Assignment #11:
Chaos System Model

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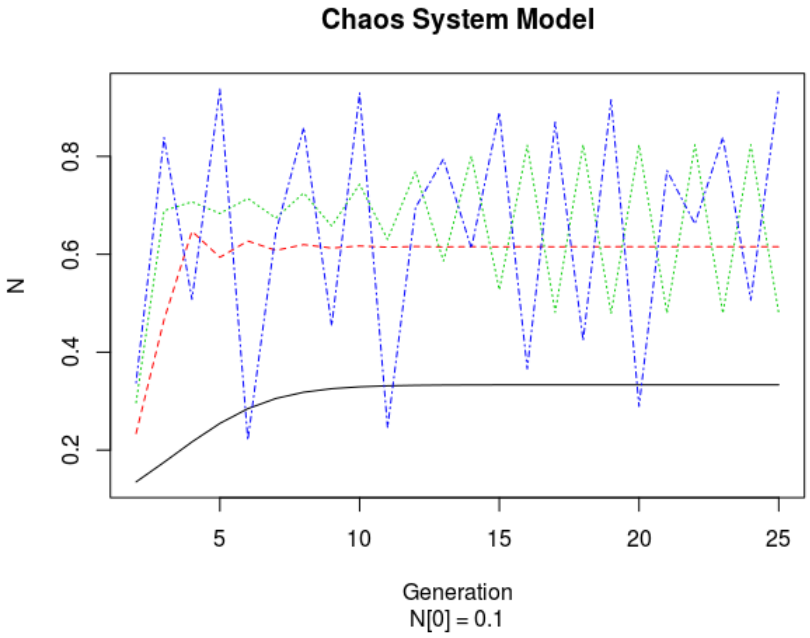
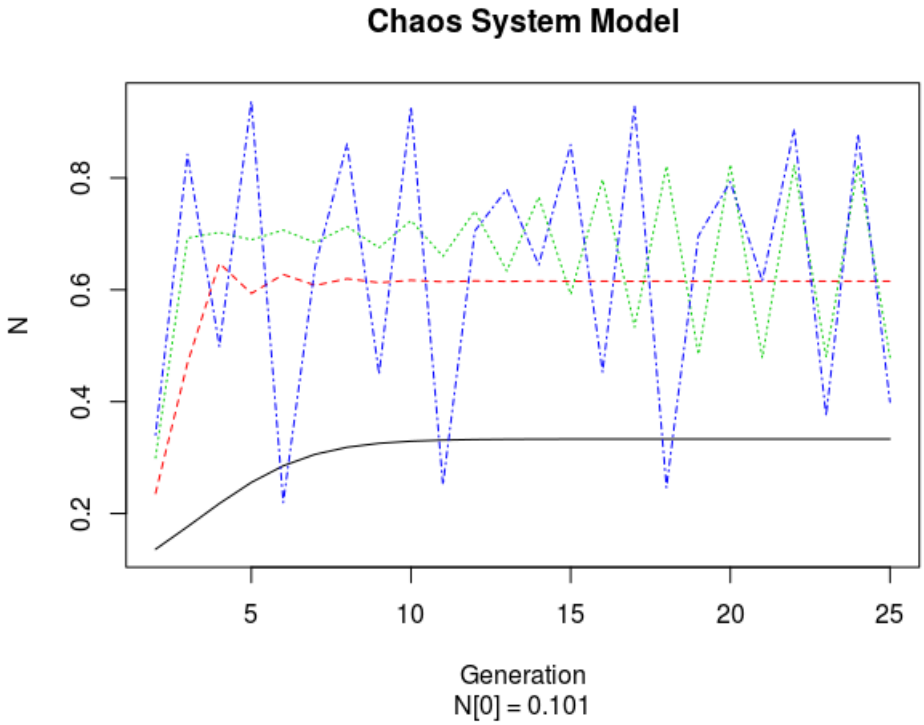
1 Overview

In this lab, I am to develop a chaos system model– a model that is sensitive to changes to conditions and parameters. Here, I am to analyze results from my model output. Learn the effects of small changes of variables in the program. Learn how it differs from other modeling approaches .

2 N[0] = 0.100



3 N[0] = 0.101



3.0.1 Summary

The chaos system model is similiar to a deterministic model by having predetermined variables. The differences are that that the chaos model approach shows behavior like that of a stochastic model and is sensitive to small changes in the program variables.

When looking at the graph, as the growth constant a gets larger, the more the results shows an oscillating behavior.

Though the chaos system model is fundamentally a logistic, it is different by not being bounded by a set carrying capacity.

4 C Code

```c
/**
 * Name: Timmy Nguyen
 * Date: 4/27/17
 * BIOL 480 SPRING 2017
 * ASSIGNMENT #11: Chaos System Model
 */
#include <stdio.h>

int main(int argc, char const *argv[])
{
  // INIT VARIABLE
  double a;

  // PROMPT USER INPUT
  printf("Enter value for variable a: \n");
  scanf("%lf", &a);

  // CREATING ARRAY
  double N_[1000];
  N_[0] = 0.101;
  int counter = 0;

  // MAIN CODE HERE
  for (int gen = 0; gen < 25; gen++)
  {
    N_[gen + 1] = a * N_[gen]*(1 - N_[gen]);
    counter++;
  }

  // OUTPUT DATA TO EXTERNAL FILE
  FILE *outfile;

  outfile = fopen("output.txt", "w+");
  for (int i = 0; i < counter; ++i)
  {
    /* code */
    fprintf(outfile, "%7.6f\n", N_[i] );
  }
  fclose(outfile);
  return 0;
}
```