Nonspreading Solutions in an Integro-Difference Model Incorporating Allee and Overcompensation Effects

Previous works in integro-difference models have generally considered Allee effects and overcompensation separately, and have focused on constant spreading speeds. Recent results obtained by Sullivan et al. (Proc. Natl. Acad. Sci. (2017) 114: 5053-5058) have shown that a combination of an Allee effect and overcompensation generates fluctuating spreading speeds. In this talk, I will analytically prove that for a piecewise constant growth function exhibiting both an Allee effect and overcompensation, there exist equilibrium solutions vanishing at infinity across solid regions of parameter space. I will numerically demonstrate that perturbations of the equilibrium solutions lead to solutions with various spatial patterns persisting essentially in compact domains. I also provide simulations to show that for growth functions involving the Ricker and Hill functions, stable equilibrium solutions with different periods exist, and patch formation can be developed.