ON A THIRD ORDER RATIONAL DIFFERENCE EQUATION WITH VARIABLE COEFFICIENTS

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\textbf{Abstract.} In this paper we investigate the solutions of the rational difference equation

\[ x_{n+1} = \frac{x_{n-1}x_{n-2}}{x_n(a_n + b_n x_{n-1} x_{n-2})}, \quad n \in \mathbb{N}_0 \]

where \((a_n)_{n \in \mathbb{N}_0}, (b_n)_{n \in \mathbb{N}_0}\) are real two-periodic sequences and the initial values \(x_{-2}, x_{-1}, x_0\) are non-zero real numbers.

\textbf{Keywords.} Difference equations, local stability, periodicity, recursive sequence, rational difference equations.

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