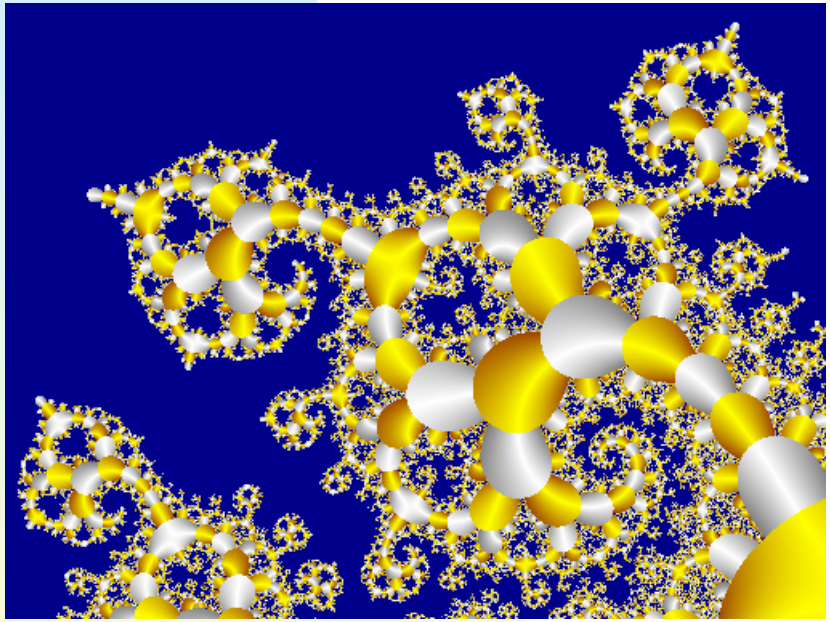
Session overview



- More on orbits
- Announcements:
  - Imaging Systems Certificate
  - Digital Imaging Talk tomorrow 7th hr in GM Room
    - http://www.rose-hulman.edu/mathconf/index.php

Eventual fixed points

- x_0 is an ***eventual fixed point*** if

$$\exists N \ni \forall n \geq N, F^{n+1}(x_0) = F^n(x_0)$$

- Example:
  - Suppose F(x) = |x|
  - x_0 = -2 is an eventual fixed point since it's orbit is { -2, 2, 2, 2, … }
  - Here all n ≥ N = 1 satisfy $F^{n+1}(x_0) = F^n(x_0)$

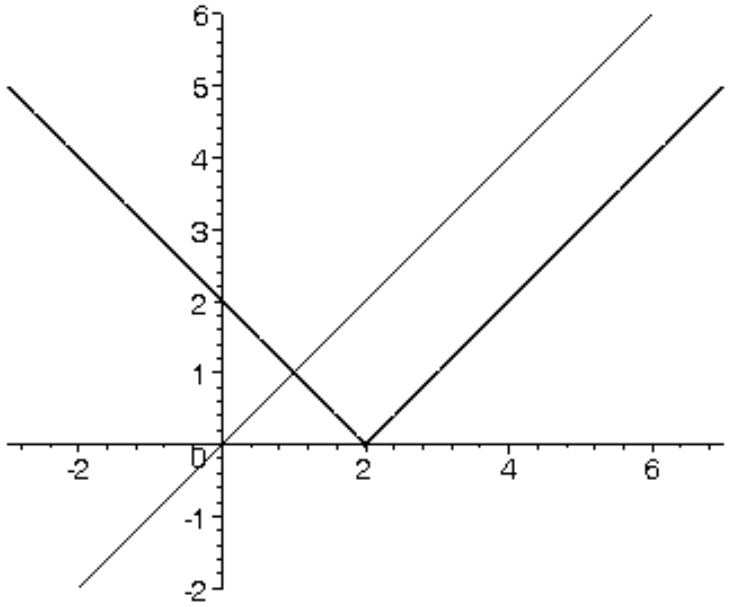
Quiz

- For each orbit, decide if there exists an N that yields an eventual fixed point. If so, what is N?
  - { 1, 3, -6, 2, 4, 5, 5, 5, 5, 5, 5, … }
  - { 5, -1, 6, 4, 7, 2, 3, 1, 2, 3, 1, 2, 3, 1, 2, 3, 1, … }
  - { 6, 4, 3, -1, 2, -1, 2, -1, 2, … }

Eventual periodic points

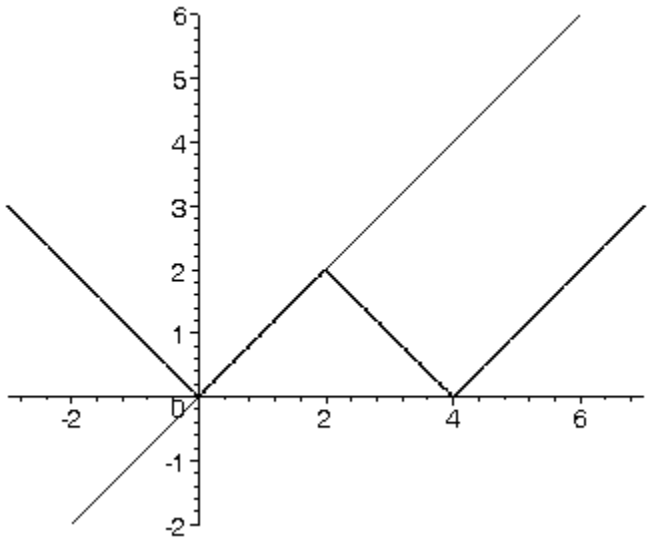
- x_0 is an ***eventual periodic point*** of period p if $\exists N \ni \forall n \geq N, F^{n+p}(x_0) = F^n(x_0)$
- Example:
  - Suppose F(x) = |x-2|
  - x_0 = -2 is an eventual periodic point of period 2 since it's orbit is { -2, 4, 2, 0, 2, 0, 2, 0, 2, 0, … }
  - Here all $n \geq N = 2$ satisfy $F^{n+2}(x_0) = F^n(x_0)$

F(x) = |x-2|



- Fixed point:
- Period 2 points:
- Eventually fixed points: Eventually periodic points of period 2

$F^2(x)$ for $F(x) = |x-2|$



- $F^2(x) = F(|x-2|) = |\,|x-2| - 2|$
- The graph to the left is quite revealing. Why?
- What can you say about most of the points in [0,2]?

Quiz

- Do the handout with questions on orbits for a linear map