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AUTOMATED MANAGEMENT BY DESIGNER PREPARATION OF PRODUCTION OF ELECTRONIC VEHICLES

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Summary. A case frame by designer preparation of production of electronic vehicles is offered in the article. The corteges of managing influences generate by the method of group account of argument for achievement of the proper index of efficiency of management, analysis of hierarchies estimated by a method.

Key words: friction modifier, slip velocity, pneumatic drive**,** friction coefficient**.**

INTRODUCTION

For the decision of task of development of the system of support of decision-making designer preparation of production of electronic vehicles taking into account an application, properties and arrangement of producible objects domain it is necessary to select the groups of influences on the object of management, to make their classification and to select from them parameters the states and managing influences. On the basis of managing influences it is necessary to synthesize the frame model of knowledge's representation and to develop the structure of the system of support of decision-making, able to realize the stopped algorithms up. There is a not unimportant task also research of efficiency of the use of the offered system of support of decision-making [2]. On results the similar sort of correction it is necessary to watch and eliminate the managements uninvolved in corteges influencing factors, to define the constituents of management corteges directly, to provide the concordance of the last with optimum parameters and arrangement of producible objects [4].

OBJECTS AND PROBLEMS

Development of the system of support of decision-making implies classification of parameters of the state, external indignation and managing influences for the same object, but on different stages (constructing of block, achievement of the required resonance stability, preparation of production [3] and other), it is therefore necessary by means of statistical tests to classify these influences, to identify dependences and to select managing influences with the purpose of determination of instruments of influence on interesting parameters and arrangement of object of designer preparation of production. On the basis of the identified managers of influences it is necessary to form the system of support of decision-making and to estimate its stability and efficiency of application [5, 17].

Direction-finding designer preparation of production problems consist in that probability of task of one or another type of managing influence is different for the electronic vehicles of different purpose and external environments, that in the turn is determined by the specific of arrangement, to the produced requirements and, consequently, by the different methods of achievement of the required properties [6]. For each of the considered types of electronic vehicles takes place the value of coefficients of meaningfulness of managing influence. Further on the set of types of managing influences and the database of coefficients of meaningfulness of each of them must define the criterion of quality of management by designer preparation of production of electronic vehicle directly (management efficiency) [9, 11]. At the hit of the got value in the application domain of the examined automated management by designer preparation of production of electronic vehicle, the transmission to the statement (working forms of the developed system of support of decision-making) of sequence and maintenance of managing influences is carried out on the optimized parameters, arrangement and properties of object of designer preparation of production, certain by the criteria of arrangement and optimized by the method of group account of argument.

Analyzing statistical selections, we get, that for functional dependence of criterion of quality of management by designer preparation of production of electronic vehicles characteristically presence of selection from the N supervisions

$$\begin{aligned} &\{X(1);Y(1)\} \\ &\{X(2);Y(2)\} \\ &\dots \\ &\{X(N);Y(N)\} \end{aligned}, \qquad (1)$$

where : $X(i)=(x_1^i, x_2^i, \dots x_n^i)$ - values of initial factors at i - supervision; $Y(i)=(y_1^i, y_2^i, \dots y_n^i)$ - values of out parameter i - supervision.

Functional dependence of F between entrances X(i) and by the out Y(i) parameters of case frame unknown, thus unknown neither dependence nor supposed its kind.

Therefore in accordance with the method of group account of argument, most complete dependence between the entrances X(i) and returns of Y(i) can be represented by the generalized polynomial of Kolmogorova – Gabora [1].

$$Y = a_0 + \sum_{i=1}^{N} a_i \cdot x_i + \sum_{i=1}^{N} \sum_{i \le j} a_{ij} \cdot x_i \cdot x_j + \sum_{i=1}^{N} \sum_{i \le j} \sum_{k \le j} a_{ijk} \cdot x_i \cdot x_j \cdot x_k + \dots \qquad (2)$$

where : a_i - unknown coefficients.

At construction of model, for determination of values of coefficients, as a criterion the criterion of regularity is used (exactnesses):

$$\overline{\varepsilon^2} = \frac{1}{N} \cdot \sum_{i=1}^{N} \left(y_i - f\left(x_i \right) \right)^2 . \tag{3}$$

It is thus necessary to find such values of parameters of model of a_i in (3), at which

$$\overline{\varepsilon^2} \to \min . \tag{4}$$

Principle of multiplicity of models for the examined case consists in that exists great number of models on this selection, providing a zeroing error (it is enough to promote the degree of model polynomial). That if is present the N sites of interpolation, it is possible to build whole family of models, each of which at passing through experimental points will give a zeroing error

$$\overline{\varepsilon^2} = 0 . \tag{5}$$

At a different noises level dependence $\overline{\varepsilon^2}$ will change on complication of S, saving here a general orientation I.e. it at first will diminish with growth of complication, and then - to increase. At the increase of noises level a size $\min_S \overline{\varepsilon^2}$ will grow.

Exceptional situations at functioning of the examined system of support of decision-making are related to the possible «fall» of necessity of application of identical managers of influences for production of different objects, but treatment such exceptional situations is taken to extraction from the database of different scales of meaningfulness of choice of type of influence, it is therefore impossible to get identical results at identical managing influences [7, 12]. And, vice versa, different sets of managing influences for different electronic vehicles after treatment in the offered system of support of decision-making give, within the limits of the set exactness, unique value of efficiency of management by designer preparation of production of electronic vehicle [8, 18].

