Numerical Methods I

Lab Session 2

September 18, 2003

The sequence of simple iteratates of the *logistic map*

$$g(x) = 1 - m\,x^2 \tag{1}$$

converges for some values of m, for others it displays periodic or non-periodic, but bounded behavior. Investigate the behavior of this sequence as a function of $m \in [0, 2]$ as follows.

1. For each value of m, compute a number of *pre-iterations* which you discard.
2. Store the next few iterations.
3. Plot m vs. these stored values.
4. Repeat for different values of m. How do you interpret the final plot?

Note: This type of plot is called a bifurcation diagram. For more information, see the section on the logistic map in Süli and Mayers, Chapter 1.