

ON THE ASYMPTOTIC BEHAVIOUR OF STOCHASTIC DIFFERENCE EQUATIONS

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Let $F_0 \subset F_1 \subset \dots$ be an increasing sequence of σ -fields on some probability space and let X_0 and X_1, X_2, \dots be real valued random variables which satisfy the following assumptions:

A) $X_n \geq 1$, X_n is F_n measurable and $X_n \rightarrow +\infty$ a.s.

B) there are functions $g(x)$ and $\sigma^2(x), x \geq 0$, and random variables ξ_1, ξ_2, \dots such that a.s.

$$\begin{aligned}X_{n+1} &= X_n + g(X_n) + \xi_{n+1} \\E(\xi_{n+1} / F_n) &= 0 \\E(\xi_{n+1}^2 / F_n) &= \sigma^2(X_n)\end{aligned}$$

Basing on the method of characteristic functions on the suitable conditions we proved the law of large numbers and the central limit theorems for suitable normalized and centralized variables X_n .