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The Julia sets of Chebyshev's method with small degrees

Given a polynomial p , the degree of its Chebyshev's method C_p is determined. If p is cubic then the degree of C_p is found to be 4, 6 or 7 and we investigate the dynamics of C_p in these cases. If a cubic polynomial p is unicritical or non-generic then, it is proved that the Julia set of C_p is connected. The family of all rational maps arising as the Chebyshev's method applied to a cubic polynomial which is non-unicritical and generic is parametrized by the multiplier of one of its extraneous fixed points. Denoting a member of this family with an extraneous fixed point with multiplier λ by C_λ , we have shown that the Julia set of C_λ is connected whenever $\lambda \in [-1, 1]$. Joint work with Tarakanta Nayak.