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Research Article

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Neurophysiological Approach to Efficiency Check of Organizational Systems

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Abstract

Problem statement: *Organizational systems are used in different areas. They are the subject for investigation in biology and other scientific fields. They consist of many interrelated elements. Efficiency check of organizational systems in non-equilibrium state is an urgent task. Conception of organizational systems was examined by P. K. Anokhin in the theory of functional systems. Achieving a useful result based on the restriction of the degrees of freedom is the main characteristic of the functional system.*

The aim of the paper was to suggest efficiency check of organizational systems using the neurophysiological approach.

Results: *We have considered motivation and memory (acquisition of new skills) in supra-organismic and organismic organizational systems. It was proposed that the conception of neural networks blockades lead to dominant center formation and decrease the efficiency of organizational systems in paradoxical way. There were listed several methods for constriction the number of complex degrees of freedom with filtration of informational noise and the elements of consciousness. Logical links between elements of organizational systems are based on these methods.*

Practical Significance: *The results of the research can be used for the efficiency check of organizational systems in non-equilibrium state. Efficiency of organizational systems can be restored by elimination of neural network blockades with the relevant elements of consciousness, which complex degrees of freedom are corrected.*

Keywords: Organizational System, Neural Network Blockade, Degrees of Information Filtering, Complex Degree of Freedom, Elements Of The Consciousness of the System

1. Introduction

Organizational systems are important in management, sociology and biology. Organizational systems are regarded as considerably important structures. The analysis of the management efficiency is reduced to the possibility of solving the problem that occurred in the system. Organizational system is a combination of connected elements formed a whole and having definite signs. Connection between elements in the system is necessary to achieve a goal. Needs and interests are the main driving force in development and functioning of organizational systems [1].

Management method is important in organizational systems, which contain stable structural links of group interaction [2, 3]. Communication in any organizational system is not only an informational process, but also relation between individuals [4]. Processing incoming information is a pivotal role for each organizational system [5,6].

Links between a person and environmental elements are represented as organizational structures. A person is an important unit of the organizational system. From the personal point of view, knowledge of the individual is a general fund of organizational structures. They are divided into formalized (or explicit) and non-formalized.

Formalized knowledge can be expressed by words, numbers, symbols. Thus, it can be explained and propagated easily. Eastern researchers put a different meaning into the concept of "knowledge". Formalized meaning for them is an evident, materialised part of hidden sense. Its value is open to individuals.

Non-formalized knowledge is opened to a single person, and it can be used by him only. It exists on an individual level and cannot be formalized. This makes it difficult to transfer it. Such knowledge is linked closely with individual experience and is individual value of its owner. The identification and use of implicit knowledge makes it possible to see an organization not as a formalized information processing machine, but as a system identified with a living, functioning organism. The world in which the system begins to function becomes clear, or if possible, it is necessary to create it, that is, to organize what this system is for, which becomes more important than simple information processing. Such subjective concepts as "premonitions", "guesses", and "intuition" are important for such a system [7].

Considering the wide variety of scientific approaches to organizational systems, which emphasize their need for the development of modern society. It became possible to talk about the importance of such an organization in the presence of a knowledge fund in it, as well as the concept of individual implicit knowledge taken from the experience of Eastern researchers [7]. Elaborated by M. V. Fedulov, the theory of constrained system in the martial arts of the East (MAE) is the most appropriate for the investigation of organized systems. It allows us to look at them both from the outside in terms of the hierarchical structure (internal logic of the system) and from the inside, that is, from the point of view of an individual who can formalize his implicit knowledge with the help of its identified elements [7-9].

The theory of the functional systems by P. K. Anokhin explains the activity of each organizational system, including supra-organismic one. For this reason, any patterns that are described for it can also be used to describe supra-organismic organizational systems. Anokhin determined that the main task of the functional system and its distinctive feature is to acquire a useful result [10]. To obtain it, it is necessary to eliminate unnecessary degrees of freedom between the elements. The theory of functional systems, with its unique approach, enriches the understanding of organizational systems by finding the necessary details from all the "information chaos" to solve the problem of obtaining a useful result.

