**COMPUTABLE SIMULATED TRANSFORMATIONS OF THE CARTESIAN COORDINATES**

**FOR RANDOM VECTORS**

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With the development of computer technology, there is the increasing interest in numerical algorithms for solving applied problems, with special importance of the computational schemes, which can be implemented on modern multiprocessor computers. From this point of view, *the numerical statistical modelling algorithms* (or *the Monte Carlo methods)* are sufficiently perspective (see, for example, [1]). One of the main elements of the algorithms of the Monte Carlo method is *the numerical simulation* (the generating of the sample values on a computer) *of random variables and vectors* (random points, multidimensional random variables).

In this talk we introduce the notion of *the computable simulated transformation of the Cartesian coordinates* for a "non-simulated" (in the Cartesian coordinates) random vector. This notion is based on the lemma on the transformation of random variables.

As the examples of such transformations we consider:

- polar and spherical coordinates for the simulating uniformly distributed random points in a circle and in a three-dimensional ball,

- cylindrical coordinates (three-dimensional case) for the simulating uniformly distributed random points in a cylinder,

- parabolic coordinates for a special distribution of a random point in a two-dimensional curvilinear domain with "parabolic" boundaries.

In addition, we give examples of algorithms of numerical statistical modelling for solving informative problems of mathematical physics in which computable simulated transformations of Cartesian coordinates are used.

**References**

[1] Mikhailov G.A., Voytishek A.V. Statistical Modelling. Monte Carlo Methods. Moscow, Yurayt, 2018 [In Russian].

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