SEMINAR IN PHYSICS
FRIDAY, May 2, 2014
3:30-4:25 – Ross 0220
Refreshments

The Behavior of Coupled Logistics Maps

David Garrett (UNC Physics student)

This project examines the effects of coupling on the behavior of the logistic map. The logistic map is an equation that is used in an iterative process, i.e. one input value produces one output value which then serves as the input for the next iteration. This process results in various behaviors: transient (impermanent,) periodic, and chaotic. Such behaviors are very important in the field of dynamics (the study of motion in physical and abstract systems). The logistic map gives us insight into behaviors exhibited by many systems.

We chose to couple two logistic maps together, allowing the one to feed into the other as they take turns iterating. This approach produces more sophisticated behavior and allows us to more accurately model the behavior of real systems. Of particular interest to this project are long-lived transients, also known as "meta-stable" states. A meta-stable state exhibits periodic behavior that looks like it will continue indefinitely, but eventually undergoes a fairly sudden transition into a different and more final periodic behavior.

Gravitational Waves and the Origin of the Universe

Jeremiah Schwartz (UNC Student)

The advent of general relativity, first proposed by Albert Einstein in 1916, has reframed the laws of gravitation in modern physics. One curious result of general relativity predicts the existence of gravitational waves. Gravitational waves are to waves in the fabric of space-time as water waves are to the surface of a pond.   Recent research has suggested that gravitational waves, and their effect on light, can tell us much about the beginnings of our universe.