МЕСТО И РОЛЬ ИНФОРМАЦИИ В ОБЕСПЕЧЕНИИ ВЫЖИВАНИЯ ОТКРЫТЫХ СИСТЕМ

Лаптев Владимир Николаевич
к.т.н., доцент

Лаптев Сергей Владимирович
к.ф-м.н., доцент
ФГБОУ ВО «Кубанский ГАУ им. И.Т. Трубилина», Краснодар, Россия

Для описания сути термина информация используется концептуальная алгоритмическая модель адаптивного управления АПК

THE PLACE AND ROLE OF INFORMATION IN ENSURING THE SURVIVAL OF OPEN SYSTEMS

Laptev Vladimir Nikolaevich
Cand.Tech.Sci., associate professor

Laptev Sergey Vladimirowich
Cand.Phys.-Mat.Sci., associate professor
Federal State Budgetary Educational Institution of Higher Education "Kuban State Agrarian University named after I.T. Trubilin", Krasnodar, Russia

To describe the essence of the term information, a conceptual algorithmic model of adaptive control of the agro-industrial complex is used

Detailed acquaintance with the *theory of functional systems* (*TFS*) P.K. Anokhin [2] convinced us that this theory clearly works within the framework of three basic laws of the dialectics of nature [16]: a) <u>the unity and struggle of opposites</u> (an *open system* (*OS*), with its *typical $Y_m(x_n)$ stop-frame mathematical models,* and the *changing environment* (*CS*) represented by its current freeze-frame mathematical models $Y_k(x_n)$, the coincidence of which ensures survival, and non-coincidence the death of the *OS* (*m*-type number, and *k*-current number models*)*; b) <u>the transition of quantity into quality and vice versa</u> providing (with an allowable error ε, model matching $Y_m(x_n)=Y_k(x_n)$, during time interval Δt_n, the same for all freeze frames of interaction $OS_m \leftrightarrow CS_k$), creating a "system effect" that balances the current impact from outside (environment *CS* with adequate opposition from the OS_m) created due to the synchronous operation of the proper number *q* of its functional elements (*FE_q*) in a specific type model $Y_m(x_n)$); c)

negation of negation (balancing with the help of optimal $Y^{opt}_m(x_n)$ or qualitatively new $Y^{new}_m(x_n)$ models of all previously unbalanced current *typical models* $Y_k(x_n)$, due to a more adequate description of the interaction process $OS_m \leftrightarrow CS_k$ based on the use of new achievements in science and technology in the field of *natural* (human) and *artificial* (computer) intelligence) [1,12-13]. In the interaction $OS_m \leftrightarrow CS_k$ n is the number of the current freeze frame of the interaction, changing from *1* to *N*, where *N* is the last time interval of the *OS* life; *m* is the number of the freeze-frame in which the *OS* survived, *k* is the number of the current state of the environment (*CS*) during Δt_n.

We note in particular that in Decree of the President of the Russian Federation No. 490 dated October 10, 2019, annotations and the development program of the Federal State Budgetary Educational Institution of Higher Education Kuban State Agrarian University in 2021-2022 [1, 12-13], the task of accelerating the development and effective use of achievements in the field of *artificial intelligence* (*AI*) in activities is clearly set KubGAU. To successfully solve it, we need to clearly understand how to do it in order to ensure successful adaptation of our university to positive changes in the country. Experience suggested that for this it is necessary that all mathematical models of the *OS*: typical -$Y_m(Y_n)$; optimal -$Y^{opt}_m(x_n)$; new -$Y^{new}_m(x_n)$ when they are implemented in the current time interval Δt_n, ensured the creation of a "system effect" that balances any current influence from the outside. This requires strict fulfillment of the following conditions:

$$\left| Y_k(x_n) - Y_m(x_n) \right| \leq \varepsilon, \ \left| Y_k(x_n) - Y^{opt}_m(x_n) \right| \leq \varepsilon, \ \left| Y_k(x_n) - Y^{new}_m(x_n) \right| \leq \varepsilon, \ (1)$$

where ε is the practical error of the coincidence of the above models.

Only in this case, the use of models $Y_m(x_n)$, $Y^{opt}_m(x_n)$, $Y^{new}_m(x_n)$ will ensure the successful survival of the *OS*, otherwise it may die. It is the set of such models that is stored in the type knowledge matrix (KTM), which really ensures the identification of the above models and adaptation of the *OS* to real changes

in the external environment, ensuring its survival in a changing environment [2, 10-11,15].

