

## SOLUTION OF RATIONAL DIFFERENCE EQUATION

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**Abstract.** The behavior of the solutions of the following system of difference equations is examined,

$$x_{n+1} = \frac{x_{n-27}}{1 + x_{n-3}x_{n-7}x_{n-11}x_{n-15}x_{n-19}x_{n-23}}$$

where the initial conditions are positive real numbers. The initial conditions of the equation are arbitrary positive real numbers. Also, we discuss and illustrate the stability of the solutions in the neighborhood of the critical points and the periodicity of the considered equations.

**Keywords.** Rational difference equation, solution, limit, stability.

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## 1 INTRODUCTION

The studies on difference equations have been increased steadily in last decade. This is largely due to the fact that difference equations present themselves as mathematical models in generating solutions for real life situations in probability, number and queuing theories, statistical problems, stochastic time series, combinatorial analyzes, geometry, electrical network, quanta in radiation, genetics in biology, economics, psycholosafasafassgy, sociology, etc. In fact, it now occupies a central position in applicable analyzes and there is no doubt that it will continuously play important roles in mathematics as a whole. Nowadays, there is a growing interest in studying the periodic nature of nonlinear difference equations. For some recent results concerning about problems related with the periodic nature of scalar nonlinear difference equations look at the examples [1 – 35].

Cinar [3-5], studied the following problems with positive initial values:

$$x_{n+1} = \frac{x_{n-1}}{1 + ax_n x_{n-1}}, \quad n = 0, 1, \dots,$$