

Chapter 13: Histograms of Chaotic Orbits

Worksheet to accompany

David Feldman, *Chaos and Fractals: An Elementary Introduction*,
Oxford University Press, 2012

In this exercise you will again use https://dpfeldman.github.io/Chaos/time_series.html to iterate the logistic equation is: $f(x) = rx(1 - x)$. We will consider the parameter value $r = 4$.

1. Do this exercise in groups of two.
2. Use either the initial condition $x_0 = 0.200$ or the initial condition $x_0 = 0.201$.
3. Use the program to make 2000 iterates.
4. You will write down iterates on your post-its. But not all 2000 iterates! Instead, write down around a dozen iterates: one iterate on each post-it. Start on the iterate that corresponds to the birthday of the oldest person in your group. For example, if that person's birthday was May 23, start with iterate 523¹.
5. Then take your post-its-with-iterates and stick them on the histogram on the board that corresponds to your initial condition.

¹Or, if you're from outside the US, you could start with iterate 235. It doesn't matter.