Unfortunately, until now, most people do not pay due attention to the 2-nd law of the dialectics of nature, which requires, when using the $Y_m(x_n)$, $Y^{opt}_m(x_n)$, $Y^{new}_m(x_n)$ models, the creation of various "system effects", i.e. OS counter measures that balance all typical aircraft impacts on the OS during the time interval Freeze interaction Δt_n $OS_m \leftrightarrow CS_k$. To create "system effects", nature uses the law of resonance (from the French reson - I respond) - the frequency-oscillatory response of the OS to periodic oscillatory effects, manifested in a sharp increase in the amplitude of stationary oscillations $\omega_1, \omega_2, ..., \omega_q$ when external influence coincides ω_k with certain values ω_q OS specific. Under the influence of resonance, the oscillatory system is especially responsive to such external oscillatory influences. Therefore, the human brain controls the joint work of the executive organs of the body with the help of the law of resonance, through the frequency spectrum $\omega, \omega_1, \omega_2, ..., \omega_q$, coinciding with the natural frequencies of its executive organs [9]. Their joint synchronous work ensures the creation of "system effects" that ensure the survival of the OS in various interaction situations typical for it $OS_m \leftrightarrow CS_k$.

With the help of these models and a computer program - *Fast Fourier Transform* (*FFT*), which calculates the above *PE* spectra q for models $Y_m(Y_n)$, $Y^{opt}_m(x_n)$, $Y^{new}_m(x_n)$, it is necessary, based on the law of resonance, to calculate the spectrum of a specific frequency-selective response of the OS $\omega_1, \omega_2, ..., \omega_q$ on a specific current external impact of the surrounding external environment on it, thus ensuring its survival during the time interval Δt_n. Only such a freeze-frame interaction $OC_m \leftrightarrow CS_k$ ensures OS adaptation to the effects of CS and OS survives. The algorithmic model of the *adaptive control mechanism* (*MAC*) of the OS, capable of providing such adaptation to changes in the external environment, is shown in Figure 1.
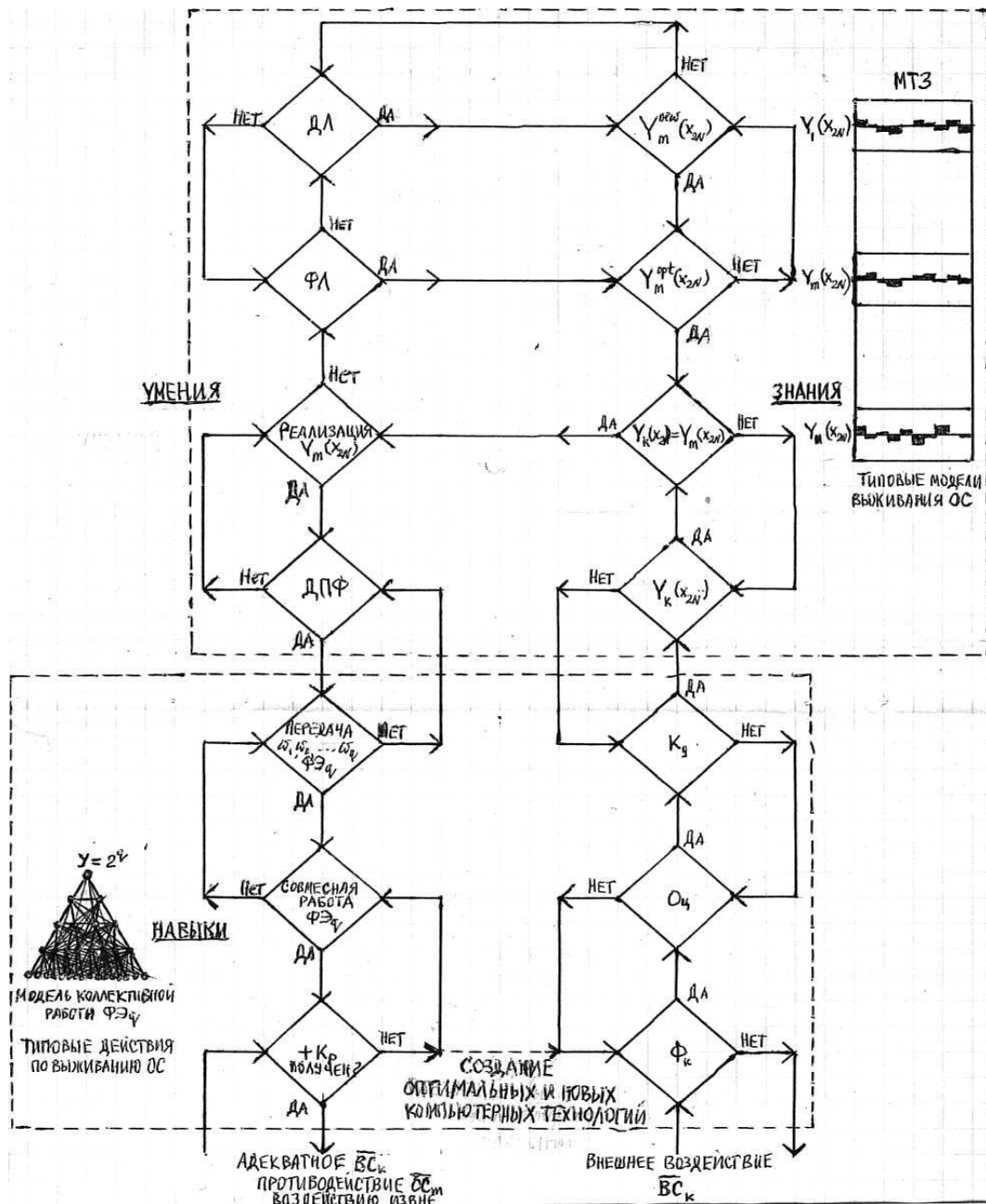
Figure 1. Algorithmic model of MAU *OS*.

