

## INTUITION AND SYNERGETICS IN THE WORLD OF MATHEMATICS

*Nadirova Zoyira Payanovna*

*Higher Military Aviation of the Republic of Uzbekistan  
socio-economic and humanitarian sciences of the  
educational institution professor of the department,  
candidate of philosophical Sciences, associate professor  
[zoyiranadirova@yandex.com](mailto:zoyiranadirova@yandex.com)*

### **Abstract:**

**Introduction.** Today, the development of science, the need to develop a culture of philosophical thinking require further expansion and strengthening of human knowledge, a comprehensive study of events and phenomena taking place in the world, the formation of scientific knowledge about the future of humanity on this basis, as well as the formation of a new approach to the problem of scientific creativity. This, in turn, determines the need for a scientific and philosophical study of the mechanisms of scientific creativity, i.e. intuition, a theoretical justification of its place in scientific knowledge. The Head of State noted that today, looking back at the path we have passed, evaluating the work done over these years, as well as plans for the future, we note that our great and sacred Motherland, which courageously and selflessly overcame the most difficult and difficult trials of restoring national statehood, strengthening political and economic independence, confidently moving forward, relying primarily on its own strength, capabilities and potential, for the sake of building a democratic state, civil society, should always be proud of our noble people.

**Materials and methods.** This article presents the thoughts of the ancient philosopher Pythagoras about the knowledge of the early Universe, the French scientist, philosopher, one of the founders of geometry Rene Descartes and the founder of the direction of intuitionism in modern mathematics, the German philosopher I. Kant, the French mathematician and philosopher Henri Poincare, the Dutch mathematician L. Brouwer's philosophical thoughts were studied. His scientific arguments on the synergetic analysis of the properties of intuition in scientific knowledge in the interpretation of philosophers were also published.

**Results and discussions.** Intuition is one of the most important concepts of the development of philosophy and science and is in dialectical connection with thinking, including rational and irrational thinking, creativity, in particular with such concepts as "artistic and scientific creativity", "intelligence", "memory", "imagination", "attention", "foresight", "consciousness", "unconscious", "subconscious sphere" and "instinct". A comprehensive analysis of the content and essence of these concepts, the study of scientific, philosophical and intuitive thinking styles on a scientific basis allow us to open new facets of the development of science. Therefore, an in-depth study of this issue has a special scientific significance. "Creativity", "scientific

*creativity" and "intuition" are interrelated concepts that have interested philosophers since time immemorial.*

**Conclusion.** *Intuition, intuitive cognition, intuitive thinking is a complex, multifaceted and holistic cognitive process that is directly related to the human psyche, and not only with his emotional and mental abilities to cognition.*

**Keywords:** *philosophy of cognition, thinking, emotional cognition, mental cognition, intuitive cognition, intuitive cognition and its manifestations in science.*

**Introduction.** Within the framework of the long-term strategic tasks set for restoring the foundation of a new period of development of Uzbekistan, the development of the National Idea, changing the worldview of our people, political consciousness and thinking, attitude to life and work, work is being carried out to expand effective cooperation between state and civil institutions in solving social problems.

In this regard, in the address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis: "While we set ourselves ulughmaksad as the restoration of the foundation of the third renaissance in our country, we must create conditions and conditions that will educate new Khorezmids, Berunids, Ibn Sina, Ulugbek, Navoi and Babur for this. First of all, the Bund should serve as the main pillars of our national idea of developing education and training, making decisions about a healthy lifestyle, developing science and innovation."

