Ramification avoidance and a dynamical Mordell-Lang conjecture

Tom Tucker, University of Rochester

The theorem of Skolem-Mahler-Lech shows that if f: C^g --> C^g is a linear map and z is any point in C^g, then for any subvariety V of C^n, then the set of n such that f^n(z) is in V forms a finite union of arithmetic progressions. Recently, it has been asked if the same result holds for any morphism f: X --> X from a variety to itself. When the map is defined over a number field, the theorem will hold whenever there is a prime p such that the orbit of z under f avoids the ramification locus of f modulo p. A "random map" heuristic indicates that one may not be able to find such a prime in dimension 4 or more. There are many families of maps when one *does* expect to be able to find such a prime. We will discuss which families this is likely to hold for.