OBJECTIVE ANALYSIS OF DESIGN, DECORATIVE, APPLIED AND GRAPHIC ART OBJECTS

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The thesis is devoted to developing the prediction model for the cyclicity of design, decorative, applied and graphic art (DDAGA) objects visual perception. The qualitative analysis of DDAGA objects cyclicity prediction is made on the basis of Solar activity (SA). The phase space of perception cyclicity of DDAGA objects may be seen as placed within a trihedron formed by three axes: $D, \dot{D}$, and $\dot{I}$. The minimum potential energy E correlates with the maximum speed of information $\dot{I}$. The phase space of perception cyclicity of art and design objects correlation is shown on Fig. 1.

To create a mathematical model within the framework of a qualitative model of predicting the perception of the objects under study, the author introduces the quantity of details (D) and information parameters (I).

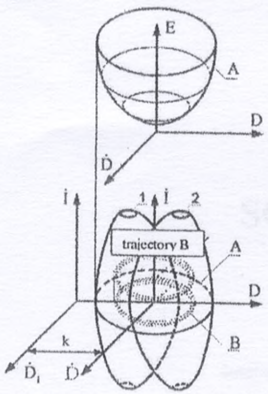


Fig.1

Ultimately a theoretical model of the cyclicity of DDAGA objects' perception based on the Space activity is proposed in the form of a set of two equations:

The disturbing moment consists of restoring, damping moments, and the moment of inertia.

The rotary movement of style changes is described by the formula:

$$I_n\left(\frac{d^2D}{dt^2}\right)+A\left(\frac{dD}{dt}\right)+f_2(D,t)=M_A, \qquad (1)$$

where M_A is the disturbing moment:

$$M_A=(F_G Z_G+F_{SA}Z_{SA})\cos D+M_K\left(\frac{d^2I}{dt^2}\right) \qquad (2)$$

where F_{SA} is the force of Solar activity; F_G is the force of geofluctuations; M_K is the moment of unexpected influences in the Space. The moment of inertia is defined as:

$$M_I=I_n\left(\frac{d^2D}{dt^2}\right), \qquad (3)$$

where I_n is the mass of all design objects multiplied by r.

The damping forces moment is calculated by the formula:

$$M_D=A\left(\frac{dD}{dt}\right). \qquad (4)$$

The restoring moment

$$M_B=f_2(D,t)=Q\cdot\cos[\sigma_K t-\varepsilon(t)], \qquad (5)$$

where Q is the volume of design and art objects V, multiplied by coefficient ρ. M_B also includes the arm of statistical stability as function of D.

The longitudinal movement of information (the increase of its speed along the axis):

$$V\left(\frac{d^2I}{dt^2}\right)=F_G+F_{SA} \qquad (6)$$

where V is the volume of design and art objects.

The above summarizing yields:

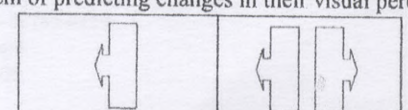
$\exp T_p, R, \Sigma P_i$ are the coefficients of the rotary movement formula, (1),

$\Sigma J_i, \Sigma B_i, M$ are the coefficients of the movement formula (6).

A system of differential equations is developed for predicting the cyclicity of percepting elements in DDAGA objects, based on SA and geofluctuations.

$$\begin{cases} \left\{\exp T_p R\Sigma P_i\left\{I_n\left(\frac{d^2D}{dt^2}\right)+A\left(\frac{dD}{dt}\right)+Q\{I(D)+\right.\right. \\ \left.\left.+\Delta I(D)\cos[\sigma_t t-\varepsilon(t)]\right\}\right\}= \\ =(F_G Z_G+F_{SA}Z_{SA})\cos D+M_K\left(\frac{d^2I}{dt^2}\right), \\ \Sigma J_i\Sigma B_i MV\left(\frac{d^2I}{dt^2}\right)=F_G+F_{SA}. \end{cases} \qquad (7)$$

In the general case of a differentiated dynamic system, a phase space is a differentiated manifold which, in turn, is a locally Euclidean space possessing a differential structure. To define a locally Euclidean space we need to correlate it with a Hausdorff topological space. At this stage of research, the author proposes to carry out a comparative analysis of DDAGA objects (design, decorative, applied, and graphic arts) based on the Hausdorff dimension in order to provide a practical solution to the problem of predicting changes in their visual perception.



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