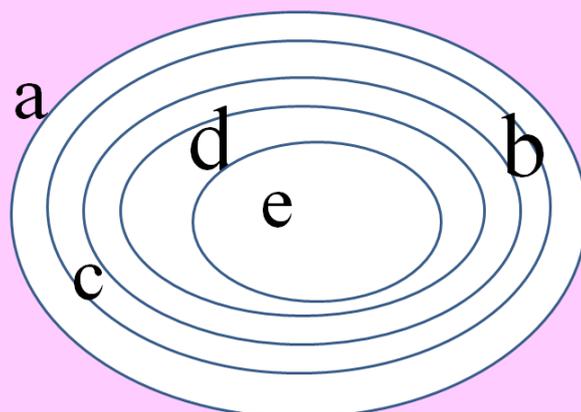
**Materials and methods.** Rene Descartes in the Philosophy of the new age, Benedict Spinoza, Immanuel Kant, Frixis Velgelim Hegel, Johann Gottlieb Fixt, Arthur Schopenhauer, Sigmund Freud, F.W. Schelling, Anre Bergson, M. In in the works of such philosophers as Bunge, Bertrand Russell, you can look at the features of intuition for a while to change the view from the outside. In particular, Rene Descartes is an intellectual scientist who put forward the idea of intuition. Benedict Spinoza understands intuition in the style of the substantial. Immanuel Kant thinks of "pure intuition". In Hegel's ideas about the "absolute spirit" there is an irrational bias towards the problem of intuition. Johann Fix evaluates intuition as an internal act, a process. Arthur Schopenhauer connects intuition with the concept of reasoning. Psychoanalysis Sigmund Freud interprets the unconscious in a purely irrational way and interprets intuition as the expression of the unconscious in creativity. In the process of Schelling's cognition, the idea of "absolute intelligence" is central, which recognizes that the object and the subject are closely related to each other. Anry Bergson devoted his work to the study of intuition. The English scientist M. Bunge will focus on several types of intuition.

**Results and discussions.** One of the topical issues in the development of education is the study of the concepts of thinking, scientific thought, intuition and synergetic. Ancient philosophers described such problems as intuition, synergetic, intuitive cognition, intuitive thinking, as a situation at the intersection of emotional and rational cognition and the process of more complex, multi-faceted holistic cognition. Understanding the universe is a complex and multifaceted process. In the knowledge of the Universe, scientists initially paid more attention to emotional cognition and rational cognition, they believed that by cognizing emotionally and

intelligently, one can understand the essence of things and phenomena, their interrelationships, their distinctive features. Having scientifically analyzed all the arguments about the concept of intuition, we will talk about the features, forms, and types of its manifestation. Intuition is a process of cognition that directly perceives reality without the help of logical facts, the ability to know it naturally “Intuition is a process of cognition that occurs in a highly creative way, which dictates ingenuity and ingenuity”. The concept of intuition is also used as a creative merit of a person or as a method of evaluation in relation to his effective activity in a particular field. [1] The concept of intuition is also used as a creative merit of a person or as a method of evaluation in relation to his effective activity in a particular field. There is also a religious bias in the concept of intuition. According to this, the concepts of “enthusiasm”, “intuition” were of Greek origin.

That is, at present, the concept of "enthusiasm" actually expresses the state of feeling in theology, that is, the connection of the soul (in) with God (theology). In our opinion, the process of intuitive cognition is the next stage of the thinking process, or rather the product of this process. Scientists-philosophers give information about the emotional, emotional, emotional and mystical types of intuition. “Intuitive perception, which precedes understanding without taking into account mental observation, is emotional intuition, the process of intelligent perception of the essence of events is mental intuition, emotional intuition manifests itself in the process of perceiving the value of something through emotions.” Some scientists claim that intuition has a number of properties. In the characteristics of the manifestation of intuition, attention should be paid to the concepts of spirituality, consciousness, and contemplation. The concept of the psyche is broader than the concept of consciousness, and the mental state implies all conscious and unconscious processes, mental properties of the individual. Consciousness is the highest form of spiritual reflection of reality in the social development of a person. Contemplation is the highest form of perception of an object, the process of reflecting an object in the consciousness of reality. Contemplation arises in the process of this social productive activity. It turns out that spirituality, consciousness, thought is an appearance, the basis of spirituality. All this is manifested in the unity and integrity of the rational and spiritual world of man. A person's attitude to the whole universe, Society, and himself is expressed in his thinking, in his psyche. (1-picture)

- a) soul
- b) understanding
- c) consciousness
- d) thought
- e) spirituality



**1-picture. The ability of a person to know**

In our opinion, the coverage of the above considerations with the help of philosophical categories allows us to understand them more deeply. Philosophical categories unite the material world, in which communication and development are manifested by the way of reflection in the human brain, and the categories themselves represent the unity and struggle of dependent opposites, which is the source of development. At the same time, the lens with the study of the movement of the most important laws of the phenomena of the world allows us to explore categories, to study the essence of things more deeply and more fully.

