

Homework 6

Due: Thursday 12 October

In this homework you will investigate another discrete time nonlinear dynamics – the Henon map. It is similar to the Sierpinski map as it involves two dynamical variables x and y . The update equation is

$$\begin{aligned}x_{n+1} &= y_n + 1 - ax_n^2 \\y_{n+1} &= bx_n\end{aligned}$$

For this homework we will take $a = 1.4$ and $b = 0.3$

1. Modify the Sierpinski code you worked with in lab 6 to implement the Henon dynamics. Include your modified code in your writeup.
2. The Henon map for these parameter values exhibits chaos. Show that the strange attractor has fractal characteristics (you may want to include snapshots of pieces of the attractor at different magnifications)
3. Calculate, using your code, the (box counting) fractal dimension of the Henon map.