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*Stability of Periodic Fixed Points and Invariant Sets of the Modulated Logistic Map.*

In this talk, We are studying the stability of the 1- and 2-periodic fixed points and the invariant sets of the two-dimensional dynamical system proposed by Elhadj and Sprott in [1]. The dynamical system generalizes the logistic map by considering  $F: \mathbb{R}^2 \rightarrow \mathbb{R}^2$  defined by  $F(x, y) = (ax(1 - x), (b + cx)y(1 - y))$  for  $a$ ,  $b$ , and  $c$  in  $\mathbb{R}$ . While the first component is the familiar 1d logistic map with parameter  $a$ , the second component is also a logistic map with a modulated parameter  $(b + cx)$ , dependent on  $x$ . We begin by finding the the periodic fixed points, and determine their stability as a function of  $a$ ,  $b$ , and  $c$ . In certain parametric regimes, we further analyze the basin of attraction of stable fixed points and fully describe the dynamics of arbitrary initial data. Lastly, we want to numerically and analytically determine the invariant sets of the second component in the domain  $[0, 1]$  as it often represents the valid region for the underlying models. We will detail our analysis using computer graphics and simulations to illustrate our results.

[1]Elhadj, Zeraoulia, and J. C. Sprott. "The effect of modulating a parameter in the logistic map." *Chaos: An Interdisciplinary Journal of Nonlinear Science*. 18.2 (2008): 023119. (Received September 26, 2017)