Figure 1 in the upper right corner, the MTS is indicated, and in the lower left corner, hierarchical organizational structures of *q functional elements* (FE_q), synchronous, whose work creates the "system effects" necessary for the survival of the *OS*. Block **Фк** fixes the input signals of *OS* interaction with the aircraft; in the **Оц** block, the signal is evaluated or it is returned to **Фк**; in the **Кд** block, the signal is coded or returned to **Оц**; in the $Y_k(x_n)$ block, a model of the current freeze-frame of the external influence is built or returned to **Оц**; in block

$Y_k(x_n)=Y_m(x_n)$ the current model $Y_k(x_n)$ <u>is compared</u> with all standard models $Y_m(x_n)$ of MTS. If the models $Y_k(x_n)=Y_m(x_n)$ match, the model $Y_m(x_n)$ is transferred to the <u>implementation block</u> $Y_m(x_n)$. Otherwise return to block $Y_k(x_n)$; in the <u>implementation block</u> $Y_m(x_n)$, decisions are made on the implementation of the model $Y_m(x_n)$ and a transition is made to the **ДПФ** block or to the **ФЛ** - formal logic block, where an improved model $Y^{opt}_m(x_n)$ is constructed according to the laws of mathematical logic; In the **ДПФ** (Discrete Fourier Transform) block, the natural frequencies $\omega_1,\ \omega_2,\ ...,\ \omega_q\ q$ of the executive functional elements of the FE_q are calculated, ensuring the creation of a "system effect" that contributes to the survival of the OS during the current time interval Δt_n or return to the **ДПФ** block; Broadcast **$\omega_1,\ \omega_2,\ ...,\ \omega_q$ executive FE_q** carried out via any working communication channels (Figure 1) clearly ensures joint (synchronous) **work FE_q** or return to the previous block; in the block **+К$_P$ received** the achievement of the OS required for survival is fixed **+К$_P$** and move on to the next $k+1$ freeze-frame or return to collaboration block FE_q, stating by feedback the survival or non-survival of the *OS*. In the second case, the *OS* must take measures to immediately search for models $Y^{opt}_m(x_n)$ or $Y^{new}_m(x_n)$.

At the same time, in the human body, nature has worked out two options for its survival. The first option is based on a partial or complete improvement of the typical models $Y_m(x_n)$ due to their optimization, i.e. creation of one, several or all of its improved (optimal) models $Y^{opt}_m(x_n)$ instead of the old $Y_m(x_n)$. The second option implements a complete recalculation of the MTS, which ensures the creation of a completely new MTS, where all its new $Y^{new}_m(x_n)$ models have fundamentally new unique qualities. In other words, the <u>optimization of the</u> MTS provides only a partial improvement of the MTS, based on the existing standard models within the framework of formal mathematical logic in the **ФЛ** block - the <u>formal logic</u> block, and the creation of a fundamentally new MTS with completely new original models $Y^{new}_m(x_n)$ is implemented in the *dialectical logic block* - **ДЛ**. It finds out whether it is

