# PERIODIC SOLUTIONS OF SOME HIGHER ORDER DIFFERENCE EQUATIONS

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| **ABSTRACT**In this work, we deal with the general form of the solutions and the periodicity of some higher order difference equations$$x\_{n+1}=\frac{\prod\_{k=0}^{r}x\_{n-2k}}{\prod\_{k=0}^{r-1}x\_{n-\left(2k+1\right)}(-1\pm \prod\_{k=0}^{r}x\_{n-2k})}, n, k \in N\_{0}, r \in N $$where the initial values are nonnegative real numbers such that the denominator is always nonzero. Moreover,some numerical examples are presented to verify our theoretical results.**References:** [1] Elaydi, S. (1996). *An Introduction to Difference Equations*, Springer-Verlag, New York, Inc.[2] El-Metwally H., & Elsayed, E. M. (2012). Qualitative Study of Solutions of Some Difference Equations, *Abstract and Applied Analysis*, Article ID 248291, 16 pages.[3] Elsayed, E. M. (2016). Expression and behavior of the solutions of some rational recursive sequences, *Mathematical Methods in the Applied Sciences*, 39(18) 5682-5694.[4] Elsayed, E. M. (2011). On the solution of some difference equations, *European Journal of Pure and Applied Mathematics*, 4(3) 287-303.[5] Elsayed, E. M., & Ibrahim, T.F. (2015). Solutions and periodicity of a rational recursive sequences of order five, *Bulletin of the Malaysian Mathematical Sciences*, 38 95–112.[6] Göcen, M., & Cebeci, A. (2018). On the periodic solutions of some systems of higher order difference equations, *Rocky Mountain J. Math*., 48(3) 845-858.[7] Göcen, M., & Güneysu, M. (2018). The global attractivity of some rational difference equations, *Journal of Computational Analysis and Applications*, 25(7) 1233-1243.[8] Ibrahim, T.F. (2009). On the Third Order Rational Difference Equation $x\_{n+1}=\frac{x\_{n}x\_{n-2}}{x\_{n-1}(a+bx\_{n}x\_{n-2})}$. *Int. J. Contemp. Math. Sciences*, 4(27) 1321-1334. [9] Ibrahim, T.F. (2009). Dynamics of a rational recursive sequence of order two. *International Journal of Mathematics and Computation*, 5(9) 98-105.[10] Göcen, M., & Cebeci, A. (2022). Form of the periodic solutions of some systems of higher order di¤erence equations. *Asian-European Journal of Mathematics*, 15(2), Doi: 10.1142/S1793557122500292.[11] Folly-Gbetoula , M., Göcen, M., & Güneysu, M. (2022). General form of the solutions of some difference equations via Lie symmetry analysis. *Journal of Analysis and Applications*, 20(2), 105-122.  |

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