APPLICATION OF MOBILE SIMPLEX FOR MODELING MULTIFACTORIAL PROCESS

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Summary. **We considered a new look at the rolling method simplex that extends Balyuba-Naydysh point-calculation that will simplify the construction of surfaces of type magnifier, to simulate processes n-dimensional function space.**

Keywords: **multifactor processes formalized geometric model, simplex method rolling, surface type of dandruff.**

Formulation of the problem. In real four-dimensional space (the fourth dimension - time), most processes are multifactorial, research and modeling which requires the use of multi spaces.

Modeling multi-process multi-system requires the use of n-parametric functional spaces defined coordinate system, the axes of which are factors, components, physical, chemical and other values that functionally interconnected in the system and describe the process in terms of research.

Thus, the dimension of space for the functional study of the process is determined by the number of its independent components and factors.

Analysis of recent research. New impetus to the development of multi-modeling, multi-process theory into the development of point-calculus Balyuby Naydysha (BN-calculus) [1,2], because it is determined by the number of point coordinates, corresponding to the number of parameters of functional space, being, while in real four-dimensional space. As a result, the process of building a formal geometric model [3] Multiparameter process of simultaneously establishes the four-dimensional space in which this process occurs. In [4] proposed to establish mutually-one correspondence between the functional and the real space using algebraic rational monoidalnoho surface type, bearing the frame curves of higher orders. This solution has a generalized approach to modeling, each new process requires the development of new mathematical models.

In [5] the theoretical basis and practical implementation regarding their general way of modeling geometric objects in the n-parametric space based on the set of discrete points array arithmetic space. It is used as a method of rolling and surface simplex type magnifier [3, 6]. However, in our opinion, in this work is not fully disclosed the possibility BN-calculus with its use on multivariate modeling of processes in multicomponent systems n-parametric function spaces. With that said it was understood that the proposed its consideration has not lost its relevance.

Forming the purposes of Article. Show in information terms, another opportunity to use point-calculus Balyuby Naydysha using his mobile simplex method for modeling multi-process systems in multi-parametric n-functional spaces.

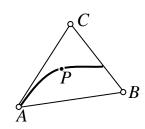*Main part.* The method of rolling simplex [6] for constructing geometric image points simplex entrusted movement by which defined this image. Thus, the points that are the vertices sypleksu have a number of coordinates to that of the parameter space in which this is simplex. For example, a three-dimensional space - A (a_1, a_2, a_3) for four-- A (a_1, a_2, a_3, a_4) for n-parametric A (a_1, a_2, ..., a_n) ai - coordinates of the point values which are recorded in sequence and clearly define point *A* in the appropriate space. Reorder record coordinates - define different point.

Fig. 1. Definition lines in BN-many.

More complicated geometric image is a line (Fig. 1) [5-7], which is defined as an organized sequence of points in simplex ABC, which in the current setting and *u* changing along the line, moves the current point P:

$$P=(A-C)p(u)+(B-C)q(u)+C ,\qquad(1)$$

where *p (p)* and *q (u)* - a function parameter which determine the law of motion of point *P*.

This method is well known that in many detailed studies of BN-calculus, for example [5-7].

In our opinion, more efficient method for moving simplex n-parametric functional space would be using functions f_1 *(u)*, f_2 *(u)*, ..., f_n *(u)* as current parameters point *A*. At point *A*, which is in three-dimensional Euclidean space E^3 and at the same time plays in the process *n*-parametric functional space can be written as follows A *(f_1 (u), f_2 (u), ..., f_n (u))*.

This entry sets the isomorphic relationship between E^3 and *n*-parametric functional space, the need for which was emphasized in [4]. Moreover, using the proposed representation above point *A*, may authorize, through line (1) (Fig. 1) present in the E^3 space hypersurface type magnifier, describing processes in *n*-parametric functional space. To do this in coordinates point *A* to take into account factors that affect the physical, chemical and so on that make up the process. In this case, the coordinates of written as follows:

$$A\begin{pmatrix} f_{10}(u), f_{20}(u),..., f_{n0}(u), \\ f_{11}(u), f_{21}(u),..., f_{n1}(u), \\ .... \\ f_{1m}(u), f_{2m}(u),..., f_{nm}(u) \end{pmatrix}.\qquad(2)$$

Conclusions. Presentation at E^3 simplex points ABC on principle (2) will in the form of lines (1) simulate hypersurface describing complex processes *n*-parametric functional space. Making a model line (1) using points (2) is much easier than building a hypersurface in *n*-parametric space because parametric representation (1) automatically displays the required hypersurface.

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