possible to formally improve one, some or all models $Y_m(x_n)$. If it is possible, then a transition is made to the **ФЛ** block, where they are created and take their places in the improved MTS, otherwise, return to the $\boldsymbol{Y_m(x_n)}$ implementation block. The **ДЛ** block is activated by the human brain when he has to solve a <u>problem</u>, i.e. create a fundamentally new class of mathematical models that ensure the survival of the *OS* in extraordinary (problematic) situations for it, by creating many new models and ways to implement them, allowing the *OS* to survive. If a person (mankind) succeeds in this in the **ДЛ** block, dialectical logic radically changes the MTS and moves to a new intellectual level of its interaction with nature (and people). Otherwise, he or all of humanity may perish. In the **ДЛ** block, within the framework of the laws of the dialectics of nature [16], new ways and methods for cardinally improving the MTS are being established and a transition is being made to the $Y^{opt}{}_m(x_n)$ and/or $Y^{new}{}_m(x_n)$ blocks based on the latest advances in science and technology. Thus, the algorithmic model of adaptive control of the *OS* presented by us (Figure 1) allows, within the framework of the three laws of dialectics of nature, to successfully search for a positive end result for the $OS +Kr_m=OS_m=ES_k$.

Thus, with the help of creative use of the possibilities of formal and dialectical logic through practical confirmation of new possibilities of optimal MTS_{opt} and new MTS_{new}, a person continuously develops his intellectual abilities [3-7]. The result of the implementation of the model $Y_k(x_n)$ suggests two options for the interaction of $OS_m \leftrightarrow BC_k$:

$$Y_k(x_n) = Y_m(x_n). \text{ (2)}$$

$$Y_k(x_n) \neq Y_m(x_n). \text{ (3)}$$

In case (2), the *OS* survives, and (3), it may die if it does not find a way to ensure its adaptation to new conditions. However, in case (3), the natural intellect (human mind), within the framework of the laws of the dialectics of nature, has found a step-by-step way to achieve (2) by strengthening its creative potential with the help of a mandatory test of its power in practice.

This was confirmed by A.N. Kolmogorov [8] and E.V. Evreinov [7], who theoretically and practically proved the need to use the achievements of **discrete mathematics** and the **model of a team of calculators**, which has no performance limitations (Table 1) [6-8].

Table 1. Comparison of calculator models and a team of calculators

Calculator model	Calculator Collective Model
Sequential execution operations;	Parallel execution of operations;
Fixed logical structure computing	Variable logic structure
Structural heterogeneity elements and connections	Structural uniformity elements and links
Has a height limit VT performance	Has no growth restrictions VT performance

It allows us to understand why *OS* survival is possible only if the condition $Y_k(x_n)=Y_m(x_n)$ is met. The computing community model is a major tool for enabling a breakthrough in the growth of high-speed computing. It has been established that the "system effect" $Y_m(x_n)$ required in terms of performance in the *OS* is achieved in the same way, namely, by the synchronous (parallel) operation of its *executive (functional) elements* (*FE*) [11-12].

All lines in it $Y_m(x_n)$ capable of $Y_k(x_n)=Y_m(x_n)$ work automatically in typical situations, and when $Y_k(x_n)\neq Y_m(x_n)$ - adapt to changes in the external environment. The numerical values included in it are presented in fractions of a unit (in a dimensionless form), which ensures their correct mathematical comparison and use.

As a rule, *M=N*, and *2N* is the total number of equal parts *Δx_n=1/2N* of the segment [0,1] obtained by the dichotomy method. $Y_k(x_n)$ and $Y_m(x_n)$ are the same type dimensionless values of the current *k* and typical *m* discrete functions $Y_m(x_n)$ of MTS, suitable for unique identification of $Y_k(x_n)$. In the installed A.N. Kolmogorov formula (4)

$$Y(x_1, x_2,...,x_N) = \sum_{n=1}^{2N+1}\left(g_n \sum_{m=1}^{N}(h_{mn}(x_m))\right) = \sum_{n=1}^{2N+1}\left(\log_2 \sum_{m=1}^{N}(h_{mn}(x_m))\right), \quad (4)$$

where $x = (x_1, ..., x_N), 0 \leq x_n \leq 1$.