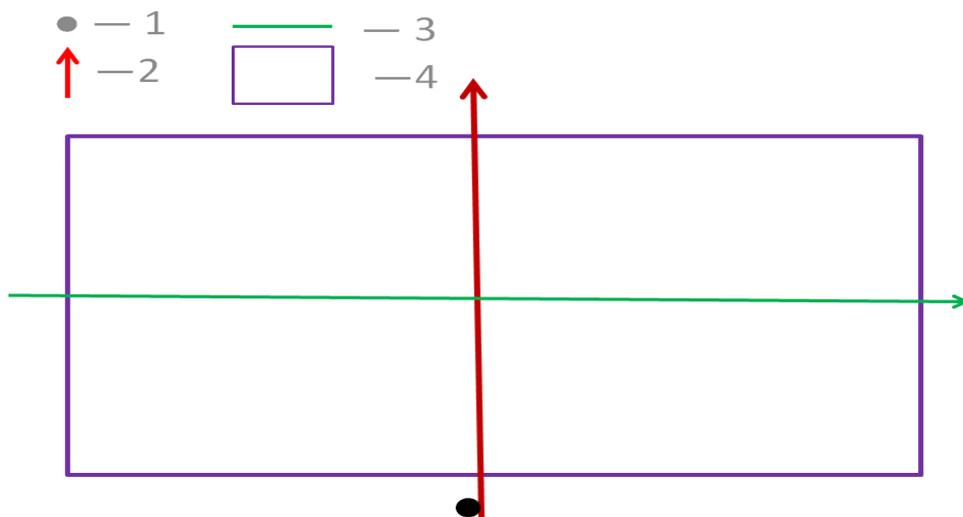
The teaching of Pythagoras (576-496), one of the ancient Greek philosophers who was the first to think about the role of numbers in the world of thinking, is inextricably linked with the theory of knowledge. Since Pythagoras knows that the basis of the universe is numbers, numbers, he also connects knowledge about it with these numbers.

The totality of existing things and phenomena has its own specific form, feature, character traits, quantity, and it is worth saying that due to quantity, in a certain sense, the quality of things and phenomena is determined. This situation is known in science as the law of interaction of quantitative changes with qualitative changes, that is, one of the laws of dialectics. This law “reveals the most general style of development of nature, Society and thought”. At the same time, quantity and quality are one of the philosophical categories that provide a holistic knowledge of the relationship of things and phenomena. As an important methodology, an intuitive and synergetic view of the problem under study is demonstrated in the process of a researcher working on a scientific problem in the case of a transition from quantity to quality.

Since a person's mental activity has a complex process, the first simple reflections on olam reveal the process of cognition, the formation of a slow way of thinking. The gradual process of cognition is changing, relativity creates the basis for the development, improvement of the way of thinking. If the process of cognition continues relatively slowly, without interruptions, then the process of contemplation

has a complex structure with interruptions, jumps. Contemplation about contemplation acquires the property of integrity, harmony. The emergence of a new process of thinking in the human consciousness is manifested in intuitive, synergetic thinking. Intuition serves as a turning point, a necessary link in the chain of progress that takes place in the human consciousness. Therefore, the dependence of the process of cognition on the way of thinking is of great importance for scientific knowledge and practical activity. This allows us to correctly understand the process of development of the objective world, to have a holistic knowledge of things and phenomena, to have intuitive thinking and use it in the further development of society. If we come to the conclusion that numbers are connected with existence, development, knowledge, that Pythagoras was right in this regard. Understanding the fundamental essence of things and phenomena makes it possible to understand not only their qualitative and quantitative characteristics, but also the mutual dialectical relationship between them, as already mentioned above. Since common things and phenomena in nature and society exist for some reason, this process manifests itself in the dialectical relationship between them. Let's consider the reasoning as an example in the thoughts that Pythagoras gives.

