

**Berg, Lothar; Stević, Stevo**

**Periodicity of some classes of holomorphic difference equations.** (English) Zbl 1103.39004  
J. Difference Equ. Appl. 12, No. 8, 827-835 (2006).

The authors consider the difference equation

$$x_{n+1} = p_n + \frac{x_{n-1}}{x_{n-2}}$$

where  $\{p_n\}_n$  is positive and periodic with period  $k \in \{2, 3\}$ . The initial conditions are positive. In the case  $k = 2$  it is proved that there are no solutions of odd period; then stability by the first approximation of the equilibrium is considered. Further global results are given for an associated system of three difference equations. This will lead to a global stability result for the basic equation.

Next, sufficient conditions for the existence of unbounded solutions are given. In the case  $k = 3$  the following results are obtained: existence of a unique positive equilibrium using such classical results as Theorems of Descartes and Rolle; this equilibrium is stable by the first approximation. Existence of unbounded solutions is obtained also in this case.

Reviewer: [Vladimir Răsvan \(Craiova\)](#)

**MSC:**

**39A11** Stability of difference equations (MSC2000)

**39A20** Multiplicative and other generalized difference equations, e.g., of Ly-  
ness type

Cited in **38** Documents

**Keywords:**

rational difference equation;  $p$ -periodic solution; holomorphic solution; stability; unbounded solutions; positive equilibrium

**Full Text:** [DOI](#)

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