

Long term behavior of positive solutions of some classes of difference equations and systems of difference equations

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Some results on the long term behavior of positive solutions of some classes of difference equations and systems of difference equations are presented. We pay a special attention on the boundedness character of the following two difference equations

$$(1) \quad x_n = A + \frac{x_{n-k}^p}{x_{n-l}^q}, \quad x_n = \max \left\{ A, \frac{x_{n-k}^p}{x_{n-l}^q} \right\}, \quad n \in \mathbf{N}_0,$$

where $k, l \in \mathbf{N}$, $k \neq l$, and p, q and A are positive numbers, as well as on some symmetric or cyclic systems of difference equations which stem from the equations in (1), for example, on

$$x_n = A + \frac{y_{n-k}^p}{x_{n-l}^q}, \quad y_n = A + \frac{x_{n-k}^p}{y_{n-l}^q}, \quad n \in \mathbf{N}_0.$$

We present numerous methods which are used in dealing with these equations and systems.

References

- [1] *R. DeVault, G. Ladas, S. W. Shultz*: On the recursive sequence $x_{n+1} = A/x_n + 1/x_{n-1}$. Proc. Amer. Math. Soc. *126* (1998), 3257–3261.
- [2] *B. Iričanin, S. Stević*: On a class of third-order nonlinear difference equations. Appl. Math. Comput. *213* (2009), 479–483.
- [3] *G. Papaschinopoulos, C. J. Schinas, G. Stefanidou*: On the nonautonomous difference equation $x_{n+1} = A_n + (x_{n-1}^p/x_n^q)$. Appl. Math. Comput. *217* (2011), 5573–5580.
- [4] *S. Stević*: On the recursive sequence $x_{n+1} = \alpha + (x_{n-1}^p/x_n^p)$. J. Appl. Math. Comput. *18* (2005), 229–234.
- [5] *S. Stević*: On the recursive sequence $x_{n+1} = \max\{c, x_n^p/x_{n-1}^p\}$. Appl. Math. Lett. *21* (2008), 791–796.
- [6] *S. Stević*: Boundedness character of a class of difference equations. Nonlinear Anal. TMA *70* (2009), 839–848.
- [7] *S. Stević*: On a class of higher-order difference equations, Chaos Solitons Fractals *42* (2009), 138–145.
- [8] *S. Stević*: On a generalized max-type difference equation from automatic control theory. Nonlinear Anal. TMA *72* (2010), 1841–1849.
- [9] *S. Stević*: On a nonlinear generalized max-type difference equation. J. Math. Anal. Appl. *376* (2011), 317–328.
- [10] *S. Stević*: On a symmetric system of max-type difference equations. Appl. Math. Comput. *219* (2013) 8407–8412.
- [11] *S. Stević*: On a cyclic system of difference equations. To appear in J. Difference Equ. Appl.