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Emmanuel Fleurantin*, Florida Atlantic University, 777 Glades Road, Boca Raton, FL 33431, and **Jason D Mireles-James**, Florida Atlantic University, 777 Glades Road, Boca Raton, FL 33431. *Computing Lyapunov Subcenter Manifolds (LSMs) for Hamiltonian systems*. Preliminary report.

A classic result by Lyapunov ensures the existence of a 2d analytic invariant manifold foliated by periodic orbits tangent to any two-dimensional, elliptic eigenspace of an equilibrium solution of a nondegenerate analytic system of ODEs with a conserved quantity, as long as certain nonresonance conditions are satisfied. These are called Lyapunov Subcenter Manifolds (LSMs), as in general they are submanifolds of the full center manifold. In this talk, we discuss the computation of high order expansions of LSMs, using a technique based on the graph transform. As an example, we derive the homological equation for the Henon-Heiles system. We will also briefly discuss some challenges and next steps in the validation process. (Received January 14, 2021)