Teaching of the developed system of support of decision-making designer preparation of production of electronic vehicles is executed in order that after determination of efficiency of management by designer preparation of production of electronic vehicle of the explored classification group, the developed system offered the optimum scenario of achievement of properties, parameters, arrangement, vibration and resonance stability of electronic vehicle [10, 14]. Six neuron perseptron, the neurons of which have an activating function as a single jump, comes forward as the structure of the developed system of support of decision-making designer preparation of production of electronic vehicles [13].

On thirty one entrance of neuron network entrances signals [15], acting further on synaps on six neurons which form an unique layer, are given. On the returns of network signals are formed:

$$y_j = f\left(\sum_{i=1}^{31} x_i \cdot w_{ij} \right), \tag{6}$$

where: $j = 1\ldots6$ - amount of classes of electronic vehicles; f - function of activating; x_i - component of vector of managing influences; w_{ij} - synapses weight.

Process what is going on in a neuron network, in a matrix form looks like:

$$\boldsymbol{Y} = \boldsymbol{F}\left(\boldsymbol{X} \cdot \boldsymbol{W}\right), \quad (7)$$

where: ***X***, ***Y*** - accordingly entrance and output vectors; ***F(S)*** - activating function applied memberwise to the components of vector ***S***; ***W*** - synaps Matrix.

For teaching of neuron network a teaching algorithm was applied with a teacher [16]. As a result of functioning of designing softwares package were got following synapses weight of neuron network of the developed system of support of decision-making, resulted in tabl. 1.

Table 1. **Synapses weight for neuron network**

Object 1	Object 2	Object 3	Object 4	Object 5	Object 6
$w_{41} = 5.943*10^{-2}$	$w_{12} = 2.878*10^{-3}$	$w_{33} = 4.683*10^{-2}$	$w_{24} = 4.953*10^{-2}$	$w_{55} = 5.558*10^{-2}$	$w_{56} = 6.843*10^{-2}$
$w_{51} = 9.138*10^{-3}$	$w_{32} = 7.348*10^{-3}$	$w_{133} = 4.822*10^{-2}$	$w_{94} = 6.394*10^{-3}$	$w_{85} = 2.033*10^{-2}$	$w_{66} = 2.556*10^{-2}$
$w_{81} = 8.151*10^{-2}$	$w_{102} = 5.263*10^{-3}$	$w_{163} = 0.223*10^{-2}$	$w_{174} = 6.904*10^{-3}$	$w_{95} = 3.904*10^{-3}$	$w_{116} = 3.943*10^{-2}$
$w_{101} = 1.81*10^{-2}$	$w_{112} = 2.843*10^{-3}$	$w_{213} = 1.242*10^{-2}$	$w_{184} = 6.394*10^{-2}$	$w_{145} = 8.037*10^{-2}$	$w_{126} = 2.374*10^{-2}$
$w_{201} = 9.66*10^{-3}$	$w_{192} = 9.239*10^{-2}$		$w_{304} = 3.230*10^{-3}$	$w_{155} = 5.035*10^{-3}$	$w_{156} = 5.495*10^{-2}$
	$w_{212} = 3.092*10^{-3}$			$w_{225} = 6.753*10^{-3}$	$w_{216} = 7.823*10^{-2}$
	$w_{242} = 6.932*10^{-3}$			$w_{235} = 2.645*10^{-4}$	
	$w_{272} = 5.633*10^{-3}$			$w_{265} = 0.549*10^{-3}$	
	$w_{292} = 9.293*10^{-3}$			$w_{295} = 3.934*10^{-3}$	

Testing of the trained network was conducted on tests selections not intersecting with teaching. Tests selections were built for each of types of electronic vehicles.

Thus, teaching of the system of support of decision-making designer preparation of production of electronic vehicles was made, testing and preliminary approbation of application of the developed system is made in designer preparation of production of electronic vehicles.

As a result of teaching of the developed system of support of decision-making designer preparation of production of electronic vehicles the list of recommendations on the management by arrangement of electronic vehicle is produced, providing the optimum scenarios of achievement of necessary properties, parameters, arrangement, vibration and resonance stability of electronic vehicle.

CONCLUSIONS

Thus, scientific and technical the issue of the day of increase of efficiency of management by designer preparation of production of electronic vehicles is decided by development of the system of support of decision-making, arrangement of electronic vehicle, operative management by designer preparation of production and control by the resources of enterprise system allowing to reduce expenses and prime price of pre-production model of electronic vehicle, functioning in single informative space; to reduce the terms of release of new electronic vehicles; to promote the competitiveness of enterprise at upgrading electronic vehicles, reliability, vibration and resonance stability.

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АВТОМАТИЗИРОВАННОЕ УПРАВЛЕНИЕ КОНСТРУКТОРСКОЙ ПОДГОТОВКОЙ ПРОИЗВОДСТВА ЭЛЕКТРОННЫХ АППАРАТОВ

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Аннотация. В работе обосновывается и предлагается модель управления конструкторской подготовкой производства электронных аппаратов, опирающаяся на исследование единого информационного пространства подготовки производства, оперативного управления предприятием и ресурсами предприятия, которая позволяет исследовать эффективность процесса управления.

Ключевые слова: управление, конструкторская подготовка производства, электронный аппарат, эффективность управления, единое информационное пространство, оперативное управление, управление ресурсами предприятия