Abstract

In this study, we obtained the solutions of nonlinear difference equations of fifteenth-order with conditions imposed on the initial values. Moreover, we investigated boundedness, stability, oscillation and the periodic character of these solutions. Finally, we confirmed these results with some numerical examples and graphs by using Matlab program. Also, we investigated the behavior of solutions of a third-order nonlinear difference equation. More precisely, we studied the boundedness, stability and oscillation of these solutions of this equation.

The   This thesis contains four chapters:
first chapter, contains introduction and some basic definitions to the difference equations, equilibrium points, stability, periodicity and oscillations of solutions of difference equations and some results which are used throughout thesis

The second chapter, contains a survey to some recent papers in this field

In the third chapter, we obtain the solutions of the following nonlinear difference equations

$$x_{n+1} = \frac{x_{n-14}}{\pm 1 \pm x_{n-2} x_{n-5} x_{n-8} x_{n-11} x_{n-14}}, \quad n = 0, 1, 2, \ldots,$$

with conditions imposed on $x_{-14}, \; x_{-13}, \; x_{-12}, \ldots, \; x_0$

Moreover, we investigate boundedness, stability, oscillation and the periodic character of these solutions. Finally, we confirm the results with some numerical examples and graphs by using Matlab program. The results of this chapter have been published in the Journal of Mathematics and Computer Science

In the fourth chapter, we investigate the behavior of solutions of the following difference equation

$$\mu_{n+1} = \frac{\alpha(\mu_{n-1} + \mu_{n-2}) + (\alpha - 1)\mu_{n-1}\mu_{n-2}}{\mu_{n-1}\mu_{n-2} + \alpha}, \quad n = 0, 1, 2, \ldots,$$

where $\mu_{-2}, \; \mu_{-1}, \; \mu_0 \in [0, \infty)$ and the parameter $\alpha \in [1, \infty)$.

More precisely, we study the oscillation, boundedness, stability of the solutions of this equation. The results of this chapter have been accepted for publication in the Journal of Mathematics and Computer Science.