Logistic Map

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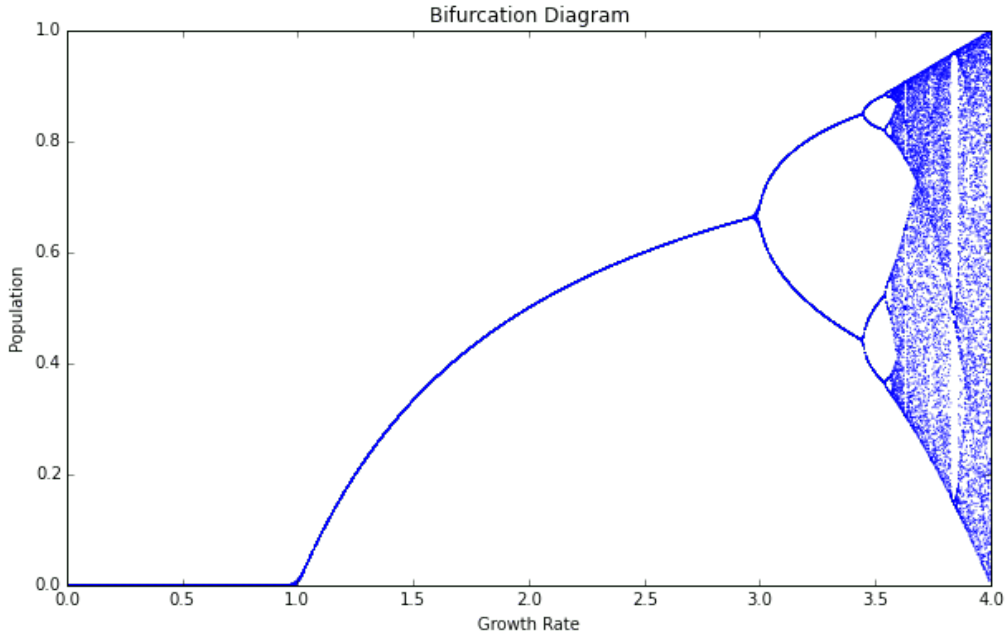
Basis of Logistic Map

The logistic map function is modeled by the equation pictured below. By its recursive nature, the function takes two inputs and modifies one of them using the previous iteration of one input and the scaling of the other input. While the population (x) input does not affect the function much, the growth rate (r) input largely determines the shape of the outputs.

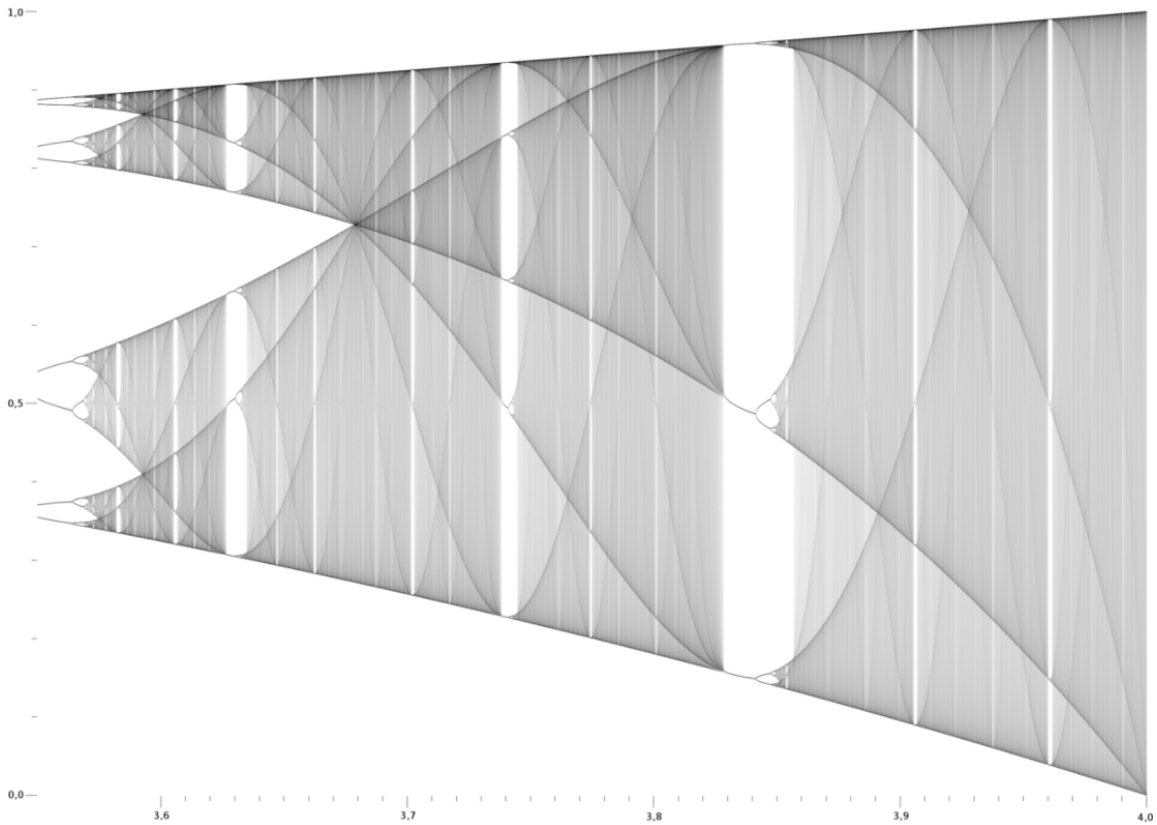
$$x_{n+1} = r \cdot x_n \cdot (1 - x_n)$$

Bifurcation Diagram



The above image visualizes the values of the function that are visited by the iterations of the function dependent on the initial parameters.

Chaos of the Logistic Map



The above image shows a magnification of the latter end of the previous image, and examines the critical points of the model, especially after the significant value of 3.56995, where chaos begins to become prevalent. Afterwards, there are specific parameter sets produce cyclical iterations that act like simple systems, but these are simply islands of stability.