

1139-39-317

**Sarah G Van Beaver\*** (svanbeaver@uri.edu), University of Rhode Island, Kingston, RI 02881.  
*Global Dynamics and Bifurcations of Two Second Order Exponential Difference Equations.* Preliminary report.

We investigate the global behavior of two difference equations with exponential nonlinearities

$$x_{n+1} = be^{-cx_n} + px_{n-1}, \quad n = 0, 1, \dots$$

where the parameters  $b, c$  are positive real numbers and  $p \in (0, 1)$  and

$$x_{n+1} = a + bx_{n-1}e^{-x_n}, \quad n = 0, 1, \dots$$

where the parameters  $a, b$  are positive numbers. The the initial conditions  $x_{-1}, x_0$  are arbitrary nonnegative numbers. The two equations are well known mathematical models in biology which behavior was studied by other authors and resulted in partial global dynamics behavior. In this paper, we complete the results of other authors and give the global dynamics of both equations. In order to obtain our results we will prove several results on global attractivity and boundedness and unboundedness for general second order difference equations

$$x_{n+1} = f(x_n, x_{n-1}), \quad n = 0, 1, \dots$$

which are of interest on their own. (Received February 15, 2018)