CONSECUTIVE SUBORDINATION OF POISSON PROCESSES AND GAMMA PROCESSES

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Abstract

Subordination by Bochner is a randomization of the time parameter in stochastic processes. There are two sources of randomness: the ground process X(t) and time process T(t), under the assumption of theirs independence. The time process is supposed to be subordinator - Lévy process with non decreasing sample paths. Subordinated process is defined as Y(t) = X(T(t)). We consider the sequences of consecutive subordination of Poisson processes and Gamma processes, starting with Poisson process and starting with Gamma process.

Poisson process subordinated by Gamma process is a Negative Binomial process. Negative Binomial process subordinated by Poisson process is a Polya-Aeppli process.

Gamma process subordinated by Poisson process is a Tweedi process - Poisson exponential Lévy process.

We prove that Tweedi process is stable by iteration. Polya-Aeppli process is stable by subordination with Tweedi process. The iteration of Negative Binomial processes leads to degeneration.

The transition probabilities of subordinated processes are expressed by special functions - Bessel function and Confluent Hypergeometric function. The asymptotic behavior is considered.

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