THEORY OF NON-VIOLENT INTERACTION

Iurii Teslia

Abstract: The basic of the hypothetical non-violent theory of interaction is provided here. Introformational method is proposed to calculate the response to non-violent influence among intellectual property rights underlying the reflex construction of intelligent systems.

Keywords: non-force interaction, introformation, reflex systems, self-organization, information theory.

ACM Classification Keywords: *I.2 Artificial Intelligence – Philosophical foundations.*

Statement of the problem

Despite the enormous investment of labor and financial resources there is no general theory till now and its practice of supporting the functioning of the human mind. There is still unknown mechanisms of the human brain as a complex structure consisting of a large number of interacting objects. Exploring the brain, or the results of its operations, it is difficult, perhaps even impossible to see those fundamental laws, which led to its establishment. Not in the narrow biological sense [Redko, 2007; Caparres, 1995], but in the context of those laws that underlie the development of nature and in the end led to the brain genesis as the best tool to process information. And for this, we first need to understand the role that nature gives to the information.

One of the most common problems in modern science is the knowledge of the role of information, not only in the life of biological objects, but also at the level of the existence of any material objects of nature. The emergence and development of scientific disciplines and areas of research which are information processing in a variety of natural and artificial systems, has led to the need to review the entire outlook on the essence and fundamentals of the laws of nature. Many scientists agree with the opinion that it exists at the level of non-living matter, that information is not only a vital part of living beings, but is present in all the processes of interaction in nature, and at all material entities and its laws, along with physical, shape our universe [Kamshilov, 1979].

Almost no discipline can do without the concept of information. It is not just about science, technical, biological, or philosophy. This is manifested in the natural sciences [Brillouin, 1972; Uspensky, 2010]. The classic example is quantum physics and its integral part - quantum information theory. Information is not just a concept used by different sciences. Based on it, the various sciences have long started to converge. But where is the limit of this convergence? If we consider some of the concepts, laws, or laws that are taking place in various sciences, we are able to interpret the essence of the understanding which has developed in other scientific field. Hence it is possible to construct a theory, based on the concept of information and explaining the basis for the unity of the laws of interaction in nature. Further it can be used to create artificial intelligent systems.

Analysis of the main research and publications

The emergence of information is impossible without the cooperation and reflection of the results of this interaction in the structure of the material objects. Interactions in nature are inseparable from the information. And information is inseparable from the process of interaction. Hence, if to seek the role that nature gave to the information we cannot ignore the issues of interaction. Everything interacts in nature. Interaction of different physical nature (gravitational, electromagnetic, weak and strong nuclear) are implemented between any of the material objects. A lot of attention is paid to the modern science of information interaction [Kuznetsov, 2011; Kuznetsov2, 2003]. A huge amount of work on this topic focus mainly on the formalization of the interaction in

computer networks (especially the Internet), in social structures, in education, etc. As part of this research information is understood as a message of knowledge, data, intellectual resources, etc. [Kuznetsov, 2011]. Semantic and axiological parameters of the information are recognized, the view is accepted that the information inherent in a self-managed systems, which make biological and social form of motion. Today, most scientists accept the view that the information is inherent not only at the level of self-managing systems; it is objective and is inherent in all the processes of interaction in nature [Redko, 2007; Kuznetsov2, 2003]. Then there is a need to expand the scope of theories on information interaction to all forms of movement in nature, not just the biological and technical aspects of its existence.

This is done in the theory of non-violent interaction [Teslia, 2005; Teslia, 2012].

Unresolved part of the problem

The results obtained in the theory of non-violent interaction results, expanding the scope of its use requires a formal and systematic localization subject of research relating to the theory, accessible representation of hypotheses, ideas and conclusions that led to the formation of mathematical tools to solve many practical problems. Spreading the ideas of the theory of non-violent interaction and confirmation of its truth by showing the benefits based on it artificial intelligent systems brings an objective need for research in this area. The lack of scientific work which fully represents the essence of the theory of non-violent interactions, was the source of this writing.

The wording of the purposes of Article

The main task of the non-violent interactions theory can be formulated as follows: "through our understanding of the world try to find a reasonable start in his laws, which may be completely unlike what we see, but it is expressed in it". The theory suggests one possible implementation of the mechanism of interaction in nature. The results obtained in the theory of non-violent interaction reinterprets physical laws and allow to create more accurate and precise in operation intelligent systems, and most importantly, create a unified picture of the implementation of the laws of interaction in Nature, suggest the importance of the dissemination of ideas called the theory in the scientific world. This is the focus of this paper.