Thus, a useful result is the only criterion that can separate a functional system from a set of elements that are not related to each other. Anokhin considered the reduction of degrees of freedom as one of the main links that helps to establish a working link between elements in hierarchical structures. In our work, it has been shown that reducing degrees of freedom increases the efficiency of movements in MAE [11]. The purpose of the work is to propose a scheme for checking the efficiency of organizational systems using a neurophysiological approach.

2. The Integrative Process of Selecting the Number of Degrees of Freedom for the Correct Operation of the Organizational System

According to Anokhin's theory of functional systems, the first block is very important for the correct operation of the entire functional system. It includes such elements as situational and trigger afferentation, afferent synthesis, memory and motivation blocks. Motivation is the key to acquiring properties, since it allows us to reduce the number of degrees of freedom, leaving only the most necessary. Consider how individual motivation is formed. Individuality is considered relative to objective reality, that is, through interaction with one's own kind [12].

Simonov approached the problem of individual differences from the perspective of the need-information theory of behavior organization developed and formulated by him [12]. The main driving force defining the concept of an individual's activity is the manifestation of need, a specific force of living organisms that communicates with the external environment for self–preservation and self-development. It supports the activity of living systems in the surrounding world and influences individual thinking [12]. Simonov and Ershov argued that the transformation of needs into externally realized behavior went through a series of stages of "objectification", i. e. motivation. The lack of information about the state of the body and the need to take certain measures deprive the individual of motivation for an appropriate search. The lack of information about the work of any of its elements stops its further development.

However, this approach indicates the complete dependence of the individual or an organizational system on objective reality [12]. Therefore, awareness of interaction with the elements of consciousness of the system as a supra-organismic structure (noosphere) carries out information control of logical chains, which comes instead of intuition, as a kind of superconsciousness [13]. These elements of the system are not "objectified", as they serve as intermediaries between the immaterial structure of the system and the material carrier of their information – the brain [14]. Their intellectual and logical search indicates the motivational nature of the search for the necessary solution, which, as it turned out, manifests itself when interacting with the elements of the system's consciousness, which can be considered satisfaction of their needs. This consists in acquiring the appropriate properties inherent in the system to influence them on the recipient [15]. The motive for creative interaction with the system lies in satisfying the need to be independent of external circumstances (objective reality) [9].

Consider the organization of motivation in a systematic approach, a principle that is adopted in organizational systems that differ in efficiency. An organizational system is considered workable if it can exist in conditions of imbalance. The motivation in the system approach lies not so much in the ability to provide creative activity to an individual, expressed in the actualization of memory traces, as in interaction with the "objectified" elements of the consciousness of the system. The constant conflict (contradiction) of objective and subjective realities has a negative effect on the individual (Fig.

1). At the same time, subjective reality is identical to the defining parameters of the system. The required parameters, formed on the basis of the principles of logic of the second order [11, 16]. And logically complementing each other (information and technical immunity) and not contradicting subjective reality, will have a positive effect on the individual. As a result, a systemic motivation scheme is formed, the task of which is to keep the individual in constant creative tension.

