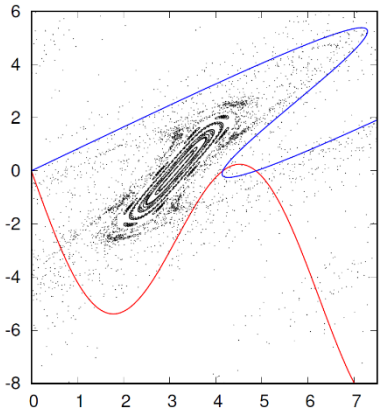
Dynamical Systems with computer assistance

Mentor: Jorge L. Gonzalez

Description: The projects will focus on the computation, analysis and application of coherent structures such as periodic orbits, invariant manifolds, connecting orbits in dynamical systems. These dynamical landmarks offer insight into complicated nonlinear systems often encountered in the physical, biological sciences and Economics. The computer is a powerful tool for these investigations. We will implement several numerical methods to compute these objects. On the other hand, the presence of strong nonlinearities in many interesting applications, combined with the propagation of round off errors, raises important questions about the meaning and fidelity of the computations and predictions. We will explore ways of using the computer to establish rigorous error bounds resulting in precise theorems about these systems. On this path, we will ensemble techniques from Topology, Analysis, and even Number Theory.



Activities: Regular group meetings and informal presentations. Participants are expected to work individually and in groups. Meetings with Georgia Tech students and Faculty. Professional development sessions organized by the School of Mathematics at GT. Poster presentation towards the end of the program.

Tentative dates: May 31, 2021 to July 23, 2021. The starting date is flexible. The REU program will run for 8 weeks.