1164-37-199 **Joan Gimeno**, **Jean-Philippe Lessard**, **Jason Mireles-James** and **Jiaqi Yang*** (jyang373@gatech.edu). *Computer-assisted proofs of persistence of periodic orbits under singular perturbations.*

Given an n-dimensional ODE

$$\dot{x}(t) = f(x(t)), \tag{1}$$

which has a periodic orbit satisfying some conditions. We consider its singular perturbation

$$\dot{x}(t) = f(x(t)) + \varepsilon P(x_t, \gamma), \quad x_t \colon [-h, h] \to \mathbb{R}, \quad x_t(s) := x(t+s). \tag{2}$$

We get rigorous bound on the parameter ε such that the periodic orbit of (**??**) persists in (**??**). We use Chebyshev polynomials to get C^2 bounds of the periodic orbit of the unperturbed equation (**??**). Then we verify several inequalities to ensure the existence of periodic orbit for (**??**). A simple example will be given to illustrate the ideas. (Received January 18, 2021)