with on the left is a continuous function of many variables $Y(x_1, x_2, \ldots, x_N)$, and on the right is a set of their 2-dimensional unit squares 1×1, in which segments in the interval $[0, 1]$ are subdivided by the dichotomy method (strict division in half of each subsequent segment in this interval). Monotone discrete mappings of columns $h_{mn}(x_n)$ having the same base $\Delta x_n = (x_n + 1 - x_n)/2N$ do not depend on a specific function $Y(x_1, x_2, \ldots, x_N)$. This means that for the implementation of functions of many variables, summation operations and compositions of a universal function of one variable are quite sufficient. Its composition in a universal dimensionless form includes all n discrete parameters of the external influence signal $Y_{km}(x_{km})$, which are balanced by n parameters of the counteraction signal $Y_{mn}(x_{mn})$ from the body.

In the human brain, all the values of $h_{mn}(x_{mn})\Delta x_{mn}$ and $h_{mn}(x_{mn})\Delta x_{mn}$ in $Y_m(x_n)$ and $Y_k(x_n)$ are strictly ordered and divided into: 1) external, coming from outside; 2) internal, reflecting the state of the *OS* and supplying it with PV resources (to maintain homeostasis and proper behavior); 3) target (control signals that ensure the achievement of the desired $+Kp_m$), changing the nature of interaction $OS_m \leftrightarrow ES_k$ from $Y_m(x_n) \neq Y_k(x_n)$ to $Y_m(x_n) = Y_k(x_n)$. The size of the MTS is $M \times 2N$, where M is the number of MTS rows and $2N$ is the number of parameters x_n in $Y_m(x_n)$. If for each $Y_k(x_n)$ and $Y_m(x_n)$ into the sum of the absolute values of all columns $\left| h_{mn}(x_n)\Delta x_n \right|$ having the same bases Δx_n, then each row

$$Y_m(x_n) = \sum_{n=1}^{N} \left| h_{mn}(x_n \Delta x_n) \right|$$

will have its own unique numeric value. When condition (6) is satisfied

$$|Y_k(x_n) - Y_m(x_n)| \leq \varepsilon \text{ and } |\Delta x_{2n}| = n|x_n + 1 - x_n| / 2N \leq \delta. \quad (6)$$

where ε and δ are the practical errors of coincidence of the values $Y_k(x_n)$ with $Y_m(x_n)$ and Δx_n, compared before and after the m-th successful <u>behavioral act</u> (BA$_m$), there is a real opportunity to establish the coincidence of $Y_k(x_n)$ with $Y_m(x_n)$ and run to achieve $+Kp_m$ in the current k-th freeze-frame, the corresponding collective work of the *FE*.

Amount phorses $|h_{mn}(x_n)\Delta x_n|$ for each function $Y_{mn}(x_n)$ are unique integral values that identify the *m-th* freeze-frame. Conditions (6) make it possible to clearly distinguish freeze-frames $Y_m(x_n)$ and $Y_k(x_n)$ as objects having different unique integral numerical (values) – <u>qualities</u>. Such reliable information allows a person (trained automaton) to unambiguously identify or not to identify a typical *OS* current freeze-frame $Y_m(x_n)$ under the condition $Y_m(x_n) \approx Y_k(x_n)$ (with admissible errors ε and δ).

In the case of such identification based on the law of resonance and discrete Fourier transform (*DFT*), MAU *OS* automatically calculates the spectrum of natural circular frequencies $\omega_{m1}, \omega_{m2}, …, \omega_{mq}$ (*FE_{mq}*) and launches the *m-th behavioral act* (*BA_m*), i.e. synchronous joint work q *FE*, which ensures the survival of the *OS*. MTS, based on such MAU *OS*, provides it with new standard knowledge necessary for its survival in all standard situations known to it at the current time (*m=1, N*) of successful interactions $OS_m \leftrightarrow ES_k$.

Usually under <u>knowledge</u> imply a result of knowledge that can be logically or factually substantiated, and then empirically or practically verified. According to this common interpretation, knowledge (K_n) is a <u>model</u> that unambiguously corresponds to the real state of affairs, justified by facts and rational arguments, human beliefs. Speaking of knowledge, most often they mean an unambiguous, unique <u>qualitative</u> reflection of reality in the human mind. In this regard, we believe that knowledge is represented by scheme (7):

$$\textbf{Kn}: (Y_m(x_n) \leftrightarrow MIM_m) \rightarrow +Kp_m. \ (7)$$

where $Y_m(x_n)$ is a working model that has an automatic model implementation mechanism (MIM_m) that ensures the achievement of the goal $+Kp_m$ (desired positive result).

