

# Boundedness and Decay of Solution in Delay Difference Equation with Unbounded Forcing Terms

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**Abstract:** We use Lyapunov functionals to obtain sufficient conditions that guarantee the boundedness of all solutions of the delay difference equation

$$x(t + 1) = a(t)x(t) + b(t)x(t - h) + f(t).$$

The highlight of the paper is relaxing the condition  $|a(t)| < 1$ . Criteria for the unboundedness of the solutions are obtained. Moreover, we will provide an example in which we show that our theorems provide an improvement of some of the recent literature.