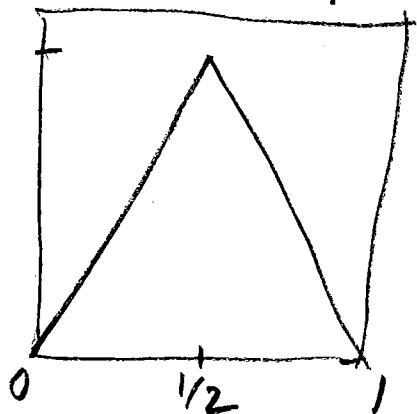


Nov 10 Review 1

Chaos: complicated behavior in time may have simple causes.

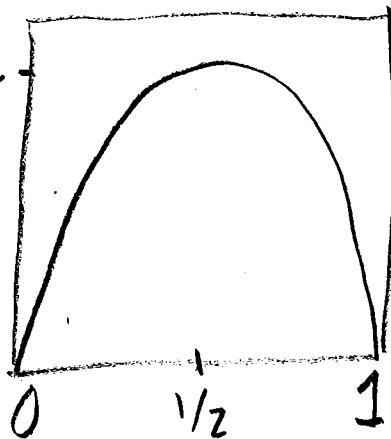
[Fractals: complicated behavior in space may have simple causes.]

Tent map



$$T(x) = \begin{cases} 5 \cdot x & x \leq 1/2 \\ 5 - 5 \cdot x & x > 1/2 \end{cases}$$

Logistic map



$$L(x) = 5 \cdot x \cdot (1 - x)$$

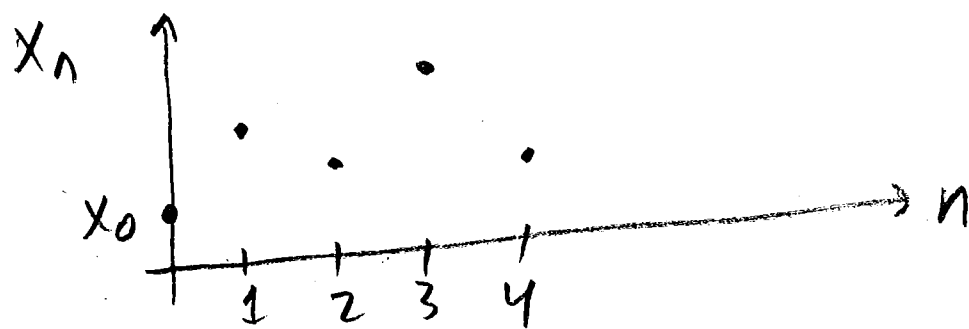
Produce iterates of some initial point

$$x_0: \quad x_1 = L(x_0), \quad x_2 = L(x_1), \quad x_3 = L(x_2),$$

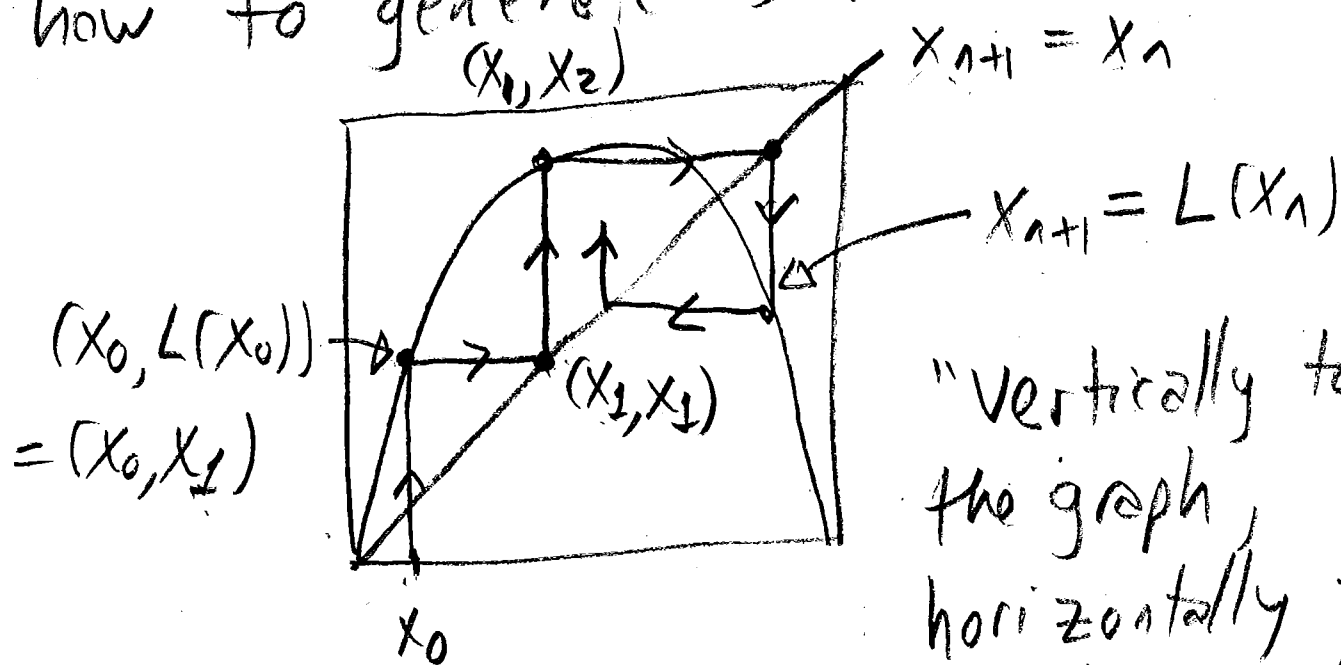
...

Find a graphical representation of these iterates

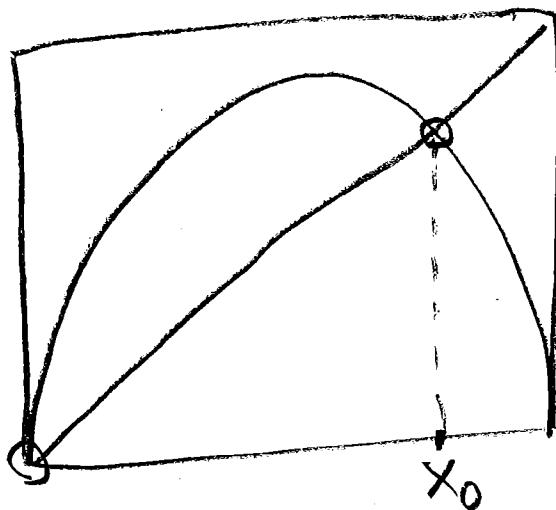
The time series is a plot of (n, X_n)



The graphical iteration process illustrates how to generate successive values



"Vertically to the graph, horizontally to the diagonal."



The intersections of the graph and the diagonal are fixed points.

Histograms: divide the range of values into bins and keep track of how often the iterates visit each bin.

