

On the Boundedness Character of a System of Rational Difference Equations with Non-Constant Coefficients

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We investigate the boundedness character of nonnegative solutions of the following nonautonomous rational system:

$$\begin{cases} x_{n+1} = \frac{\alpha_n}{\beta_n x_n + y_n} \\ y_{n+1} = \frac{a_n + b_n x_n + c_n y_n}{A_n + B_n x_n + C_n y_n} \end{cases} \quad \text{for } n = 0, 1, \dots,$$

where the coefficients are nonnegative sequences of real numbers bounded from above and below by positive constants, and initial conditions are nonnegative real numbers, such that the denominators are always positive. We will give several theorems which apply to this system as well as a more general system. We will present several open problems and conjectures.