Dynamical Systems
Homework Three
Due January 17, 2013

Figure 1: A rabbit. Figure source: Larry D. Moore. CC BY-SA 3.0. `http://en.wikipedia.org/wiki/File:Rabbit_in_montana.jpg`

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Please do these before class on Thursday. We will discuss these exercises in class.

In class last time I motivated the logistic equation:

$$x_{n+1} = rx_n(1 - x_n) \,, \tag{1}$$

where x is a population ranging from 0 to 1, and r is a parameter (the growth rate of some sort) that can be varied from 0 to 4.

Using python programs, explore and classify the behavior orbits of the logistic equation for different r values. What sort of equilibria do you see? Are there fixed points? Any cycles?

Experiment with different ways of visualizing your results. It might help in some cases to plot more than one orbit on the same axis.

(This is a deliberately vague and open-ended assignment. Spend a while exploring and having fun, but don't obsess over it.)