Basic material research

Non-violent nature of the interaction

The author of works came to an interesting and somehow crazy assumption, based on the studies for many decades, issues of cooperation related to physical science (gravitational, electromagnetic, weak and strong nuclear), and interaction at the self-managing systems (IT), spending thousands of computer experiments in the search for analogies [Teslia, 2005; Teslia2, 2010]. And what if the laws of responses to the impact of the external environment in the living and non-living matter are one and the same? And, just as a person can handle the information, and on this basis, forms his behavior (defines the trajectory in the medium of existence), and all material objects process information (coming through the interactions of different physical nature - gravity, electromagnetic, weak and strong nuclear) and based on that change their trajectory. From this assumption that the objects do not bend the space-time continuum, forcing other objects go to the "hole". They "convince" other objects move in a certain path (to or from exposure). We can say that the interaction of different physical nature is not by force, but is non-violent (information). That is, the "word was first". Word provides information about the existence of some objects to other objects and changes something in the internal organization of these objects, which leads to a change in their behavior. Hence the name of the theory is theory of **non-violent interaction**.

The internal organization of material objects in the theory of non-violent interaction called **introformation**. Introformation (internal organization, their own functional material objects) forming their attitude to the truth (reality).

If the motion of any material formation is determined by its internal organization (introformation), the changes of the laws of motion can be obtained by changing the laws introformation. And this has to lead to the numerical measure of introformation. It should be such that the actual "amount" of the movement of material corresponds to its introformational filling. We can go even further. If the laws of interaction in nature are one, it is likely that the resulting introformational laws changes will work at the level of living matter at the level of the man and his intellectual apparatus.

Based on the research on this scheme a new theory was created. Let's have a look at it.

VIP-interpretation of the motion

The theory of non-violent interaction provides a new interpretation of the VIP-motion (linking: V-speed traffic, I-introformation, P-probability). The essence of it in the following. Mechanical motion is characterized by the direction and speed. It is traditionally believed that the laws of nature must provide formation in the interaction of material formations of different directions and different speeds of movement. Suppose, the nature laws of motion are implemented more simply than we had so far? And there is only one **(absolute) velocity** of the matter! The speed of light in vacuum is "c". And at this rate moves all matter. And all observed or not observed but the existing example in microcosm, the diversity of the relative velocities of the internal organization formed themselves moving objects as follows. Suppose there is a quantization of space and time, at each time slot material formation is shifted to one quantum of space in one direction. The possibility of bias in each direction is given its own (for physical education) probability, which in turn generates an internal organization (internal relation to reality) of this formation, its introformation. As a result of the formationeach material will drift in that direction, which probability is higher.

Expected drift rate for one-dimensional motion will be:

$$V_{drift} = (p - (1 - p))c = (2p - 1)c , \tag{1}$$

where V_{drift} – the observed velocity (drift velocity);

   p – The probability of displacement;

   c – Absolute speed.

If displacement occurs only in one direction, the drift velocity of the material formation is equal to the absolute velocity of matter – c.

$$p = 1 \Rightarrow V_{drift} = (2p - 1)c = (2 \cdot 1 - 1)c = c$$
$$p = 0 \Rightarrow V_{drift} = (2p - 1)c = (2 \cdot 0 - 1) = -c$$

The light in vacuum moves with the speed $V_{drift} = |c|$. Hence, the movement of the light can be seen as a one-way.

Introformation measures

Internal organization (introformation) of the material entities in work [Teslia, 2005; Teslia2, 2010] is presented with a geometric model - areas which determine their displacement in space. For one-dimensional motion – it is two directions of displacements determination (DDD) (Fig. 1).

The probability of selecting the direction is determined by the size relation DDD. If there is a choice between one-dimensional motion to the direction of Z, and the direction opposite to Z, then the following relation

$$\frac{p^+}{p^-} = \frac{p}{1-p} = \frac{i^+}{i^-}\left(given\, i^- \neq 0\right),$$

where $p^+ = p$ – the probability of displacement in the direction Z;