Sucha mechanism for the formal implementation of standard knowledge (7) very successfully uses automatic data processing with the help of a computer. When using digital means of communication, such a complex includes an <u>information and communication structure</u> (*ICS*) and <u>software</u> (*SW*), which uses

machine learning methods, processes and services for data processing, and a quick search for the right (optimal) management decisions [9]. At the same time, *artificial intelligence* (*AI*) ensures the effective use of software tools and *information security* (*IS*) and *information protection* (*IP*) technologies in computing systems and networks in typical *open systems* (*OS*) situations, and natural intelligence (EI), in herent only to humans, in a typical (extraordinary) situations.

Therefore, already now, with the correct addition of the skills and abilities of a creative person to MTS, such MTS_{opt} and MTS_{new} able to provide both optimization of individual private models $Y^{opt}{}_m(x_n)$, as well as cardinal automatic recalculation of all $Y^{new}{}_m(x_n)$ by introducing new or eliminating non-working x_n parameters, thereby ensuring the successful operation of the OS in typical and unusual situations of $OS_m{\leftrightarrow}CE_k$ interaction.

For the development of UAU *OS*, standard knowledge may not be enough. Therefore, MAU *OS* should automatically perform its typical management functions in real time (RWM), as well as, with the help of a person, quickly create and work out the optimal and new actions necessary for MAU *OS* with the proper "system effects" to ensure its survival in new conditions for the *OS*. In other words, MAU *OS* should really help a person (team) to rapidly develop their knowledge and implement it in the RWM, clearly distinguishing between the terms skills and abilities. Skills is the ability of a person to creatively identify in real situations new, more advanced optimal $Y^{opt}{}_m(x_n)$ and new $Y^{new}{}_m(x_n)$ models, to quickly clarify which typical or new circular frequencies $\omega^{opt}{}_q$ and ($\omega^{new}{}_q$) will be able to create new "system effects". All this creates the prerequisites for the rapid development of skills that ensure the survival of the OS in extraordinary situations. Skills are bringing to automatism the ability to implement $Y^{opt}{}_m(x_n)$ and $Y^{new}{}_m(x_n)$, in the shortest possible time and with due efficiency due to a cardinal improvement of the initial MTS. (MTS_{opt} and MTS_{new}).

In this regard, we can argue that <u>information</u> is a <u>mathematical model</u> of one or more variables, <u>which has a unique quality</u> that allows a <u>person</u> or a trained <u>machine</u> (more precisely, a digital electronic computer /digital computer, computer/ and a digital data transmission system to uniquely <u>identify it</u> (endow it with specific quality), and then, with the help of discrete mathematics and formal mathematical logic, <u>write computer programs</u> that are <u>precisely and unambiguously understood and executed by the computer</u>, strictly and formally manage the activities of the OS, in typical situations for it. <u>Data</u> is a digital representation of information uniquely identified by the computer.

A correct understanding of the place and role of information in everyday activities allows a person to competently use knowledge in his professional and personal life, to ensure successful survival and development in a changing world. MAU *OS* is a control system that ensures its survival as an *OS* by balancing the current external freeze-frame impact from outside $Y_k(x_n)$ with an adequate opposition $Y_m(x_n)$ from the *OS*. In fact, MAU *OS* helps a person (team) to get the necessary for his survival adaptive result in any time interval of the current freeze frame $Y_k(x_n)$. In it, the continuous function $Y(x)=Y(x_1. x_2, …, x_N)$ is presented as an *M×2N* matrix, which is calculated using the Eidos software package [10-11]. Each of the functions $Y_m(x_n)$ is compared with the current function $Y_k(x_n)$. If they coincide, using the <u>fast Fourier transform</u> (FFT), the spectrum of circular $\omega_1, \omega_2, …, \omega_q$ resonant frequencies is calculated for q executive PV *OS*, which ensure the creation of a "system effect" that balances the external influence $Y_k(x_n)$ and the *OS* survives. If $Y_k(x_n)$ does not match $Y_m(x_n)$, the *OS*, as a rule, dies.

