

Homework Assignment Five

Chaos and Complex Systems

Due Wednesday October 27, 2006.

Note: Please be sure to include a list of the references you consulted and any students you worked with.

1. Complete homework four.
2. Consider the cellular automata that corresponds to rule 150.
 - (a) Write out the rule in pictorial form.
 - (b) Start with a random initial configuration of width 16. By hand, iterate the CA for 5 generations.
 - (c) Start with a single seed. Iterate the CA by hand for as many generations as you have the strength and motivation.
3. Convert the following numbers from base 10 to binary:
 - (a) 3
 - (b) 16
 - (c) 15
 - (d) 33
4. Convert the following numbers from binary to base 10:
 - (a) 1
 - (b) 10
 - (c) 111
 - (d) 1010
5. **Optional, and potentially challenging.** Argue that the set of rational numbers is countable.