$p^- = 1 - p$ – The probability of displacement in the opposite direction Z;

i^+ – The size of the area that forms the shift in direction Z;

i^- - Size of the area that forms the displacement in the opposite direction Z.
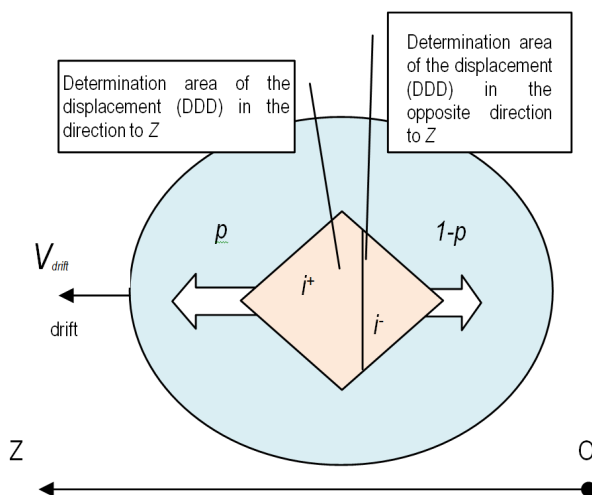

Figure 1. *VIP*-motion interpretation in nature

In this model, the movement is the property (functionality) of the object, and not the result of force or other material objects curvature of space-time continuum. Only the aspect ratio DDD sets its own probability of displacement in one direction or another.

The essence of **non-violent interaction** is that the interactions between material formations lead, initially, to change of the dimensions DDD, and the change in size DDD leads to a change of direction and speed of drift in space.

In this case, the drift velocity of material formation can be represented by the rate of motion of matter in nature and probability of displacement

$$V_{drift} = \left(2p^+ - 1\right)c = \left(2\frac{i^+}{i^+ + i^-} - 1\right)c = \frac{i^+ - i^-}{i^+ + i^-}c \, .$$

To simplify the model, the difference in the size of DDD in non-violent interaction theory was called certainty, and the amount – material formation awareness.

$$d = i^+ - i^-$$
$$i = i^+ + i^-$$

where d - the certainty of material formation, relative to the movement in the direction Z;

i - Awareness of the material formation, relative to the movement in the direction Z.

But the question is: what should be the dimensions of DDD, to determine the speed of 1 m / s? This question is linked with the other. After all, even Albert Einstein showed that all traffic except light traffic is relative. Where as the relative movement linked with the proposed VIP-interpretation? To get the size of DDD in the works [Teslia, 2005; Teslia2, 2010] a model is proposed, and the corresponding physical laws, and the intuitive understanding

that the frequency of manifestation of material objects must conform to the size of their DDD. Consider the motion of two objects - X and Y. Of the special theory of relativity, the velocity of the object Y equal to the object X.

$$V_{XY} = \frac{V_Y - V_X}{1 - \frac{V_Y \cdot V_X}{c^2}}$$

(2)

where V_{XY} - the velocity of the object Y relatively to the object X;

V_Y - the velocity of the object Y relatively to an observer located at a point O;

V_X - the velocity of the object X relatively to an observer located at a point O;

c - the speed of light in vacuum.

Substituting (1) into (2) we obtain

$$p_{XY} = \frac{p_Y(1 - p_X)}{p_Y(1 - p_X) + p_X(1 - p_Y)}$$

(3)

where p_{XY} - the probability of displacement Y in the direction of the object Z relative to the object X;

p_Y - the probability of displacement of the object Y in the direction Z;

p_X - the probability of the object displacement X in the direction Z.

If we look at the denominator of (3), it can be far-reaching conclusion. Objects X and Y move only when they move in different directions. It is clear. But more interesting is the following. The denominator is not the amount that reflects the displacement of these objects in the same direction; we find that there is no displacement of different objects in the same direction at all? Or in such displacements different objects "transformed" into a single object?

From (3) that the number of times the subject Y moves in the same direction, the same amount of time the object X moves in the opposite direction (Fig. 2) and vice versa. But if the displacements "generate" internal organization of material formations, it means that the internal organization of the material objects must be related as follows:

$$\frac{i_X^+}{i_Y^+} = \frac{i_Y^-}{i_X^-} \left(given \ i_Y^+ \neq 0; i_X^- \neq 0 \right),$$

(4)

where i_X^- - the size DDD of the object X in the direction opposite to Z;

i_X^+ - the size of DDD of the object X in the direction Z;

i_Y^- - the size DDD of the object Y in the direction opposite to Z;

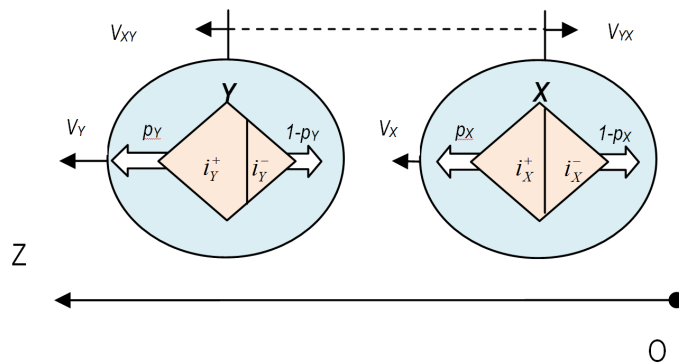i_Y^+ - the size DDD of the object Y in the direction Z.