If the *OS* is able to optimize some of its old $Y^{opt}_m(x_n)$ or create new $Y^{new}_m(x_n)$, then she has a chance to survive. By sharing the modeling of $Y_m(x_n)$ and creating, with the help of the law of resonance, the proper "system effects" inherent in $Y_m(x_n)$, nature has created in the human body a very effective mechanism for controlling the *OS*, not only in typical, but also extraordinary

situations for them. It is the presence of such an ability in a person that allows a creative person to successfully apply and develop his knowledge.

The complex use of knowledge, skills and abilities by a creative person in practice is illustrated by the following chains of *OS* interaction with a changing nature (Figure 2):
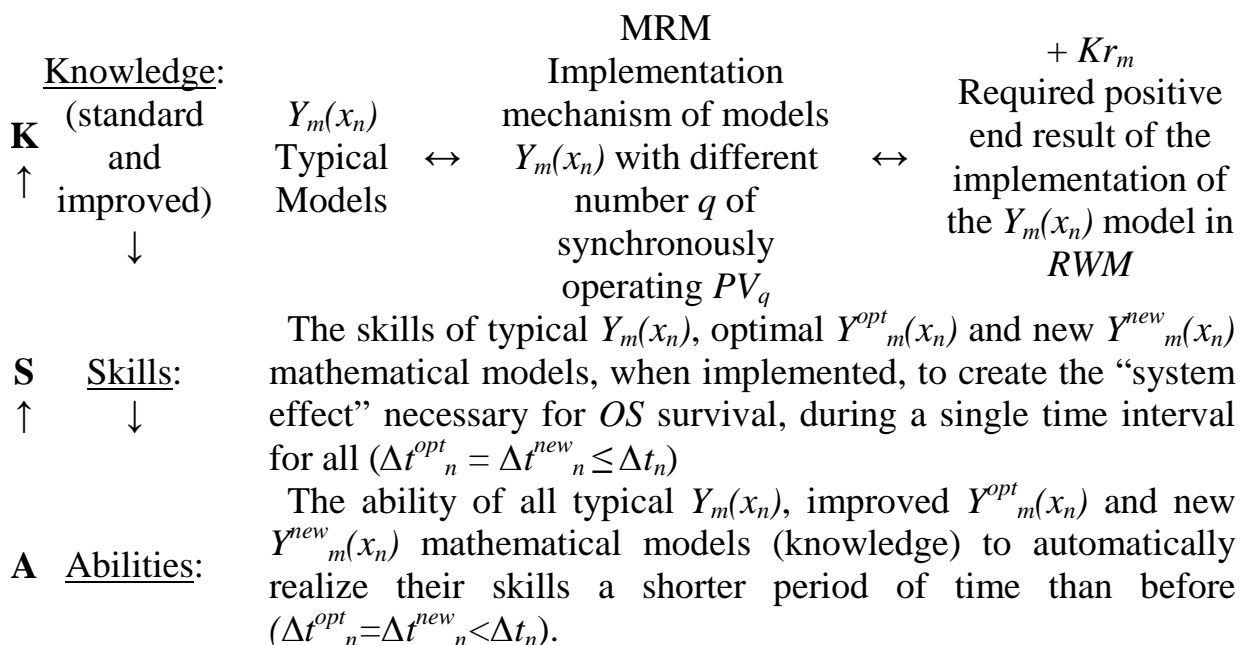
			MRM		$+ Kr_m$
Knowledge: (standard and improved)	$Y_m(x_n)$ Typical Models	$\leftrightarrow$	Implementation mechanism of models $Y_m(x_n)$ with different number q of synchronously operating PV_q	$\leftrightarrow$	Required positive end result of the implementation of the $Y_m(x_n)$ model in *RWM*

K
↑
↓

S   <u>Skills:</u>   The skills of typical $Y_m(x_n)$, optimal $Y^{opt}_m(x_n)$ and new $Y^{new}_m(x_n)$
↑   ↓   mathematical models, when implemented, to create the "system effect" necessary for *OS* survival, during a single time interval for all $(\Delta t^{opt}_n = \Delta t^{new}_n \leq \Delta t_n)$

A   <u>Abilities:</u>   The ability of all typical $Y_m(x_n)$, improved $Y^{opt}_m(x_n)$ and new $Y^{new}_m(x_n)$ mathematical models (knowledge) to automatically realize their skills a shorter period of time than before $(\Delta t^{opt}_n = \Delta t^{new}_n < \Delta t_n)$.