In his opinion, the number one is [•], the “point” is the number two is a “straight line” [ | ], the number three is a “plane”[—], and, finally, the number four is a “whole body”. The idea can be described by the following figure: (2-picture)



**2-picture. Pythagoras numbers diagram**

We can say that the sum of the integral information about the object in the process of cognition allows us to form an intuitive and synergetic vision. From the point of view of the Pythagoreans, we see that intuition is connected with rational thinking. As for the importance of mathematics in the process of cognition, the French scientist, philosopher, co-founder of geometry Rene Descartes (1596-1650) in his work “Observations on the method” believed that mathematical knowledge is embedded in the human mind, nature, such knowledge is the most basic knowledge. Also, scientists working in the field of mathematics pay special attention to the concept of intuition. In particular, the direction of intuition has been formed in

modern mathematics. This direction was founded by the German philosopher I. Kant, the French mathematician and philosopher Henri Poincare and the Dutch mathematician L. Brauer. It is known that in the epistemology of the present time and in the practice of direct scientific creativity in science, first of all, many remarkable discoveries in mathematics, chemistry, and theoretical physics have arisen in the form of intuition. Henri Poincare, Jacques Hadamard, Leon Brauer, Hermann Weil and others cannot imagine mathematical creativity without intuition. An important section of the current geometry of the world is the taftalog, its founder played a big role in the appearance of “geometric intuition” by Wujuda Poincare. He puts forward the basic concepts of tautology on the basis of imagination, which Poincare intuitively reveals. Henri Poincare believes that the creation of a mathematical idea with the help of a new intuition, logic, is not derived from old mathematical ideas. In addition to logical proof in mathematics, the generalization of knowledge and the advancement of new synthetic reasoning and ideas is called Poincare intuition. From our point of view, intuition is a process of cognition that is formed in a system of generalization of certain ideas. L. Brauer linked all his hopes in mathematics not only with logic, but also with intuition. “In his mathematical work, he proclaimed intuition as the only source of mathematics, the negation of mathematical continuous reasoning and the criterion for the correctness of mathematical theories”.

In addition, many great mathematicians have paid attention to the creative role of symbols in mathematical knowledge. The great German mathematician Felix Klein described the power of mathematical symbols as “a pen is stronger than a person” - a mixture of humor. Bunda meant that she could understand her thoughts in the form of characters, using a pencil on paper to discover new realities with the help of characters.

The great physicist Henry Gers Maxwell said about the equations of classical electrodynamics: “When studying this amazing theory, from time to time it seems that there is a sense of soul and mind in mathematical formulas, they are smarter than us, even from their own author”. He was talking. We can say that when forming intuitive thinking, we come to the conclusion that numbers, symbols and logos, mathematical thinking, have their own meaning.

Synergetic is a method of teaching and scientific cognition aimed at understanding the essence of these relations and based on the principle of evolution of development and considering Evolution in the form of a general law of existence, the expression of relations between man and nature. As it turned out, the German scientist in 1973The year in which Haken made a speech at the first conference on self-organization problems is considered the year of the birth of synergy. Synergetics is a complex of scientific views aimed at recognizing the existence of the Universe on the basis of self-organization, the age-old sequence of things and events in space and time, their interconnectedness, cause-and-effect relationships consisting of certain systems. It is based mainly on such concepts as self-organization, self-management, violation of regularity, linear and nonlinear in economic, technical, social complex processes, in physical, chemical, biological phenomena.

Synergetics is a scientific direction, a method of thinking aimed at studying the nature of complex structural processes, such as cooperation, the theory of self-

organization of harmony systems, the theory of self-government of the present time, the study of nonlinear phenomena, a new interpretation of the world, natural and socio-economic. "Since synergetics is a self-organizing process as a method of philosophical and methodological thinking, intuition in scientific knowledge is also studied as a random process that occurs in certain mysterious, spontaneous, unintended cases. Synergetics in the process of development is based on the law between an unstable state and a stable state, imbalance and equilibrium, the relationship between disorder and regularity, the nonlinear dependence" on the content of the form".

In the event that intuition arises precisely in an unexpected situation, the researcher observes in such cases that this happens at a time when the researcher is not looking for a solution to the problem, for example, while walking, confusion turns into ordered reasoning within the framework of irregular problems. Also, creative intuition is a specific process of cognition, the essence of which is the combination of emotional images and abstract concepts. This leads to the formation of completely new images and concepts either by a simple synthesis of illiterate concepts, or by a simple logical processing of existing concepts. "Synergetics is based on the principle of the evolution of development. Synergetics considers evolution as a general law of existence, unity and community, cooperation not only between people and people, but also between man and nature".