Figure 2. *VIP*- interpretation of the motion of two objects

This ratio provides correspondence between the probability of actual displacement and shifts frequency with respect to any observer of statistically independent manifestations. Correlation (4) is set to the same choice of different displacements of material formations in different directions. It is because of this relationship follows the formula of the relativistic velocity addition (2).

In non-violent interaction theory is suggested that if the ratio (4) was not satisfied in anytime, then more than 13 billion years could be eliminated [Teslia, 2012]. Inanimate matter has evolved too!

From VIP-interpretation of motion in the theory of non-violent interaction the relationship between the speed of the drift, the probability of displacement, definition and awareness of material objects was received:

$$i = \frac{1}{2\sqrt{p \cdot (1-p)}} \tag{5}$$

$$d = \begin{cases} 0.5\sqrt{\dfrac{p}{1-p} + \dfrac{1-p}{p} - 2}, p \geq 0.5 \\ -0.5\sqrt{\dfrac{p}{1-p} + \dfrac{1-p}{p} - 2}, p < 0.5 \end{cases} \tag{6}$$

$$i = \sqrt{d^2 + 1} \tag{7}$$

$$p = 0.5 + \frac{d}{2i} \tag{8}$$

$$V = \frac{d}{i}c \tag{9}$$

where V - the observed speed.

These relationships allowed a new perspective on a number of physical concepts and quantities [Teslia2, 2010; Klapchenko, 2011]. Thus, it became clear that the Lorentz factor of the material is identical to the material formation awareness. Indeed, from (5) and (9)

$$i = \frac{1}{2\sqrt{p(1-p)}} = \frac{1}{2 \cdot \sqrt{\dfrac{c+V}{2c} \cdot \dfrac{c-V}{2c}}} = \frac{1}{\sqrt{\dfrac{c^2 - V^2}{c^2}}} = \frac{1}{\sqrt{1 - \dfrac{V^2}{c^2}}}$$

$$\frac{1}{\sqrt{1 - \dfrac{V^2}{c^2}}} - \text{Lorenz factor.} \tag{10}$$

Then the formula for the relativistic mass and time are simplified

$$m = \frac{m_0}{\sqrt{1 - \dfrac{V^2}{c^2}}} = m_0 i \tag{11}$$

where m_0 - the rest mass of material formation;

  m - relativistic mass of material formation.

$$\tau \frac{\tau_0}{\sqrt{1 - \dfrac{V^2}{c^2}}} = \tau_0 i \tag{12}$$

where τ_0 - the time of the material formation if it is at rest;

  τ - relativistic time of the material formation.

Operations on introformation

The interaction of material objects changes the direction and speed of movement. So, it brings to the change of the introformation. Numerical measures that is specific and informed. How operates Nature of a certainty and awareness? The answer can be derived from physical laws. In particular, the law of conservation of momentum.

Substituting (9) and (11) into the momentum

$$P = m \cdot V = \frac{m_0}{\sqrt{1 - \frac{V^2}{c^2}}} \cdot V = m_0 \cdot i \cdot (\frac{d}{i} c) = m_0 \cdot d \cdot c \ , \tag{13}$$

where P - the momentum of the material formation.

Then the law of conservation of momentum sets the conservation law of certainties in a closed system

$$\sum P = const \Rightarrow \sum d = const \tag{14}$$

So, in a closed system the total certainty (the sum of the size difference DDD) does not change. Therefore, the law of conservation of momentum can be the basis for the formulation of the law unchanged definition of a closed system of material entities. In addition, based on the expression (14) the addition operation certainties can be offered. Namely, all material formation of the closed system can be replaced with a material formation with certainty, equal to the amount of certain material structures of the closed system

$$d_\Sigma = \sum_i d_i \ , \tag{15}$$

where d_Σ - the total certainty of material objects of a closed system;

d_i - certainty of the material formation M_i .

Another operation of the definition may be obtained from the formula of the relativistic velocity addition. From (2) and (9) comes up operation refilling of certainty

$$d_{XY} = d_Y \cdot i_X - d_X \cdot i_Y \ , \tag{16}$$

where d_{XY} - supplement certain (value of the certainty that reflects the difference in the definition of material objects M_X and M_y);

d_Y - certainty of the material formation M_y ;

d_X - certainty of the material formation M_X ;

i_Y - awareness of the material formation M_y ;

i_X - certainty of the material formation M_X .

