# Iteration of rational functions over the complex $p$-adic numbers

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**Abstract**

Let $\mathbb{C}_p$ be the field of the complex $p$-adic numbers and let $R \in \mathbb{C}_p(z)$ be a rational function of degree $\deg(R) \geq 2$. We divide this talk into two parts.

The first part describes the dynamical system generated by the family of iterates of $R$, where $R$ is acting in the projective space $\mathbb{P}(\mathbb{C}_p) = \mathbb{C}_p \cup \{\infty\}$. We will define the Fatou and Julia sets in the p-adic setting, describe some of their properties and provide examples.

In the second part, we will explain how to extend the dynamical system generated by the iterates of R over the Berkovich projective line $\mathbb{P}_B$. We will define the Berkovich Fatou and Julia sets and explain their relation with the p-adic Fatou and Julia sets.

We will conclude by addressing the existence of wandering domains in the p-adic setting and present some of our recent work.

# References

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