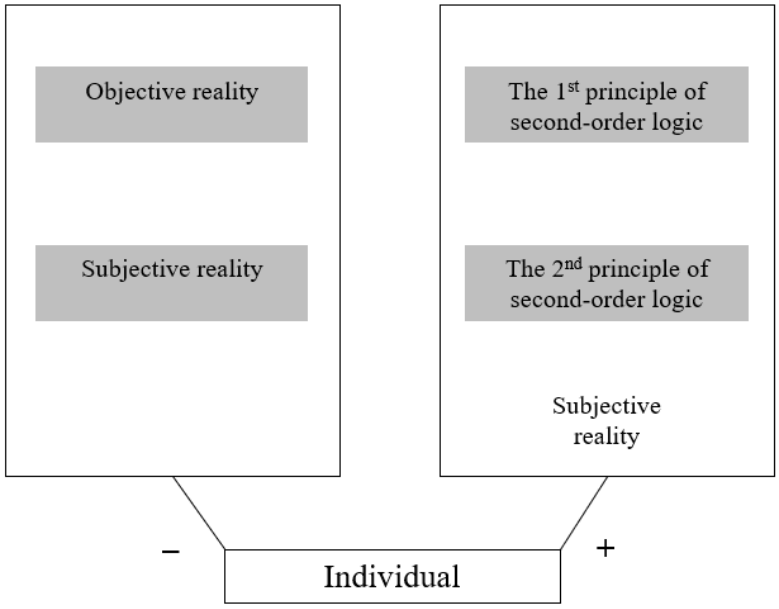

Figure 1: The effect of subjective and objective reality on an individual

Objective reality in such art forms as MAE, acting as the majority opinion, pushes the individual to physical loads, motivating him to them. When agreeing with the opinion of the majority, the individual loses his opinion, and hence his individuality. In this case, there is a substitution of values, when an action imposed by objective reality is accepted by an individual for his personal choice. The further formation of interneuronal connections ensures the development of the brain and leads to the creation of mental images corresponding to objective reality, which can acquire the dominant property [17]. In an individual exposed to the dominant, the personal creative process is replaced by public opinion (objective reality). Therefore, instead of a creative personality, a dominant personality is formed in an individual, based on the opinion of the majority, both negative and positive.

A systematic approach that implements properties in an individual through his interaction with the elements of the system's consciousness neutralizes the dominant features of objective reality, freeing the individual from imposed mental images. An individual, studying the rules of image construction, deliberately avoids copying them, which is the main point of rejecting generally accepted opinions. He becomes a person who follows the required parameters of the system. A creative person evaluates his interaction with the system through its immunological elements, in any situation relying on the limitations of the appropriate order – information-technical immunity (ITI). A person who is free from other opinions, but who does not ignore them, but passes their information through ITI, as through a kind of filter, is capable of creativity and art. Such a person, free from generally accepted opinions about beauty, creativity, and art, and indeed having a wide range of freedom to choose the right degrees of freedom, finds absolute protection from public opinion in the elements of the system's consciousness.

The criterion of truth in interaction with the immunological elements of the system is awareness of the process of interaction with it to acquire a significant property for the purpose of its subsequent transmission. For any organizational system, it is possible to consciously choose certain elements, the upcoming interaction with which is formed regardless of political and religious beliefs. The question is, will this interaction define a systematic approach and ensure that the organizational system works as a structure that uses a creative approach to art? The martial arts of the East answer this question with a specific example, namely the acquisition of the rigidity property in the karate system [18].

3. The Mechanism of Skill Formation Leading to the Formation of Neural Network Blockades – Structures that Hinder the Work of Organizational Systems

Consider how a skill is formed, i.e. how the memory block is filled - one of the most important components of a functional system. Memory is defined as a complex phenomenon. It is formed because of individual experience. From the number of degrees of freedom (n), one degree of freedom is selected for the formation of a motor (or other other) skill. In the absence of a "guiding" degree of freedom (the "default" degree of freedom), and therefore in the

absence of an understanding of the principles, emphasis is placed on one of them (in MAE, this is most often a physical force that will work according to the principle of motion optimization: the smallest trajectory, the highest speed and the greatest force).

The presence of a single degree of freedom creates the dominance center in the brain. According to Ukhtomsky's theory, the dominant amplifies all incoming signals, but these signals are directed to the center and thus ensure (facilitation) the implementation of the action through only one output (stereotypical reaction) [17]. The presence of a dominant center does not allow you to use a different degree of freedom, i. e. it does not allow you to look beyond the dominant center. As a result, a *neural network blockade* is created. It is especially enhanced if the action performed leads to a useful result. Then the individual is convinced that the action he performed is correct. If at the same time the individual has experienced a positive emotion (reality has exceeded his expectations), then the conviction is strengthened [19].