Or

$$d_Y = d_X \cdot i_{YX} + d_{YX} \cdot i_X \tag{17}$$

What is the purpose of these operations? Build of the certainties - is the sum of non-power impacts on all of us, which is provided by our friends, acquaintances, the media, etc. Operation of the certainty refilling gives the difference in the amount determined by different subjects. And it is equal to the magnitude of the impact, which is needed for the subjects were equally determined.

The conclusions from the theory of non-violent interaction

As can be seen from (11) - (17) *non-violent theory of interaction* not only allows us to simplify some of the physical expression, it still gives a qualitatively new interpretation of known physical concepts and laws.

1. It becomes clear why the speed of light is limited and maximum. After all, it is always offset with probability 1. And probably more than one does not happen.

2. It becomes clear why the speed of light is absolute (unchanged relative to the movement at any speed). From (1) $V = c$

$$p = \frac{V + c}{2c} = \frac{c + c}{2c} = 1$$

In addition, from (9) comes that, for material objects whose velocity is less than the speed of light ($V < c$) probability of displacement is less than one ($p < 1$)

$$V < c \Rightarrow p = \frac{V + c}{2c} < 1.$$

Then, substituting the value of $p_y = 1$ in (3) and obtain

$$p_{XY} = \frac{p_Y \cdot (1 - p_X)}{p_Y \cdot (1 - p_X) + p_X \cdot (1 - p_Y)} = \frac{1 \cdot (1 - p_X)}{1 \cdot (1 - p_X) + p_X \cdot (1 - 1)} = \frac{1 - p_X}{1 - p_X} = 1, \quad (p_x < 1)$$

Substituting in (1) we will get

$$V_{XY} = (2 \cdot 1 - 1) \cdot c = c$$

Therefore, with respect to any object, the direction of displacement is not set with probability ($p_x < 1$), one-way movement will have the velocity *c*!

The reason is very simple. Since the material formations exist in relation to each other only when they are moved in opposite directions (3), the light we see only at those times when we displace by ourselves in the direction opposite to the direction of displacement of the light.

3. Becomes clear the core (if you want - intelligence) of certain physical laws. Thus the expression for the relativistic time (12) and weight (11) is simplified. And the increase in time and weight, with significant relative velocities can be seen as the result of increasing the size of DDD, i.e. increasing certainty (confidence) of one object relative to another on the right direction. The essence of this increase may be due to the greater awareness (increased areas DDD) produces greater confidence in how this formation acts (where it moves). Indeed, the likelihood that a significant certainty (confidence) is formed incorrectly or accidentally is insignificant. Therefore, a significant size of DDD shows not just the area of the corresponding relation to reality. But also greater confidence in the formation of this material (it is informed, mean very smart, so it can be trusted).

It also appeared that the momentum of the material is proportional to its certainty (can be generated by its definition?) (13). Comes up the following analogy. It is difficult to change the direction and speed of the massive and rapid material formation. Similarly, it is difficult to convince the informed person in something that does not coincide with his opinion.

If this study ends at this point, then many would have had the view of the next "setting up" the known laws. But these studies only begin. In any case, in the use of the theoretical results obtained for the creation of artificial intelligent systems. If we recall the origins of the theory of non-violent interaction, it should be recognized that the theoretical model was not the result of consideration. It was obtained by computer experiment with the natural language text. It turned out that the statistical regularities in texts (the experiments were conducted on different texts of the Russian language) correspond to the above equations [Teslia, 2005]. And only then, the author has found a theoretical explanation for this coincidence. In any case, the only criterion of truth is practice. Therefore, we consider the application of the theory of non-violent interactions for construction of artificial intelligent systems.

Applications of non-violent interaction to build reflex intelligent systems

As of now a number of "smart" programs and systems that solve intellectual problems are developed. But there is no significant progress in establishing "artificial intelligence". Enormous capital investment often ends with scientific rather than beneficial to the business practical results. One of the reasons is seen in the fact that there

are no simple tools for implementing the basic intellectual functions of living organisms. No tools to develop reflexes to external stimuli [Caparres, 1995; Teslia, 1998]. We must learn to store statistical information about the necessary reactions to certain external influences the same way as does the human brain and develop on the basis of information, the correct response to new (including those that occur for the first time) combination of external influences. Under the proper response is understood to satisfy the intellectual system by reaction to external stimuli.

