

Sufficient conditions for existence of bounded solution of nonlinear difference system

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We consider three-dimensional nonlinear difference system with deviating arguments on the following form

$$\begin{cases} \Delta(x_n + px_{n-\tau}) &= a_n f(y_{n-l}) \\ \Delta y_n &= b_n g(w_{n-m}), \\ \Delta w_n &= \delta c_n h(x_{n-k}) \end{cases}$$

where the first equation of the the system is a neutral type difference equation, p is a given real constant and $\delta = \pm 1$. Firstly we present the classification of nonoscillatory solutions of the considered system. Next, we put the sufficient conditions for boundedness of a nonoscillatory solution. At the end we illustrate the obtained results by example.

References

- [1] R. P. Agarwal, *Difference equations and inequalities. Theory, methods and applications*, Marcel Dekker, Inc., New York 1992.
- [2] M. Migda, J. Migda, *Asymptotic properties of solutions of second-order neutral difference equations*, *Nonlinear Anal.*, 63, e789-e799, (2005).
- [3] E. Schmeidel, *Boundedness of solutions of nonlinear three-dimensional difference systems with delays*, *Fasc. Math.*, 44, 107–113, (2010).