This is how an individual's opinion becomes a private opinion based on individual experience. If the number of carriers of neural network blockages is large, then opinions from private (from individual experience) become generally accepted. The main difficulty in following a generally accepted opinion is that there is no criterion that would allow us to understand whether it is true or false, i.e. whether it is not fraught with errors. The optimization principle is based on copying an image to further simulate it. As examples, we can analyze physical loads, the purpose of which is to adapt to an artificially created environment (a sports hall for MAE). Physical loads are subject to the principle of optimization in the case of the beginning of copying the imposed image (athlete's training), and it is in this case that the individual encounters the problem of objective reality. In many cases, the manifestation of images through objective reality requires the individual to fulfill the needs that have arisen through temperament and character [12].

It can be concluded that the individual needs self-realization. This motivates him to search for an opportunity to "objectify" himself through his self-expression in physical culture. The result of this kind of self-expression (through physical culture and image copying) is usually achieved through psychological stress. Information about the possibility of achieving a goal with a systematic approach becomes unclear, since the basis for responding to a request for objective reality is laid in the central nervous system in the form of a stable neural network innervating the corresponding muscle groups. In this case, it is easier for an individual to resort to physical loads than to accept elements of the consciousness of the system. In this way, neural network blockages are acquired, which, according to the laws of the formation of a dominant center, slow down those areas that are outside of it. In other words, there are centers in the inhibition zone that could participate in following the elements of the system's consciousness.

It can be concluded that the elements of the system's consciousness serve as protection against information destabilization introduced into the system by objective reality. On the contrary, a dynamic process of transition from one state to another can be used to stabilize the system, which is analogous to the principles corresponding to the Tai Chi filling and emptying system of the "Great Transition" or the Taekwondo system, which is determined by the vertical movement of the center of gravity both down and up [8, 20, 21]. Only in this case, the process of responding to objective reality is increasing, which ensures the constant creative development of the system. Awareness of any actions performed in accordance with the elements of the system's consciousness provides a way to protect against such external influences (stimuli). These irritations are strategically targeted at eight body systems: nervous, respiratory, cardiovascular, lymphatic, digestive, endocrine, genitourinary, musculoskeletal system. This is the objective reality. The process of overcoming such pressure is possible when establishing contact with the elements of the consciousness of the system, namely through the process of acquiring and transferring properties through interaction with a single matrix of consciousness. So far, this process is the only way to become aware of oneself as a person in the conditions of objective reality, as it provides a creative process for an individual through the proof of one's own "I" in society. The unified matrix of consciousness contains both external and internal parameters (logic of the first and second orders). *External* parameters are understood as the social environment and anatomical features of an individual, *internal defining parameters* are the rules for constructing these elements, and *required parameters* are the selection rules in accordance with the logical relationships between the elements [11].

4. The Main Types of Distribution of Information Impact that Objective Reality has on a Person

Consider what informational effects objective reality can have on an individual. Elements of the consciousness of the system can exist in any field of art and culture. When interacting with them, an individual (later an individualized personality, or an intermediary of the system – an immunological android) becomes able to resist objective reality. That is, it becomes a part or even an instrument of the organizational system. Here, motivation comes to the fore as a person's desire (need) to interact with the system, which in the future may lead to a paradigm shift in moral values. This will allow us to determine the transition to a position that will manifest itself through the implementation of the latest biotechnological methods.

The interaction of an individual with the elements of the consciousness of the system (a single matrix of consciousness) occurs in parallel with the reassessment of objective reality. With physical loads, the emphasis is on the musculoskeletal system. Thus, objective reality requires constant physical exertion from the individual. They are the platform for the principles of optimization and biomechanics.

The process considered makes it possible to determine the main types of distribution of mental loads that objective reality exerts on a personality.

1. The maximum burden exerted by objective reality. With normal physiology in the environment and the adaptation

of muscle structures to it, the emphasis is on the principle of optimization to achieve the goal in the absence or under conditions of basic limitations.

2. The minimum burden exerted by objective reality. The interaction of an individual with the noosphere through the matrix of consciousness, followed by the organization of an immunological android ready for dialogue with the recipient through feedback.
3. There is no burden from objective reality. An individualized personality becomes a carrier of the system.