The central assumption of the theory of non-violent interaction is the assumption of the unity of the laws of interaction for any form of existence of matter. In non-violent interaction theory the category of the internal organization of matter – introformation is introduced as the root cause (source) displaying material formations in Nature. Some of the physical laws were presented through this category. Is it possible to do the opposite: to Use introformational representation of physical laws to describe the information interaction of people. Expressions for refilling of certainty (16) - (17) follow from the addition of relativistic velocity. And based on the law of momentum conservation the law of the closed certainty of the material formations is obtained (15).

But the question arises. Do these formulas show deeper patterns in the construction of the laws of nature? Laws of wisdom of the Universe, which are embodied in particular in physical laws. If you imagine the reaction of material objects on collision is a reflex, the formation laws of which lie in the depths of nature, than it could be that the laws of reflex making in the objects of nature are the same? And then these formulas can be used to calculate the "human behavior"? If nature has constructed this way the physical laws, by transforming introformational content of matter, it may be, that, the human brain works on that basis? Maybe each neuron shows its internal organization based on the same laws that show material formation in motion of its introformation? Perhaps the realization of the above operations with introformation underlies the workings of the brain? And maybe they can be used to create artificial intelligent systems.

Using VIP-interpretation the method was proposed (hereinafter - introformational method) for constructing intelligent reflex systems, which react to exposure based on the same laws that all matter responds to the impact of different physical nature. More precisely, the calculation of the effect of the reaction is the a new introformational interpretation calculation of material object speed after simultaneous collision (impact) with a variety of other objects, if you know how to change the speed of the object after the collision with each of these items separately. Method is a sequential execution of the following calculations (with italic the physical nature of the calculations are described) [Teslia2, 2010]:

1. On known probabilities of the reactions (actions) of the system its definition (6) with respect to these reactions is calculated. Let's determine

p_0 - The unconditional probability of the reaction x ;

$p_j = p(x/y_j)$ - The probability of the reaction x , if the action was y_j .

$$d_j = \begin{cases} +0,5 \cdot \sqrt{\dfrac{p_j}{1-p_j} + \dfrac{1-p_j}{p_j} - 2}, \ p_j \geq 0,5 \\ -0,5 \cdot \sqrt{\dfrac{p_j}{1-p_j} + \dfrac{1-p_j}{p_j} - 2}, \ p_j < 0,5 \end{cases}, j = \overline{0,n} ,$$

where $d_j, \ j = \overline{1,n}$ – is certainty of the reaction x , if the action was done to the system y_j (d_0 –certain reactions in the absence of actions to the system).

At this point, a transition from the speed of the material objects to their certainty, if the object impacted on y_j . For example, a collision with an object, the impact of which is referred to as y_j .

2. On known probabilities awareness of (5) is calculated with respect to these reactions

$$i_j = \frac{1}{2\sqrt{p_j \cdot (1 - p_j)}}, j = \overline{0, n},$$

where i_j - the awareness of the system relative to the reaction x, when exposed to y_j (i_0 – awareness of the system relative to the reaction x, in the absence of action on the system).

And here is a transition from speed of the material object to its knowledge, if the object y_j was impacted.

3. The calculation of the total, based on all impacts to the system, the increment of certainty of the system. Introformational representation of momentum conservation (15) and (16) and the formula of the addition of relativistic velocity are used

$$\Delta d = \sum_{j=1}^{n}(d_j \cdot i_0 - d_0 \cdot i_j) = \sum_{j=1}^{n} d_j \cdot i_0 - \sum_{j=1}^{n} d_0 \cdot i_j = i_0 \sum_{j=1}^{n} d_j - d_0 \sum_{j=1}^{n} i_j , \qquad (18)$$

where Δd – total increment of certain reactions you received from the law of conservation of momentum

Performed calculation increment certainty if the total exposure to the object (the clash happens with all objects at the same time).

4. The calculation of the increment of awareness of (7)

$$\Delta i = \sqrt{\Delta d^2 + 1},$$

where Δi – the increase of awareness of the system.

It is calculated for the specified increment of awareness in terms of the method in point 3.

5. Calculation of a new determination of the reaction x. The identity of the calculation of the new relative speed of the object after its collision with all objects. Using (17)

$$d_\Sigma = \Delta d \cdot i_0 + d_0 \cdot \Delta i ,$$

where d_Σ – a new determination of the reaction x, resulting from the law of conservation of momentum.

Calculation of a new determination of the motion of the object x.

