In this paper we study the behavior of the rational difference equation of the fourth order
\[ x_{n+1} = ax_n + \frac{bx_n x_{n-2}}{cx_{n-2} + dx_{n-3}}, \quad n = 0, 1, ... \]
where the initial conditions \(x_{-3}, x_{-2}, x_{-1}, x_0\) are arbitrary positive real numbers and \(a, b, c, d\) are positive constants. Also, we give the solution of some special cases of this equation.

**Keywords:** difference equations, stability, boundedness, periodicity, solution of difference equations.

**2000 AMS Classification:** 39A10

1. Introduction

In this paper we deal with the behavior of the solutions of the following nonlinear difference equation
\[ x_{n+1} = ax_n + \frac{bx_n x_{n-2}}{cx_{n-2} + dx_{n-3}}, \quad n = 0, 1, ... \]
where the initial conditions \(x_{-3}, x_{-2}, x_{-1}, x_0\) are arbitrary positive real numbers and \(a, b, c, d\) are positive constants. Also, we give the solution of some special cases of this equation.

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