THE COMPUTING MODELING OF MARKOV PROCESSES ON THE SURFACE

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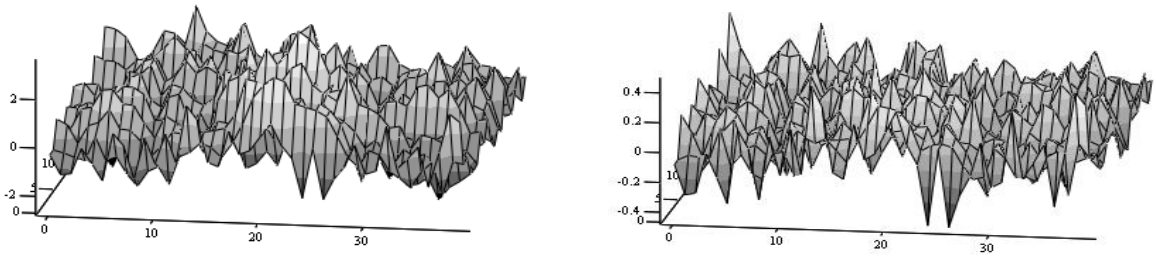
In the artical is considered the issue of modeling of Markov processes on the surface. Markov processes – a separate case of random processes, but for a number of reasons occupy a special position among other types of random processes [1]. Now the mathematical modeling of theory of markov processes is increasingly used in different directions because, first, it is well developed for it and the second, it can describe behavior of real systems and devices with its help.

In this article on the basis of general properties of Markov processes and on the basis of transient and unconditional distribution of probability amplitude of analyzed processes theoretical results in the task of construction of the algorithm of generation of normal Markov processes are applied. This enabled to synthesize the corresponding algorithms of calculation of different types of markov processes on the plane. In the program computing environment there are examples of application of the built algorithm procedure, which allows to visualize the searched processes.



a) b)

Fig. 1. – The markov stochastic field $H(x,y)$; parameters

a) – $\nu = 0.25$, $\mu = 1.0$; b) – $\nu = 1.0$, $\mu = 1.0$.

In the Fig. 1 examples of generation generated from white noise of random normal Markov dimention field of the first order on the surface are given. Calculation parameters: step by axis of *OX* $\Delta x = 1.0$, number of steps $N_x = 40$, step by axis of *OY* $\Delta y = 1.0$, number of steps $N_y = 20$, the intensity of the amplitude field $H(x,y)$ is $\sigma = 1.0$. The calculations are performed with a permanent decrement $\mu = 1.0$ and two values of decrement $\nu = 0.25, 1.0$. As can be seen from Fig. 1, amplitude $h(x,y)$ of the field $H(x,y)$ with the increase of decrement ν and unchanged μ accordingly decreased, while the relief of the field did not have significant changes.

Therefore, the task of constructing the algorithm of generating normal markov processes was performed and several examples of building of Markov fields with variations of decrement values ν and μ were given.

References (translated):

1. Mazmanishvili A. S. Normal Markov processes, two-dimensional and three-dimensional fields: analysis and algorithms − Kharkiv, 2015. − 83 p.