game situations, where a player can play different moves in the same position. We propose to use a relation (= a multivalued mapping) here: