# RANDOM PERTURBATIONS IN THE PROPERTIES OF THE REACTOR ENVIRONMENT. NOISE GENERATOR MATHEMATICAL MODEL

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There was reviewed a one-dimensional reactor model, which greatly simplifies the modeling of statistical experiment. We consider a one-dimensional reactor as a flat plate.

In our research we have applied mathematical model named "high-altitude model", in relation to the RBMK reactor.

For the simulation of random variables we have used noise generator method, which is described mathematically as follows:

$$a_2 \frac{d^2x(t)}{dt^2} + a_1 \frac{dx(t)}{dt} + a_0 x(t) = b_1 \frac{d\xi(t)}{dt} + b_0 \xi(t) \quad (1)$$

All epy factors are taken from the RBMK archives.

The following results were obtained on the basis of a mathematical model of the particles flow and the noise generator: The increase of the reactor's size and the noise level leads to the expected value deviates from fundamental solution and the variance is characterized by the appearance of the peaks and moving them to the edges of the reactor.

Further, according to the archives there was built graphics 4 sections RBMK. In general, all the sensors show the same trend: the lower Expected value and the large variance in extreme sections . This corresponds to the obtained data mentioned above.

There was made an attempt to determine the cause - why the variance of flow neutrons is so different. In this regard, the studies were conducted according to the dispersion of the sensor from location in the core . Also, analysis of the behavior of the sensor's signal over time was carried out, when we look at it the axial offset (Figure 8), we see that the system is clearly present vibrations, in this case, when the flow sections 1 and 2 is increased, the flows of sections 3 and 4 are reduced and vice versa, i.e. We clearly observe distortions field height.

To summarize, for the Expected value the low values are in the extreme sections, but for dispersion the small value is in the center and two characteristic peaks are closer to the edge of the reactor. In conclusion we should admit that for the simulation of random variables it is suitable to apply noise generator function that has been proven above.

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## DEVELOPMENT OF INNOVATION METHODS BY THE AFFECTION AT EXTREME IMPACT ON THE BASIS OF LASER, NUCLEAR AND BIOLOGICAL TECHNOLOGIES

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For new method efficiency monitoring we have compare it with other protection methods from viruses, toxins and radiation effects.

It is known that different intensity stress- factors are able to neglect the protective mechanisms in the human's body. For example - cross-adaptation and cross-protection. These processes are activating innate immune receptors. (TLR) to activate TLR there is used:

- Microbial lipopolysaccharide - structural components of bacterial cell wall. Increase resistance to infection. But in practice it is rarely used alone because of its high toxicity.
- Extracellular heat shock proteins (BSHT70) - is an active protein when the heat is exposed to it. It activates universal protective mechanisms against lethal infections, toxic and radiation damage.

Modified MPLS (this reduces toxicity) and activated BSHT70 are taken from food yeast and are used for new generation vaccines creation . MPLS and BSHT70 modification and activation are carried out with the help of laser with its power from 10 W to 15 kW, and neutrons with energy of at least 190 keV.

Experiments

In order to test the resistance theory to various influences in the combined preparation use of the modified MPLS and activated BSHT70 there were conducted series of experiments:

- Antiviral protection

There were used mice for the experiment conduction. The mice were infected a lethal kind of influenza virus (H3N2). In result there was revealed a MPLS and