

Puiseux series dynamics and leading monomials of escape regions

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We will use non-Archimedean methods to prove a result in classical holomorphic dynamics. In particular, we will prove a result in complex cubic polynomial dynamics using cubic polynomial dynamics over the field of formal Puiseux series.

More precisely, for each $p \geq 1$, we consider the affine algebraic curve \mathcal{S}_p formed by all monic and centered cubic polynomials with a marked critical point which has period p under iterations. Each unbounded hyperbolic component of \mathcal{S}_p , called an escape region, has an associated vector of leading monomials which encodes the asymptotic behavior of the periodic critical orbit. We show that this vector determines the escape region, giving a positive answer to a question posed by Bonifant and Milnor.