

Dynamical Systems
Homework Seven
Due January 31, 2013



Figure 1: Alexander Ljapunov Figure source: http://en.wikipedia.org/wiki/File:Alexander_Ljapunow_jung.jpg.

1. Write a program that calculates the Lyapunov exponent λ for the logistic equation and then plots λ as a function of r . This is the “icicles” plot that I showed in class on Monday afternoon. This might be a slightly tricky programming assignment. If you need help, let me know.
2. Suppose a dynamical system has a Lyapunov exponent of 0.7. Two initial conditions are 0.05 apart. Approximately how far apart would you expect them to be after two iterations? How far apart would you expect them to be after six iterations?
3. Suppose a dynamical system has a Lyapunov exponent of -0.5 . Two initial conditions are 0.1 apart. Approximately how far apart would you expect them to be after two iterations? How far apart would you expect them to be after six iterations?