

Newton-like components in the Chebyshev-Halley family of degree n polynomials

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We study the Chebyshev-Halley methods applied to the family of polynomials $f_{n,c}(z) = z^n + c$, for $n \geq 2$ and $c \in \mathbb{C}^*$. We prove the existence of parameters such that the immediate basins of attraction corresponding to the roots of unity are infinitely connected. We also prove that, for $n \geq 2$, the corresponding dynamical plane contains a connected component of the Julia set, which is a quasiconformal deformation of the Julia set of the map obtained by applying Newton's method to $f_{n,-1}$.