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DYNAMICS OF CERTAIN ANTI-COMPETITIVE SYSTEMS OF RATIONAL DIFFERENCE EQUATIONS IN THE PLANE

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Abstract

We consider a system of rational difference equations in the plane

$$\begin{cases} x_{n+1} = \frac{a+x_n}{bx_n y_n^{\alpha} - c}, \\ \\ y_{n+1} = \frac{a+y_n}{bx_n^{\alpha} y_n - c}, \quad n = 0, 1, 2, \cdots \end{cases} \tag{1}$$

where $a, b, c \in (0, +\infty)$ and initial conditions x_0, y_0 are nonnegative numbers. We prove that the unique positive equilibrium point of this system is globally asymptotically stable. We, also determine the rate of convergence of a solution that converges to the equilibrium point $(\overline{x}, \overline{y})$ of this system.

Key Words : *Equilibrium point, Difference equation, Globally asymptotically stable.*

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