The Allegheny College Mathematics Department
Presents Guest Speaker

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Dynamical Systems from a Number Theorist's Perspective

Henderson Auditorium, Quigley Hall
Allegheny College
4:00 pm Thursday, August 30, 2012

Abstract: A classical problem in the theory of dynamical systems is to take a rational map $f(z) = F(z)/G(z)$ and to describe the behavior of points under iteration

$$f^n(z) = f \circ f \circ \dots \circ f(z).$$

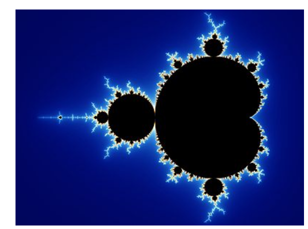
The *f-orbit* of a point b is the set of images of b under the iterates of f,

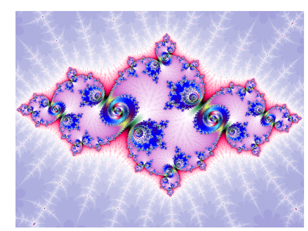
$$\text{Orbit of } b = \{\, b, f(b), f^2(b), f^3(b), \dots \,\}.$$

The points with finite orbit are called *preperiodic points*. They play a particularly important role in the dynamics of f. For a number theorist, it is natural to take $F(z)$ and $G(z)$ to be polynomials with integer coefficients and to study the orbits of rational numbers b. In this talk I will survey some of the known results and some of the outstanding conjectures related to this number-theoretic view of dynamics. Typical problems include:

(1) How many rational numbers can be preperiodic points?

(2) For which rational maps f can the orbit of a rational number b contain infinitely many integers?





Refreshments will be available after the talk.

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For more information, contact Harald Ellers at hellers@allegheny.edu.