With the third type of information impact, such a paradigm shift is possible only when the individual realizes the fact of interaction with the system, in which he first becomes a personality himself – an immunological android. Only under these conditions can a new biotechnological unit be formed that meets all the norms of interaction with the system through a single matrix of consciousness. In the latter case, the system's consciousness elements will then be distributed along an associative series in the neocortex of the brain, with each element being assigned an anti-rejection pass code using the ITI recoding process. As a result, a system will be created capable of composing inter-element compositions in an associative series. This ensures the formalization of the transition to a separate self-learning biotechnical unit.

Neural network blockages are the main obstacle to the realization of an individual into an immunological android. The main reason for this is the problem of images being imposed to further imitate them, rather than following the rules of their construction. Imitative forms of behavior exist in wildlife. In organizational systems, an individual, having a prototype in front of him, may well accept it without any distortion, if it is not taken as a copy and not from a behavioral environment.

The situation is different with neural network blockages, when further mindless copying of the image occurs and its transfer to a subsequent individual. In this case, it is not the rule of building the prototype that is transmitted, but its distorted copy (Fig. 2).

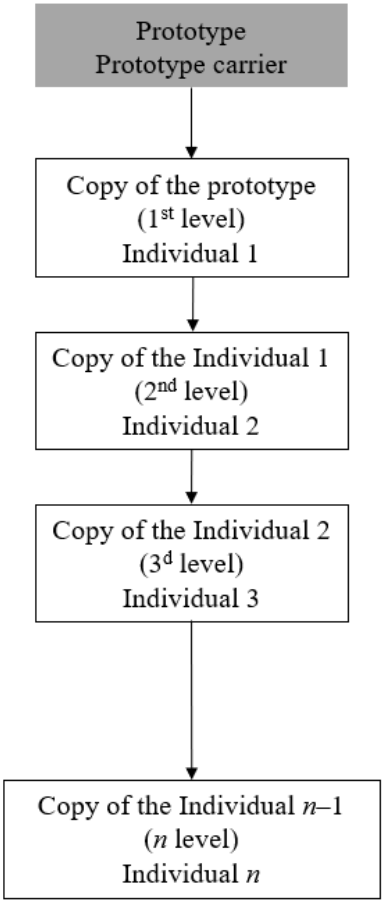

Figure 2: Events that occur when the prototype is distorted because of neural network blockades

In this case, the prototype is the final phase of logical reasoning obtained because of analyzing observations of certain patterns that copied it (the prototype) for further imitation. That is, when individuals did not consider the rule of building a prototype, but relied only on authorities in their actions, who also resorted to copying. Figure 2 shows the result of serial transmission of information. In this case, the transfer of copies of the n order reduces the truth of the prototype to zero. There is only one link consisting of individuals, where the previous one transmits information to the next, but at the same time receives information

from its predecessor. Hence, there is a shortage of information, which ends with the fact that the individual is forced to resort to other sources to acquire knowledge, as this is required by objective reality.

The neural network blockade becomes stronger the more the carriers act on the principle of copying the image, rather than following the elements of the system's consciousness. However, even with this scheme, there is a natural creative process of searching for the best copy image to achieve maximum results. So called informational sprouting appears [14]. In the situation of the formation of such a neural network blockade in relation to the elements of the consciousness of the system, the search behavior of an individual is the tool that is capable of confrontation.

5. Removing Neural Network Blockages Using a Systematic Approach

The formed unified matrix of consciousness is the basis of the process of freeing an individual from neural network blockages. This is possible because the unified matrix of consciousness is represented from the point of view of the neuroanatomical aspect of its formation, which means it is identified as a neuronal structure. The solution of the tasks set by objective reality must occur primarily with the concept of its meaning. In a mathematical problem, the answer should be the same for all those who solve it, while the algorithm for solving the problem may be different depending on the approach used. This is a fundamental difference from the systemic approach, where an individual, trying to enter a dialogue with the elements of the system's consciousness and interacting with them, finds exactly his own solution to the problem to get an answer to the question posed. And the validity of the option is determined by the feedback established with the organizational system. This approach ensures the removal of neural network blockages previously established by objective reality and negatively affects the development and creative abilities of an individual.

