

1135-39-1463

Jim M Cushing* (cushing@math.arizona.edu), Department of Mathematics, 617 N Santa Rita, University of Arizona, Tucson, AZ 85721. *Equilibrium bifurcations in difference equation models from structured population dynamics: extinction, survival, and strong Allee effects.*

Systems of difference equations, expressed as matrix models of discrete time dynamical systems, are widely used in structured population dynamics. A fundamental bifurcation occurs when the extinction state is destabilized, which results in a local transcritical bifurcation of a continuum of non-extinction equilibria whose stability depends on the direction of bifurcation. I will discuss some global properties of this continuum, the stability and instability of its equilibria outside of the neighborhood of the bifurcation point, and the role that a backward bifurcation and saddle-node bifurcations play in the occurrence of strong Allee effects. Strong Allee effects play a role in studies of population survival in adverse environments (climate change) and the presence of a tipping point at which a sudden collapse to extinction occurs. (Received September 22, 2017)