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Some Asymptotic Results for the Semi-Markovian Random Walk with a Special Barrier

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Abstract: In this study, the semi-Markovian random walk with a special barrier (X(t)) is considered and under some weak assumptions the ergodicity of this process is discussed. Moreover, the characteristic function of ergodic distribution of X(t) is given by using a joint distribution of random variables N and Y_N and some exact formulas for the first and second moments of ergodic distribution of the process X(t) are obtained. Based on these results, the asymptotic behaviours of expectation and variance of this process are investigated as S-s \to \infty . It is finally proved that the ergodic distribution of the process is close to a uniform distribution over (s,S) as S-s takes sufficiently large values.

Key Words: Semi-Markovian random walk; ergodicity of process; asymptotic behaviour; weakly convergence

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