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Science proves that many scientific discoveries occur due to the intuitive ability of a person to know, and in the process there is a connection between a person and nature or the object being studied. "Paying special attention to the relationship between an unstable and stable situation in the development process is a general principle of synergy. Analyzing these cases, I. Prigozhin believes that the original essence of the concept of "instability", which has so far been used in his philosophy of instability in a negative sense, has not been given sufficient attention. He interprets instability as an important aspect of existence. In his opinion, since any old system is exchanged for a new system, there will first be instability, confusion, and then there will be a stable state and regularity. A simple coincidence is also important when such a situation occurs, that is, it can unexpectedly turn the movement completely in the other direction".

Intuition is a random process in its state, that is, a process of instability (like storing a problem in memory). Intuition is a process of acquiring new knowledge that

allows you to immediately embrace integrity, without relying on any observations and evidence about the situation in which a problem arises in the object under study, and it serves as a decisive factor in choosing the ideal of many options, such as the desire for maturity and beauty, which is carried out at any moment. Progress in the principle of nonlinear synergetics does not follow a predetermined path, but recognizes that on the basis of the inherent nature and external connection of things and phenomena in the Universe, it is possible to follow a new, unique path every time.

In some places, intuition is interpreted in the manner of the process of absolute unconscious, Divine Inspiration that arises in the process of communicating with the divine power. Intuition helps to determine the seriousness of a complex, never-existing reality, fully revealing some inner awareness. Synergetics studies the processes and laws of self-organization as components of development processes"

Thanks to intuition, a person understands the essence of complex phenomena, comprehending, figuratively speaking, holistically, without paying attention to its various parts. At the same time, certain parts of the thinking process are not understood at one level or another, and basically the result of thinking is a clear, clear record, only with a real understanding.

Understanding the essence of something and the phenomena that affect each other and enter into a dialectical connection due to causes and effects is important in the process of cognition. The cause comes before the end from the point of view of time and serves as a necessary condition for the occurrence of the effect. The cause, so to speak, affects the body, as well as the result, affects the cause, and this process, in our opinion, provokes a synergistic process that is formed by itself and develops.

In our opinion, since synergetics as a style of thinking is a self-organizing and controlling system, intuitive cognition in the process of scientific cognition is also a random process that occurs unexpectedly by itself. If synergetics studies evolution as a general law of existence, intuition tries to determine the seriousness of a complex reality, revealing the fullness of some inner consciousness. Synergetics is the process of self-organization from a state of chaos. A problem that is not solved in a conscious state passes into a state of unconsciousness. Therefore, the concept of "intuition" is evaluated as a random process that occurs unexpectedly in some sources.

According to the law of unity and struggle of opposites, conflict is the cause, source, movement and development of the struggle between dependent opposites, forces. Based on this, we come to the conclusion that in an irregular order, conscious activity finds its expression in the unconscious. The Buda synergistic concomitant factor is important. In our opinion, synergetics studies the dialectical connection between consciousness and the unconscious. At this time, he studies the integrity between the object and the subject in the process of cognition.

Understanding the spontaneous, free nature of self-organization processes led to an understanding of the creative nature of man. From the point of view of synergetics, the creativity of the subject is the highest, most fruitful, active stage of self-organization at the social level of existence. Self-organization of the creative activity of the subject occurs at the conscious and unconscious levels of the spiritual being.

We can say that the weakness of logical thinking is first manifested in its analytical study, that is, it divides reality not in a holistic form, but into parts and facets. Such an awareness of existence always comes from contradictory views. And in thinking, the “White” and “black” sides of Real Things do not seem to be equal.

In general, conflicts are of great importance in the evolution of human consciousness and thinking. But we believe that these contradictions have a positive effect only when the dependent opposing parties are able to form a dialectical unit that complements each other.

