1035-92-760   **J. M. Cushing*** (`cushing@math.arizona.edu`), Department of Mathematics, 617 N Santa Rita, University of Arizona, Tucson, AZ 85721. *An application of planar monotone maps to synchronized cohort oscillations in population dynamics.*

I will describe an application of planar monotone maps that arises in a population dynamics problem. The life cycle defining so-called semelparous species gives rise to a discrete time matrix model that possesses an exceptional bifurcation scenario when the extinction state equilibrium state destabilizes as the net reproductive number R0 increases through 1. The options provided by this scenario correspond to unusual dynamics often observed in semelparous species. A thorough understanding of this bifurcation in the two dimensional case is known, but has only just recently been worked out in the three dimensional case. In the three dimensional case, the theory of planar monotone flows plays a crucial role in analyzing the bifurcation at R0 = 1 when the model nonlinearities have certain natural monotonic properties. This is not because the matrix model defines a monotone map, but because its double composite defines a planar monotone map on the boundary of the positive cone. I will show how this fact allows for a (fairly) complete description of the bifurcation dynamics for three dimensional semelparous models, and how the resulting theory accounts for cohort temporal synchronization of semelparous species. (Received September 14, 2007)