Independence from the need to copy the original image underlies the formation of an individualized personality interacting with the system through a single matrix of consciousness. In other words, it turns out to be an objective reality, free from neural network blockages. Consider how to avoid neural network blockages that interfere with an individual's interaction with the organizational system. Discuss how neural network blockages, like obsessive images, interfere with interaction with the system. And is there a possibility of opposing these images? Moreover, through them, objective reality keeps the individual in a state of subjugation, depriving him of any creative principle. The reason for such a phenomenon as the rejection of an organizational system under the pretext of unavailability lies in the individual himself. But the most dangerous thing is conscious opposition to the system, which can turn into disaster for the individual.

Consider the steps of an individual's transition to interacting with the system.

Step 1: Visual observation. It consists in observing from the outside certain images constructed according to the rule of their construction, which is a fundamental difference from the creation of image copies. However, the conscious element of the system itself does not carry any "special" information. It manifests itself in it only if it is recognized as part of the entire organizational system. Therefore, the next step is necessary, bringing the individual closer to interacting with the system.

Step 2: The acceptance of system components as elements of the consciousness of the system, followed by the inclusion of the individual in the overall logical chain of the organizational system. At this stage, there is a logical distribution of elements in the individual's mind, depending on their affiliation to the system, which determines and makes it possible to trace the order of these elements later. The individual begins to realize the simplification of the whole process. This is necessary for the individual's perception of the system, that is, this stage is a platform for the transition to the third step.

Step 3: Interaction with the elements of the consciousness of the system. At this step, the individual realizes the full depth of the systemic approach, which includes external and internal logic. This happens when interacting with the elements of the consciousness of the system, through which the individual begins to acquire properties for their effect on the recipient. ITI begins to function, supporting the entire hierarchical structure of a single matrix of consciousness. The individual becomes an individualized personality, a carrier of the system (an immunological android). At this step, neural network blockages are lifted.

Step 4: This step is strategic in nature. It is not so important and interesting compared to the previous three steps, since it involves ordinary processes of an adaptive nature that are necessary for the social environment to change paradigms and lead to the emergence of self-learning biotechnological units in the form of separate infrastructures.

So, a constructive approach to solving the problem of removing neural network blockages is to interact with the system through the matrix of consciousness. This ensures the individual's creative approach, which consists in step-by-step integration into the organizational system.

6. Three-Level Filtering as a Verification Mechanism for the Approaches used

Consider the ways that can be used to correctly eliminate "unnecessary" degrees of freedom and achieve efficiency in the work of organizational systems. When the number of carriers of neural network blockages is large, opinions from private (from individual experience) become generally accepted. Is there a criterion by which we can check whether the generally accepted opinion is true, whether it is not fraught with some kind of error?

To do this, consider the initial stage of skill formation. The optimization principle has been chosen as the criterion for selecting the required degree of freedom, regardless of the organizational system. But is it true?

To achieve a useful result, it is important to understand the principles of an organizational system (recall that in this case, not only an individual, but also any supranational system works according to the principle of a functional system).

To take into account exactly the principles of operation, it is necessary to go through a three-level filtering of incoming information. In this case, the mechanism of acquiring individual experience, which is then included in the memory block, becomes more specific and based on principles. The main task in the work of an organizational system is to choose the necessary degrees of freedom that would ensure awareness of interactions with its elements, removing unnecessary information noise. Such a process can only be creative, because it is important not to copy the image, but to follow the rules of its construction.