In our opinion, the unity of rational and irrational thinking, the opposite sides of dependence are the cause, the source of action and development. When studying the essence and validity of these concepts, it is necessary to distinguish between internal and external, basic and non-basic aspects, but there is also no absolute boundary between them. In the process of cognition, they mutually rot, pass into each other and affect thinking in different ways. Therefore, it is necessary to take into account the circumstances, the situation, the situation in which a certain bias, contradiction is manifested in each of the contradictions.

**Conclusion.** First of all, first of all, intuition as a new scientific direction serves as an important factor in establishing interaction between representatives of different sciences. The interaction and connection inherent in itadorlik are manifested not only in scientific knowledge, but also in social life, in the complex processes of existence. Intuition has taken a worthy place in the implementation of great scientific achievements and results for more than a century of this past. This served as a basis for further strengthening its methodological source.

From the philosophical point of view of Pythagoras, it can be understood that a number, a number, is the addition and subtraction of them together, the multiplication of which causes the formation of the first thought process in a person's worldview. The views of Pythagoras reflected integrity in the process of cognition. At this time, philosophers such as Pythagoras, Plato and Aristotle, when they say “philosophy”, refer to holistic wisdom. As for the number, the numbers have the inscription "Plato on the forehead of his philosophical school: “A person who does not know mathematics, let him not enter my presence”. Mathematics teaches a person to philosophical thinking. It develops human thinking from a small point to an infinite universe, forms knowledge, integrating the dialectical attitude to the order and disorder existing in the universe into an integral system.

Cognition is a complex and multifaceted process. It is very important that he knows all the things and phenomena that relate to matter, but also studies issues related to the psyche. The evidence of the above idea can be the creation of new discoveries in the harmony of rational and irrational thinking

In this regard, we can draw the following conclusion by the formula:

**Mathematical thinking+intuition=synergetic analysis**

Secondly, in the views of Plato and Henri Bergson, the concept of intuition is interpreted in the style of an infinite, abstract process that does not depend on time and space. Such a feature inherent in intuition is a direct connection with the concepts

of memory, attention, thinking. Memory in a person is reflected in his needs, a person tries to keep in his memory everything that he needs and events. In the history of mankind, the achievements and discoveries made by scientists occurred as a result of their need for the object being studied, their interest and preservation in memory.

The harmony of these cases, which depends on the process of cognition, allows you to form intuitive thinking. At the same time, the concept of experience referred to by Aristotle is also directly related to the concepts of intuition and prophecy. R. With Descartes' taste, intuition is a reliable expression of this thoughtful and intelligent mind. Logic and intuition are inextricably linked. This idea was also considered by the thoughts of A. Bergson. Bergson argues that logic and intuition are special complementary tools of cognition, and intelligence and intuition are forms of objective reality and cognition. Intuition is a socialized instinct that moves in the direction of the creative evolution of life and understands its essence. And the mind is an action. This is an internal movement of intuition in the eyes of the Fiesta. We can quote the following formula from this review:

### **Logic +action=intuition**

Third, the intuition referred to by Rene Descartes is actually a product of conscious activity. At this point, we can say that logic and intuition are inextricably linked. Bergson evaluates intelligence and intuition in the form of objects of reality and forms of cognition, as well as special complementary tools for cognition of logic and intuition. In Spinoza's views, the concepts of intuition and influence have an integral relationship. An example of this is I. Newton's law of attraction in general, that is, the process of reflection in relation to the subject. Spinoza believed that intuitive knowledge would help to understand the universal necessity. Thus, we come to the conclusion that intuition, like mathematics, studies the integrity from a small particle in the universe to the universe. Johann Gottlieb Fichte evaluates intuition as a process of internal effort, A.A. Nalchajyan understands intuition as a way of the psyche's activity under consciousness. In general, we come to the conclusion that this situation is a process aimed at solving the problem.

“If the basis of science were absolutely rational, then development and, nevertheless, often radical exchange would not take place”, said Lou de Broglie, gives high appreciation instead of irrational thinking. In Schelling's thoughts, there is an idea of absolute reason-in the connection of object and subject. We can say that in the creative activity of the mind, the relations of the object and the subject are harmonious. A. The concept of volitional discretion, implied by Schopenhauer, is inextricably linked with the concept of intellectual activity.

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