1146-34-538 **Shangbing Ai*** (ais@uah.edu), AL , and **Susmita Sadhu**. *The entry-exit function and relaxation oscillations in slow-fast planar systems.* Preliminary report.

The entry-exit function for the phenomenon of delay of stability loss (Pontryagin delay) arising in certain classes of slow-fast planar systems plays a key role in establishing the existence of limit cycles that exhibit relaxation oscillations. In this talk, we present an elementary approach to study the entry-exit function for a general class of slow-fast systems, and apply the entry-exit function to a broad class of slow-fast planar systems to obtain existence, global uniqueness and asymptotic orbital stability of relaxation oscillations. We further extend this result to another class of slow-fast systems and show that multiple relaxation oscillations exist. We apply these obtained results to some predator-prey models. (Received January 29, 2019)