Eighth homework set

Due at the beginning of class on Thursday, Nov 15. No late homework will be accepted.

Fold your homework paper vertically and PRINT your name on the outside.

1. Recal that the fixed points of a function f are the values of x where the graph of y = f(x) intersects the graph of y = x. Suppose f is continuous, that is, the graph of f has no breaks or jumps. If f has only two fixed points, call them a and b, can both be stable? Give an example if you think this is possible. If you think it is is impossible, explain why. Hint: draw a few sketches of functions. Try to make both fixed points stable.

2. In this graph, the bold lines are the function to be iterated. For reference, the bins 1, 2, 3, and 4 are shown on both the x and y-axes.



(a) List the allowed bin to bin transitions.

(b) Draw the transition graph for the IFS drven by iterating this function.

(c) Find the dimension of the fractal generated by this driven IFS. (Hint: consider the transition graph. Are there romes?)

3. Consider the doubling map, f(x) = 2x. If x - y = 1/128, find the smallest value of n for which $f^n(x) - f^n(y) > 1000$. "Even the tiniest change" Hint:2x - 2y = 2(x - y).