

## The functional form of nuclei decay in a point-approximation reactor within the particles' birth and death model

In this paper we consider the development of the sub-Poisson distribution application in particles' birth and death model for description of a finite number of particles. The main goal of current work is to achieve more accurate mathematical apparatus for particles' birth and death model with respect to the theory of a nuclear reactor in one-point approach than it was made in previous articles. During early research the exponential dependence of neutron generation time in breeding medium was obtained. Followed-up studies showed that a more suitable function can be applied for description of neutron emitters and hence the lifetime of neutron generations.

Key words: birth and death model, binomial distribution, sub-Poisson distribution, lifetime, neutron generation, breeding medium

### Summary

A number of works were devoted to the investigation of the dependences of the generation, decay, and lifetime of nuclei and neutrons in a reactor within the particles' birth and death model. The studies carried out concerned Poisson and binomial distributions, which did not allow us to reliably describe the whole process of neutron generation in the breeding medium. Subsequent studies showed that a specific function can be used to describe the whole process of nuclei decay and further neutron generation with a reasonably acceptable accuracy. This work is devoted to the description of the this function and its comparison with previous results of particles' birth and death model research

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