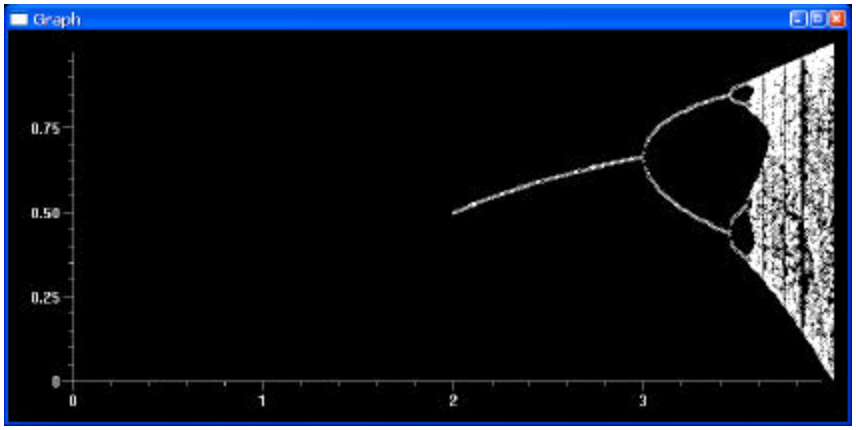
PHY307, Science and Computers I
Lab #5, September 17-20, 2002

The Curves of Chaos - KEY



Found using bifurcatelogistic.py:

```
## This Python code uses the graph portion of the visual library (VPython)
## to create a bifurcation diagram for the logistic map.
##
## The points on the plot show how the long term behavior of the map
## depends on the parameter a. When the map converges to a single value,
## there will be a single line. The branching or bifurcation into more
## complex behavior is seen as a increases (with occasional reversions to
## simpler behavior.)

from visual.graph import *

## Set up an empty plot
mydots = gdots()
Ninitial = 100                ## How many times to apply map w/o plotting.

## For eacah a from 2 to 4 in steps of 0.01, plot the "attractor", that
## is, the pattern that the map settles down into.

for a in arange(2,4,0.01):
    xA = 0.25

    ## "Warm up" the variable - repeat the map a large number of times,
    ## without plotting.

    for j in range(Ninitial):
        xA = a * xA * (1.-xA)

    ## Now plot 64 points in the map - if they are identical, they will
    ## appear as a single point. If the orbit has period-2, there will be
    ## 2 apparent points, consisting of 32 overlapping points.

    for k in range(64):
        xA = a * xA * (1.-xA)
        mydots.plot(pos=(a,xA))   ## plot the "population" vs. a
```