6. Calculation of a new awareness of the system action. Use the formula (7)

$$i_\Sigma = \sqrt{d_\Sigma^2 + 1},$$

where i_Σ – a new awareness of the system derived from the law of conservation of momentum.

Calculation of a new awareness of the movement of the object x.

7. The calculation of the relevant physical laws of probability of reaction x (8)

$$p_\Sigma = p\ (x/Y) = 0{,}5 + \frac{d_\Sigma}{2i_\Sigma},$$

where $p_\Sigma = p(x/Y)$ – derived from the law of conservation of momentum reaction probability x, in operations $Y = \{y_j\}, j = \overline{1, n}$.

The calculation of a new probability of a shift in the direction of the object (which determines the speed of the movement after a collision with all objects).

The idea of the above method is that it points to the expected "reaction" to the impact, the adequacy of which comes up from the well-known and experimentally verified physical laws. By assumption, the interaction of

neurons is based on the same laws and implemented in accordance with the proposed model non-violent interaction. And on this basis it is possible to create artificial introformational processors operating as neurons. Such neurons are not the same as a well-known in classical cybernetics formal neurons, which are also similar to the natural, like a paper boat on the ocean ship. A more advanced and complex structures that respond to stimulation (effects) as well as material formations and react in inanimate nature, and natural neurons. All this is embodied in a number of **reflex intelligent systems** that can store information about the environment and to develop an adequate functioning of the reaction (reflexes) on everything in this environment [Teslia, 2005; Teslia2, 2010; Teslia, 1998; Teslia3]. This is one of the arguments in favor of recognizing the wisdom of the laws of Nature. And pretty much confirms the hypothetical theory of non-violent interaction.

What applications of the theory of non-violent interactions have been implemented? The theory of non-violent interaction and its application to the development of artificial intelligence systems were examined, in particular, in [Teslia, 2005; Teslia2, 2010; Teslia, 1998; Teslia3]. Statistical analysis of the significant amount of text in Russian was performed. It was found that the probability of the different length of text fragments completely correspond to equations (15) - (17), which may be indicative of the unity of the laws of interaction in nature. In any case, such a correspondence, at least, is quite interesting. Besides theory has practical development in the design and operation of the reflex intelligent systems: evaluation of investment proposals in development, natural language access to databases, evaluate the impact of harmful substances in the water resources of the region on public health; predicting results of sports events, voice control by technical means. The main advantage of these systems is an ease of development (development cost is lower than creating traditional expert systems), and the effectiveness of solutions of various intellectual tasks. More details with these systems can be found at the web site *introformatika.org.ua.*

Conclusions and prospects for further research

The theory of non-violent interaction is based on the hypothesis of the primacy of internal organization (introformation) of material objects in the processes of interaction and movement. In this case, the expression obtained in the theory is mathematically beautiful, simple, and give a reasonable explanation of many physical laws and paradoxes. During the study the author founds similarities in the interaction in the physical and self-managed systems, similarity, which formed the basis of this work, and which may be of interest not only to specialists in the field of computer science, but also to experts in the field of theoretical physics, philosophy, biology, computer science and computer engineering. And that similarity, in my opinion, is a consequence of the unity of the laws of interaction in nature. The important thing is that based on the non-force model of interaction in nature, you can create a fundamentally new system of artificial intelligence for many areas of human activity. After all, the theory of non-violent interaction reveals the root causes and the laws of interaction including the basic elements of the human brain - neurons. It is hoped that this article will help many researchers, engineers apply their knowledge to further progress in solving the basic problems of cybernetics - the construction of the disclosure laws and mechanisms of the brain and on this basis to create artificial systems that are not inferior to their "intelligence" of man.

The next article will talk about the reflex intelligent systems built using the mathematical apparatus of the theory of non-violent interaction.

Bibliography

[Ay, 2008] N.Ay, N.Bertschinger, R.Der, F.Guttler, and E.Olbrich Predictive information and explorative behavior of autonomous robot. The European Physical Journal B - Condensed Matter and Complex Systems, 63 (3): 329-339, 2008.

[Brillouin, 1972] Brillouin L.new look at the theory of relativity. - Wiley, 1972, p. 142 (In Russian).

[Caparres, 1995] Gonzalo Joya Caparres, Francisco Sandoval Hern ndez. A Neural Paradigm for Controlling Autonomous Systems with Reflex Behaviour and Learning Capability. In Jos Mira, Francisco Sandoval Hern ndez, editors, From Natural to Artificial Neural Computation, International Workshop on Artificial Neural Networks, IWANN 95, Malaga-Torremolinos, Spain, June 7-9, 1995, Proceedings. Volume 930 of Lecture Notes in Computer Science, pages 283-290, Springer, 1995.

