

About Properties of Ultrametric Meromorphic Solutions of Some Types of Difference Equations

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Abstract

We consider an algebraically closed field $\mathbb{K}$, complete for an ultrametric absolute value. We denote by $\mathcal{A}(\mathbb{K})$ the $\mathbb{K}$ -algebra of entire functions and by $\mathcal{M}(\mathbb{K})$ the field of meromorphic functions on $\mathbb{K}$.

In recent years, many works have focused on the behavior of meromorphic solutions to difference equations, both in the complex and ultrametric cases. Significant results have been obtained regarding the growth of such solutions.

In this talk, We extend some results from the complex case to ultrametric difference equations of Malmquist and Painlevé types. In particular, we study equations of the form

$$\sum_{j=1}^n A_j y(x + c_j) = \frac{P(x, y(x))}{Q(x, y(x))},$$

where P and Q are relatively prime polynomials in y with rational coefficients.

References

- [1] W. Bergweiler, K. Ishizaki, N. Yanagihara, Meromorphic solutions of some functional equations, *Methods and Applications of Analysis*, **5**(3), 248–258 (1998).
- [2] S. Bourourou, A. Boutabaa, and T. Zerzaihi, “On the growth of solutions of difference equations in ultrametric fields, ”*Indagationes Mathematicae. New Series* **27**(1), 112–123 (2016).
- [3] H. Boughaba, S. Bouternikh, and T. Zerzaihi, “Results on the Growth of Meromorphic Solutions of some Functional Equations of Painlevé and Schröder Type in Ultrametric Fields, ”*P-Adic Num Ultrametr Anal Appl* **16**, 14–22 (2024)