Figure 2. Relationships of ZUN$_s$ in human creative activity

Figure 2 shows that **k**nowledge is a set (set) of typical mathematical models of effective synchronous activity of a different number of *functional elements* (*FE*) of the agro-industrial complex, which, with their correct mechanical collective implementation, by professional people and their automatic means, provide in the same time intervals Δt_n of freeze-frame interaction $OC_m \leftrightarrow BC_k$ of APC reactions with the proper integral maximum "system effect", balancing the current integral impact of the external environment $Y_k(x_n)$. With such interaction in the current time interval Δt_n, when $Y_m(x_n) = Y_k(x_n)$, all the above joint actions of people and equipment are performed automatically (automatically), which enables a person to successfully perform his professional activity with a *proper positive end result* $(+Kr_m)$. **S**kills are the ability of the agro-industrial complex to successfully implement all typical

$Y_m(x_n)$, optimal $Y^{opt}_m(x_n)$ and new $Y^{new}_m(x_n)$ mathematical models of its professional activity, which allow, with proper use of the "system effect", to successfully survive in a changing world. <u>A</u>bilities are skills brought to automatism, but already on the basis of a radically improved MTZ_{new} (with the latest typical mathematical models $Y^{new}_m(x_n)$).

From the provisions of specific mathematics and the practice of effective application of mathematical models, the need for the widespread use of this triad, the so-called ZUN_s (knowledge - skills - abilities) in the *OS*, without using the latest achievements in science, vocational training and production is clearly seen.

All this is spelled out in detail in Decree of the President of the Russian Federation of October 10, 2019 No. 490 "On the development of artificial intelligence in the Russian Federation" [12], which approved the National Strategy for the Development of AI for the period up to 2030. From these positions a block of knowledge is an area of using *AI*, which is defined as a set of technological solutions that imitate human cognitive functions (including self-learning and searching for solutions without a predetermined algorithm), which allows, when solving specific problems, to obtain results that are at least comparable to the results of human intellectual activity. The skill block includes an information and communication structure (communication), software, processes and services for data processing, autonomous search for optimal and new solutions, and the skills block allows you to really verify the ability of the agro-industrial complex to find optimal and fundamentally new ways to solve problems and problems, related to his survival in a changing world. Comprehensive use of available and developed knowledge, skills and abilities (KAS) by an individual and a team, and even better, their constant development contributes to the real survival of the agro-industrial complex in the new conditions. If there is a well-run system for the rapid assimilation of new knowledge, the development of the corresponding skills and abilities, the work

of any specialist and team of the agro-industrial complex will always be successful.

With the rapid development of the above ZUNs, any revolutionary ideas, models, technologies are quickly transferred to the category of typical ones, but with qualitatively new capabilities. So the human body, as the most perfect *OS* (with *EI* and armed with *AI*), ensures its successful functioning (automatic problem solving) and the development of its intellectual capabilities by improving its skills and abilities - ensuring their mechanical, i.e. automatic implementation. Only such a harmonious interaction of natural and artificial intelligences (AI and AI) can really ensure the survival of the agro-industrial complex in a constantly changing environment (*CS*). With the rapid development of the above ZUN, any revolutionary ideas, models, technologies are quickly transferred to the category of typical ones, but already with qualitatively new capabilities.

Any freeze-frame of interaction $OC_m=CS_k$ is the establishment of the fact of coincidence or non-coincidence of their images: mathematical models $Y_m(x_n)$ and $Y_k(x_n)$. In the first case, the $Y_m(x_n)$ model is put into operation, which, using the *DFT*, calculates the entire spectrum of circular resonant frequencies ω_1, ω_2, ..., ω_N, for discrete values x_1, x_2, ..., x_N, but leaves and passes on only the spectrum circular resonant frequencies ω_1, ω_2, ..., ω_q, providing, according to the law of resonance, synchronous operation of q actuating functional elements (FE_q). With the help of this frequency spectrum, synchronous collective work of only q functional elements (FE_q) is ensured, the frequencies of which coincide with one of its specified circular resonant frequencies, which coincide with its own resonant frequency. Just in this way,

If attackers can distort identification processes $Y_m(x_n)=Y_k(x_n)$ and calculation of resonance frequency spectra ω_1, ω_2, ..., ω_q, then they can drastically worsen or even destroy the process of obtaining the required "system effect". This will directly contribute to the failure of the *OS* or its destruction,

death. When using the Eidos system, these processes are reliably controlled, i. it does not allow the possibility of reducing the effective activity of the *OS*, due to the distortion of information [10-11,15].

Литература

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