Neimark-Sacker, flip and transcritical bifurcation in a symmetric system of difference equations with exponential terms

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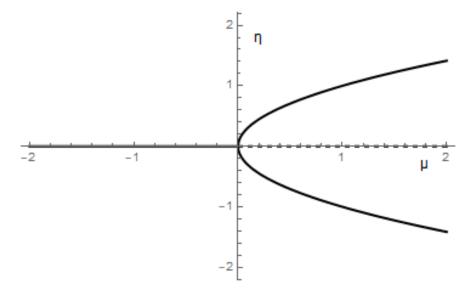[1]Democritus University of Thrace
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Abstract

In this paper, we study the conditions under which the following symmetric system of difference equations with exponential terms:
$$ x_{n+1} = a_1\frac{y_n}{b_1+y_n} + c_1\frac{x_n e^{k_1-d_1 x_n}}{1+e^{k_1-d_1 x_n}}, $$
$$ y_{n+1} = a_2\frac{x_n}{b_2+x_n} + c_2\frac{y_n e^{k_2-d_2 y_n}}{1+e^{k_2-d_2 y_n}} $$
where a_i, b_i, c_i, d_i, k_i, for $i=1,2$, are real constants and the initial values x_0, y_0 are real numbers, undergoes Neimark-Sacker, flip and transcritical bifurcation. The analysis is conducted applying center manifold theory and the normal form bifurcation analysis.

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