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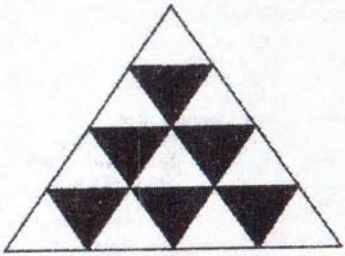
XVI International Conference

DYNAMICAL SYSTEM MODELLING AND STABILITY INVESTIGATION



MODELLING & STABILITY

ABSTRACTS OF CONFERENCE REPORTS
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COMPARISON, PROPERTIES AND APPLICATIONS OF INTEGRALS WITH RESPECT TO FRACTIONAL POISSON PROCESS WITH MOLCHAN-GOLOSOV AND MANDELBROT-VAN NESS KERNELS

Zubchenko V.

Fractional Poisson process investigation is a logical continuation of fractional Brownian motion study. Active learning and applications of fractional Brownian motion started relatively recently and have become an important tool of modern probability and statistical modelling. For Hurst parameter $H > 1/2$ the process has long-range dependence property, for $H < 1/2$ the increments are negatively correlated and for $H = 1/2$ the increments are independent.

But for many natural, technical, and economical phenomena the instantant change in the dynamics of the studied characteristics is quite usual. In particular, such dynamics is typical for interest rates, exchange rates and financial indices. At the same time there is significant dependence of such dynamics upon the history of the process. Studying properties of such processes is of great importance for estimating and forecasting parameters of complex financial instruments, based on the dynamics of indicated rates.

Models based on fractional Poisson process and integral with respect to fractional Poisson process are relevant for simulation of characteristics of such processes. In this regard, studying fractional Poisson process and integral with respect to fractional Poisson process is of great interest.

We investigate the fractional Poisson process:

$$Y_t = \int_0^t z_H(t,s)d\lambda_s,$$

where $z_H(t,s)$ is the Molchan-Golosov kernel, λ_s is the Poisson process. We study properties of this process, make a comparison of properties of fractional Poisson process with Molchan-Golosov and Mandelbrot-Van Ness kernels.

The integral with respect to centered and non-centered fractional Poisson process with Molchan-Golosov kernel is defined. We have estimated moments of such integral and obtained maximal inequalities for

$$E(\sup_{0\le t\le T}\int_0^t f(s)d\tilde{Y}_s)^p,$$

where $\tilde{Y}_t$ is the centered fractional Poisson process with Molchan-Golosov kernel. Other properties of specified integral are studied.

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КВАЗИОПТИМАЛЬНОЕ ПО БЫСТРОДЕЙСТВИЮ ТОРМОЖЕНИЕ ВРАЩЕНИЙ НЕСИММЕТРИЧНОГО ТЕЛА В СОПРОТИВЛЯЮЩЕЙСЯ СРЕДЕ

Акуленко Л.Д., Зинкевич Я.С., Лещенко Д.Д., Рачинская А.Л.

Аналитически и численно исследована задача синтеза квазиоптимального по быстродействию торможения вращений динамически несимметричного твердого тела в среде с сопротивлением под действием малого управляющего момента с неравными коэффициентами. В рамках асимптотического подхода определены управление, время быстродействия (функция Беллмана), эволюции квадрата модуля эллиптических функций, безразмерных кинетической энергии и кинетического момента. Установлены качественные свойства квазиоптимального движения. Проведено исследование квазистационарных движений.