1116-00-2999 **J.D. Mireles James***, Florida Atlantic University, Boca Raton, FL 33431. *Rigorous Computation of (Un)Stable Manifolds and Connecting Orbits*

The study of dynamical systems begins with consideration of basic invariant sets such as equilibria and periodic solutions. After local stability, the next important question is how these basic invariant sets fit together dynamically. Connecting orbits play an important role as they are low dimensional objects which carry global information about the dynamics. This principle is seen at work in the homoclinic tangle theorem of Smale, in traveling wave analysis for reaction diffusion equations, and in Morse homology.

This lecture builds on the validated numerical methods for periodic orbits presented in the lecture of J. B. van den Berg. We will discuss the functional analytic perspective on validated stability analysis for equilibria and periodic orbits as well as validated computation of their local stable/unstable manifolds. With this data in hand we study heteroclinic and homoclinic connecting orbits as solutions of certain projected boundary value problems, and see that these boundary value problems are amenable to an a posteriori analysis very similar to that already discussed for periodic orbits. (See more at http://www.ams.org/meetings/short-courses/short-course-general#jam.) (Received December 03, 2015)