

Dynamical Mordell–Lang problems

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007 Kemeny Hall, 4:00 pm
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Abstract

The actions of groups on sets, and the orbits of points under such actions, appear as a basic topic in abstract algebra. When one endows the set with an algebraic structure (such as a vector space or variety) and considers the intersections of orbits of points with smaller algebraically defined sets (say subspaces or subvarieties), a number of interesting questions, some solved and some unsolved, quickly arise. Skolem's theorem on linear recurrence sequences is naturally phrased in terms of orbits of points in vector spaces under the action of a group generated by single matrix. Faltings' theorem (nee the Mordell conjecture) follows from a statement about the orbits of points under groups of translations of abelian varieties. And some natural questions about the complex dynamics of rational functions (and specifically polynomials) can be viewed from this perspective as well. We will describe the connection between these problems, the methods used to treat some of them, and some attempts at formulating a general explanation of all of these phenomena.