1163-37-998 **Irina Popovici*** (popovici@usna.edu), Annapolis, MD 21402. *On the Existence of Multiple Bifurcations in A Piece-Wise Smooth Planar Dynamical System Modelling Cardiac Rhythm.*

The talk concerns the bifurcations of a dynamical system modelling the response to stimulation of a cardiac cell (or electrically coupled multicellular preparation). The two-dimensional system is controlled by four kinetic parameters and the stimulus period, T; it is continuous but only piece-wise smooth. Earlier work (with M. Kidwell, M. Baker, R. Kline) showed that the dynamics transitions from simple to complex as T decreases: large T correspond to global contractions, mid-range T have co-existing stable periodic orbits, and for small T we have multiple unstable cycles.

The first bifurcation, of period-doubling type, results from the collision of two cycles with a switching manifold. The second type of bifurcations captures the transition of 1-, 2-, ... n-escalators from stability to instability; their largest (i.e. first) bifurcation times follow the 1, 1/2 , 1/3, ... 1/n pattern detected experimentally. Observations and reduced models suggested that the bifurcation from stability to instability is unique.

This talk gives a few rigorous results re. the existence of kinetic parameters for which escalators have multiple transitions from stability to instability and gives conditions for parameter subsets to have unique bifurcations. (Received September 14, 2020)