Three-term Asymptotic Expansion for the Moments of the Ergodic Distribution of a Renewal-reward Process with Gamma Distributed Interference of Chance

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Abstract

In this study, a renewal-reward process with a discrete interference of chance $(X(t))$ is investigated. We assume that $(X_\lambda(t))_{t\geq 0}$ is a renewal-reward process with a gamma distributed interference of chance with parameters (α,λ). Under the assumption that the process is ergodic, the paper provides the three-term asymptotic expansions for the moments EX_λ^n, $n \in \mathbb{N}$, as $\lambda \to 0$.

References

[1] Aliyev R.T., Khaniyev T.A., Okur Bekar N., Weak convergence theorem for the ergodic distribution of the renewal- reward process with a gamma distributed interference of chance. Theory of Stochastic Processes, 15 (31) 2, 42-53, 2009.

[2] Csenki A., Asymptotic for renewal-reward processes with retrospective reward structure, Operation Research and Letters, 26, 201-209, 2000.

[3] Feller W., An Introduction to Probability Theory and Its Applications II, J. Wiley, New York, 1971.

[4] Gihman I.I., Skorohod A.V., Theory of Stochastic Processes II, Springer, Berlin, 1975.

[5] Ross S.M., Stochastic Processes, 2nd Ed. New York: John Wiley & Sons, 1996.