Dynamic Rays for Transcendental Holomorphic Self-maps of $\mathbb{C}^*$

DAVID MARTÍ PETE

Departament de Matemàtica Aplicada i Anàlisi,
Universitat de Barcelona,
Gran Via de les Corts Catalanes 585, 08007–Barcelona,
Spain

E-mail address: david@maia.ub.es
URL: http://www.maia.ub.es/~david

I am interested in the iteration of holomorphic self-maps of the punctured plane $\mathbb{C}^* = \mathbb{C} \setminus \{0\}$ for which both zero and infinity are essential singularities. These maps are of the form $f(z) = z^n \exp(g(z) + h(1/z))$ with $n \in \mathbb{Z}$ and $g(z), h(z)$ non-constant entire functions. In particular, I would like to understand what is the structure of the escaping set $I(f)$, the set of points whose orbit accumulates to zero and/or infinity.

In the setting of transcendental entire functions, A. Eremenko conjectured that every $z \in I(f)$ could be joined with ∞ by a curve in $I(f)$. In analogy to what G. Rottenfußer, J. Rückert, L. Rempe and D. Schleicher proved in [1] for functions in class $\mathcal{B}$, we show that this property holds for a class of functions whose singular set is bounded away from zero and from infinity and satisfy some technical conditions which are related to the notion of finite order.

References

[1] Günter Rottenfußer, Johannes Rückert, Lasse Rempe and Dierk Schleicher *Dynamic rays of bounded-type entire functions*, Ann. of Math. (2) **173** (2011), no. 1, 77–125.