The deprivation of degrees of freedom occurs due to artificially introduced by human consciousness rules for the construction of system elements (immunological elements), which can serve as the basis for artificial intelligence. It is the basics, since it is not so much about the intellectual abilities of technical systems, but rather about their creative approach to achieving goals, freely choosing an organizational system for the sake of a useful result. In technical and dynamic systems, degrees of freedom usually mean limitations in the direction of movement. In the work of organizational systems, it is important to emphasize the role of the so-called *complex degrees of freedom* (CFS). They mean the presence of principles (elements of the consciousness of the system) on which the entire logical process is built. In this case, it is optimal to have three CDF.

1. The classifying CDF includes all multilevel logic in general. In MAE, for example, these are asystemic, classical and systemic approaches [14]. With the help of it, it is possible to navigate all kinds of art.
2. The systemic CDF is built thanks to the immunological elements of the consciousness of the system as the basis of the immunological android.
3. The directed CDF allows you to achieve a useful result that meets the principles of the organizational system.

It is necessary to proceed from the fact that immunized channels, in addition to not interfering with each other, also allow predicting their compatibility or incompatibility (conflict), as well as monitoring buffer filling [11]. The efficiency of these organizational systems lies in the coordinated (compositional) action of elements of the system's consciousness that stimulate the creative process in conditions of expanding the range of applications. And this range can be located both within the framework of a particular art and expands according to the elements of consciousness of the system to mutual enrichment and exchange of experience (information) between one type of art (for example, avant-garde painting) and another (MAE) [15]. Such an exchange is necessary to maintain the viability of both organizational systems in the context of the beginning of active creative processes of the system.

7. Degrees of Information Filtering

According to Anokhin's theory of functional systems, to achieve a useful result, it is necessary to bring the components of the functional system out of equilibrium. Thus, appropriate progress is achieved. It is possible to achieve a useful result only if it is possible to select the necessary trigger afference from the entire context afference, which will allow you to subsequently select the necessary degrees of freedom. In this case, the authors consider trigger afference from a different perspective than that presented by P. K. Anokhin. Here we are talking about the fact that an internal motive based on existing individual experience becomes the criterion that allows you to consciously choose the desired trigger afference. But for this, it is necessary that the incoming information goes through filtering, which can have three degrees.

The first degree of filtering involves comparing incoming information with what is stored in the individual's memory and always corresponds to his needs. At the same time, the received information, although it represents isolated units and is devoid of basic information noise, does not allow to avoid confusion between individual elements and intersystem conflict. For this reason, the first level of filtering can be called *definition filtering*, since it allows you to identify (determine) the affiliation of elements to organizational systems. The second degree of filtration already allows an individual to reduce the number of degrees of freedom and thereby establish the principles on which an organizational system operates. It is the second degree of filtering (*optimization filtering*) that turns out to be the most suitable for the field of robotics, since in it the work is based on copying an image, the creative process is excluded, and the algorithms are based on optimizing actions.

The third degree of filtration (*system filtering*) really makes it possible to identify differences between organizational systems and move from the principle of optimization to the acquisition of properties. At the same time, the principle of optimization is not rejected, but rather improved through a kind of continuity, that is, an information bridge is organized from the principle of optimization to the acquisition of properties necessary for inclusion in the organizational system. This solves such problems as the transmission of information, the difficult problem of consciousness, and at the same time reveals the elements of ITI as the basis of the immunological android.

In this case, the purity of the immunized channel through which the trigger afference is received is ensured by additional system restrictions. As a result, the programmed result is achieved. Thus, degrees of filtration are necessary for the step-by-step identification of system principles in organizational systems, getting rid of information noise that makes it difficult to select the desired trigger afference and transmit it without distortion.

8. Conclusion

A neurophysiological approach is described, which helps to avoid neural network blockages that hinder the operation of organizational systems, as well as the interaction of an individual

with them. The mechanism of operation of any organizational system (including supra-organismic ones) is proposed to be considered from the standpoint of the theory of functional systems of P. K. Anokhin. Much attention is paid to ways to change the degrees of freedom. This is the purpose of working with motivation and memory block in functional systems. The degrees of filtering of incoming information can be used to eliminate information noise, and therefore to achieve a useful result. This is an indicator of the efficiency of organizational systems, i. e. the possibility of effective activity in imbalanced conditions.

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