COX PROCESSES SIMULATION

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Simulation of the Cox processes directed by random intensity will be considered. Let $\{\mathbf{T}, \mathfrak{B}, \mu\}$ be a measurable space, $\mu(\mathbf{T}) < \infty$.

Definition 1. [1] Let $\{Z(t), t \in \mathbf{T}\}, \mathbf{T} \subset \mathbf{R}$ be a not negative random process. If $\{\nu(B), B \in \mathfrak{B}\}$ under fixed simple function $Z(t)$ is Poisson process with intensity function $\mu(B) = \int\limits_B Z(\cdot, t)dt$, that $\nu(B)$ is said to be a random Cox process driven by process $Z(t)$.

Let $Z(t) = \exp\{Y(t)\}$, where $\{Y(t), t \in \mathbf{T}\}, \mathbf{T} \subset \mathbf{R}$ – be a Brownian motion process, then $\nu(B)$ is said to be a Cox process directed by the Brownian motion.

Since $\{\nu(B), B \in \mathfrak{B}\}$ is a double stochastic random process, then the model of this process is constructed in two stages. At first we simulate the Brownian motion process $\{Y(t), t \in \mathbf{T}\}$, then we consider some partitioning $D_{\mathbf{T}}$ of the domain $\mathbf{T}$ and on every element of the partitioning $D_{\mathbf{T}}$ we construct the model of Poisson random variable with corresponding mean.

References

[1] Kozachenko, Yu., Pogoriliak O., Tegza A. Modeljuvannja gaussovyh vypadkovyh procesiv ta procesiv Koksa. Karpaty, 2012.

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