[Hartmut , 1989] Hartmut H. The application of information theory in physics. - Academic Press, 1989, p. 347 (In Russian).

[Kamshilov, 1979] Kamshilov N.M. The evolution of the biosphere. - Moscow: Nauka, 1979, p. 256 (In Russian).

[Klapchenko, 2011] Klapchenko V.I. Probabilistic interpretation of mechanical motion / V.I. Klapchenko, Y.M.Teslya / / Cornell University Library. - [Electronic resource] - [arXiv:1102.0441], 2011

[Kuznetsov, 2001] Kuznetsov N.A. Informational cooperation in technical and living systems. Information Processes, Vol.1, № 1, 2001, pp. 1-9 (In Russian).

[Kuznetsov, 2006] Kuznetsov N.A., Baksan O.E., Grechishkina N.A. The fundamental importance of science in the modern scientific worldview. Information processes, T.6, № 2, 2006, p.81-109 (In Russian).

[Kuznetsov, 2011] Kuznetsov N.A., Baksan O.E., Zholkov S.Y. The origins and pragmatic knowledge base. Information processes, T.11, № 4, 2011, pp. 428-447 (In Russian).

[Kuznetsov1, 2003] Kuznetsov N.A., Lyubetsky V.A., Chernavskii A.V. On the concept of information exchange, 1: underphysical level. Information processes, V.3, № 1, 2003, pp. 1-22 (In Russian).

[Kuznetsov2, 2003] Kuznetsov N.A., Lyubetsky V.A., Chernavskii A.V. On the notion of information interaction, 2: underphysical level. Information processes, V.3, № 2, 2003. - P.154-172 (In Russian).

[Oleksienko, 2009] Oleksienko M.M. The method of forecasting the number of illnesses from exposure to harmful substances, based on the model of non-violent interaction. East European journal of advanced tehnology.-Kharkov. - 2009. - № 1.-P.34-38 (In Ukrainian).

[Redko, 2007] Redko V.G. Computer science and biology - the science of the 21st century. That at the interface? / V.G.Redko / / Information Processes, V.7, № 3, 2007, pp. 214 - 247 (In Russian)

[Teslia, 1998] Teslia I.N. Reflex system for processing natural language text in the ACS building complex energy facilities. Electronics and Computer Science. - 1998. - № 4.-P.52-55 (In Russian).

[Teslia, 2005] Teslia I.N. Non-force interaction. Monograph. Kiev: Condor, 2005, pp. 196 (In Russian).

[Teslia, 2009] Teslia I.M. Application of the reflexive approach to building intelligent systems for evaluating investment proposals. - Ukrainian national collection of scientific papers: mining, construction, road and agricultural machines. № 73-2009. - P.82-87 (In Ukrainian).

[Teslia, 2012] Teslia I.N. Dynamic properties of introformation. Managing the development of complex systems, 2012, №. 9, pp. 44 – 49 (In Russian).

[Teslia1, 2010] Teslia I.N., Teslia O.V. Conceptual apparatus of the theory of non-violent interaction. Managing the development of complex systems, 2010, №. 1, pp. 46 – 52 (In Russian).

[Teslia2, 2010] Teslia I.N. Introduction to computer science of nature. Monograph. Kiev: Maklaut, 2010, p. 256 (In Russian).

[Teslia3] Teslia I.N. Demonstration of GUT / I.N.Teslia - [Electronic resource]. - Mode of access: http://www.youtube.com/watch?v=m_pYXVndpbc (In Russian).

[Timchenko, 1991] Timchenko A.A., Rodionov A.A. Fundamentals of Computer Systems Engineering machinery projects. - Naukova Dumka, 1991, p. 152 (In Russian)

[Uspensky, 2010] Uspensky V.A., Vyugin V. Formation of algorithmic information theory in Russia. Information Processes, Vol.10, № 2, 2010. - P.145-158.

Authors' Information

Iurii Teslia - *doctor of technical sciences, professor, laureate of the State Prize of Ukraine in Science and Technology, Head of the Department of Information Technology of the Kyiv National University of Construction and Architecture, e-mail: teslyas@ukr.net, tel.: +38 067 503 39 16, work tel: +38 044 241 55 07.*

Major Fields of Scientific Research: Theory of non-violent Interaction, General theoretical information research, Multi-dimensional information systems