# MONTE-CARLO METHOD IN PHYSICS, MATHEMATICS, BIOLOGY

Luchko A. D., Kokodii M. G.
National University of Pharmacy, Kharkiv, Ukraine
kokodiy.n.g@gmail.com

**Introduction**. Monte Carlo method is used at research of many processes in physics, chemistry, biology. This method is basing on the use of random numbers. Nuclear reactors settle accounts by this method, it is widely used in geophysics, economy, biology, ecology - for the solving of those tasks, wherever the analytical or numeral methods are not work from the high degree of complication.

There are random numbers generators in the mathematical programs of MATHCAD, MAPLE, MATLAB, STATISTICS and other. It is possible to get the arrays of random numbers with the different laws of distributing - even, normal, exponential and other with their help

**Aim**. Different tasks for the decision of which the method of Monte Carlo is used are considered in our researches.

**Materials and methods**. The program MATHCAD is using for demonstration of solving of different tasks by using of Monte-Carlo method.

1. Generation of random numbers. The different variants of the programs realizing this process are considered.
2. Demonstration of one-dimension moving of particle.
3. Two-dimension Brownian motion of particle. The numeral experiment is made on verification of Einshtein-Smolukhovsky equation for diffusive processes.
4. Calculation of mathematical constants. This is calculating of $\pi$ and error of result is estimated.
5. Calculation of integrals.

**Results and discussion**. The numeral experiments are look the possibilities of Monte-Carlo method for modelling of different processes in physics, mathematics, biology.

**Conclusion.** Monte-Carlo method can be using for solving of many tasks, which not possible to solve by traditional methods.