1164-37-138 **Davide Guzzetti*** (guzzetti@auburn.edu) and **Kanak Parmar**. *Coloring Poincaré sections with the Finite Time Lyapunov Exponent to track bounded motion within nearly time-periodic three-body dynamics.*

Nearly quasi-periodic orbits supply naturally bounded pathways to control the spacecraft motion. Inserting a spacecraft into a nearly quasi-periodic orbit may require nominal position and velocity values that guidance algorithms can target, typically at a fixed epoch. A lower fidelity dynamical model, nominally the circular restricted three-body problem (CR3BP), may supply an initial framework to discover quasi-periodic trajectories. However, known mapping techniques (e.g., Poincaré maps) to identify target conditions within low-fidelity dynamics are not easily transferable to higher-fidelity models. Higher-fidelity dynamics are often non-autonomous and prevent a static description of the reference quasi-periodic motion. In this work, we explore position/velocity maps associated with quasi-periodic orbits when the fidelity of the dynamical model is increased. We explore a framework to facilitate the interpretation of Poincaré map patterns associated with epoch-dependent solutions and states that are projected to a lower dimensional position and velocity space. The introduction of chaos indicators, such as the Finite Time Lyapunov Exponent, may reveal regions of the projection that produce bounded motion as a function of the given epoch and/or initial state perturbation. (Received January 16, 2021)