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Unlikely intersections in arithmetic dynamics

Motivated by the classical conjectures formulated independently by Bombieri-Masser-Zannier, and also by Pink and Zilber regarding intersections of subvarietes X of semiabelian varieties G with unions of algebraic subgroups of G of codimension larger than the dimension of X, we formulate the following dynamical analogue. In our setting, the ambient space G is the affine space $\mathbb{A}^N$ endowed with the coordinatewise action Φ of N one-variable polynomials $f_1, \ldots, f_N$ of degree larger than 1, which are not conjugated to monomials or to $\pm$Chebyshev polynomials. Then for a subvariety X of G of dimension d, it is expected that its intersection with the union of all irreducible subvarieties of G of codimension larger than d, which are periodic under the action of Φ would not be Zariski dense in X, unless X is contained in a proper, irreducible periodic subvariety of G. In a joint work with Khoa Nguyen, we proved this conjecture when X is either a curve, or it has codimension at most equal to 2.