

NUMERICAL ANALYSIS, MATH318, FALL 2009, SHEPHERD UNIVERSITY  
ASSIGNMENT 6  
DUE FRIDAY, OCTOBER 9, 2009

**1. Read and understand.** Chapter 3, Sections 3, 4

**2. Hand-in.** Be prepared to hand-in problems

- Section 3.3 2, 4, 12
- Section 3.4 1, 2, 4, 6, 8, 10, 16

**3. Plot.** Make a plot of  $x_n$  versus  $\mu$  for the equation  $x_{n+1} = \mu x_n(1 - x_n)$  where  $x_n \in [0, 1]$ . We want to see how the (stable) fixed point(s) vary (or not) with respect to  $\mu$  for  $\mu \in [2.9, 4)$ .

To do this,

- pick  $\mu$ ,
  - pick  $x_0$ ,
  - iterate our map  $x_{n+1} = \mu x_n(1 - x_n)$  100 times without plotting ,
  - continue to iterate  $x_{n+1} = \mu x_n(1 - x_n)$  several hundred more times, only now plot each point  $(\mu, x_n)$ ,
  - back to beginning.
- done.

Pick enough values for  $\mu$  so that your plot appears to vary smoothly from  $[2.9, 4)$ .

Hand in your beautiful plot, which will be scored on its subjective beauty.