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Polynomial vector fields on \mathbb{C}

The study of polynomial vector fields $dz/dt = P(z)$ on \mathbb{C} with complex methods was initiated by Douady, Estrada and Sentenac, who introduced a combinatorial invariant and an analytic invariant for generic vector fields. Together with Arnaud Chéritat, we introduced a new invariant, the periodgon, for polynomial vector fields of the form $dz/dt = z^k - \varepsilon$. In joint work with Martin Klimes, we generalized the periodgon for polynomial vector fields on \mathbb{C} . The periodgon is uniquely defined for “generic” vector fields, but genericity here is different from the notion introduced by Douady, Estrada and Sentenac. Furthermore, when the vector field varies, the deformation of the periodgon allows an immediate derivation of the bifurcation diagram. The study of polynomial vector fields on \mathbb{C} was motivated by their importance in the study of unfoldings of parabolic points of diffeomorphisms and other similar questions.