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PHILOSOPHY OF THE ALGORITHM OF ABU RAIKHAN BERUNIY

Abstract: *For the first time in the history of science, the algorithm was used by Muhammad al-Khwarizmi to solve algebraic problems. Although the elements of algebra were known in ancient Egypt, Babylon, and Greece, it was al-Khwarizmi who made algebra a separate branch of science. Its name is associated with a set of rules of sequence, according to which one of the four arithmetic operations on the decimal number system is supposed to be performed.*

Key words: *Algorithm, algebra, arithmetic, knowledge, structure of society, technique, technology, determination, module, category, homology, differentiation, integral.*

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Introduction

As a rule, the algorithm can be described as the passage of natural and artificial processes in nature, [1] society and human thinking. The principles of the algorithm will be the basis of algorithms that have penetrated into all areas of science and require precise calculations. Today, technology, manufacturing, agriculture and many other fields are based on it. In the structure of society belonging to each stage of development, the present has a space of opportunities determined by the past. Our task is to show the space of possibilities of the subject's cognitive activity and its impact on the further development of society.

It is well known that cognition is the process by which the human mind is enriched with new information. And knowledge is the result of thinking activity, the regulator of human activity. It finds its practical expression in technique and technology, harnesses the potential of the source, and has so far surpassed all the natural resources used by man and all the productive forces of the past. Knowledge as an ideal is materialized throughout human activity. At the same time, the intellect of the subject, the forms of existence of knowledge, the close access to information - are the main factors in the transformation of information into knowledge.

There is al-Khwarizmi's scientific ideas will be the basis for illuminating the space of information possibilities in this research. The concepts of cybernetization, computerization, informatization of modern science form the basis of algorithms. The word "algorithm" means "Al-Khwarizmi" in Latin transcription. Al-Khwarizmi's analysis of the results of four arithmetic operations (addition and multiplication, division, division, and infinite periodic fractions) justifies the introduction of negative fundamental numbers, new boundary concepts such as "boundary" and "boundary transition" into the scientific apparatus of science.

These concepts are the fundamental ideas of mathematical analysis, from which Leibniz and Newton began differential and integral calculus. Although there are different classifications of knowledge, it should be noted that it is free and “open”. [2]

On the basis of these features of knowledge, new fields of knowledge will be opened, differentiation and integration of sciences will take place. In this sense, modern algebra is an infinite field of mathematics.

We have not yet come across modules, categories, homology theories. Many partial theories are now placed in the general scheme of general

algebra. At the intersection of algebra and mathematical logic, the theory of modules emerged. Today we can talk about modern algebraic geometry, algebraic typology, algebraic theories. "The development of these theories continues, and Uzbek mathematicians are making a significant contribution to this development."[3] That is, the expansion of the possibilities of applying knowledge and all its forms in various combinations of knowledge has become the basis for the development of modern society.

The organized interaction of explicit and implicit knowledge is the basis for the creation of new knowledge. The realization of knowledge by researchers is the result of personal activity and cannot be transmitted to others through formalized structures. When explicit knowledge could be transferred to non-explicit knowledge and vice versa to what was not explicit, there would be more knowledge that “information is obtained through the senses” [4] than that which occurs through the mind.

In general, knowledge and information are important for all modes of development of society, because the production process always depends on the level of processing of knowledge and information. Knowledge is used to activate devices that process information and communicate between areas of innovation.

An algorithm is a specific rule that performs actions or operations in a specific order that are used to solve problems in a particular category. The problem found in the algorithm is solved. It becomes a natural human goal to find algorithms in the process of solving various problems and tasks. Knowledge is a tool of value and activity of the subject, but knowledge is its value in its objectivity.

The subject's attitude to the world around him, the knowledge gained as a result of intellectual activity is positively used due to the presence of a socio-cultural space in which the methods of developing skills are intertwined. The area of the socio-cultural space is different in each period. The scientific idea does not always correspond to the possibilities of space and time.

So how can one define what space is and its historical and social significance from the point of view of social practice? In social reality, space is fundamental. Today, the information space is sweeping the globe. It is a leading factor in social unity, a set of rules and codes that people develop to understand each other, on the basis of which, of course, the boundaries of a cultural community are defined.

In short, the concept of "algorithm" is gradually evolving, and as science progresses, its field of activity is constantly expanding. This process is related not only to human cognition and labor activity, but also to the computers that form the foundation of modern information society. Uzbek scientists are also making a significant contribution to the expansion of the "space of possibilities" of knowledge, enriching the concept of "algorithm" with scientific concepts.

It is known that in social practice, space consists of a set of elements that maintain the flow of knowledge, information, and the division of time can be thought of as the material basis of social practices. The space of possibilities is based on the interaction of the pieces in the formation of the structure as a whole. In the space of possibilities there is an "contact" environment of activity, in which knowledge of different levels and different specific sciences can be connected. The purpose of the analysis here is to identify the logic underlying the information space of possibilities. Let's look at this in the case of “Algorithm”.

It is known that al-Khwarizmi is at the head of many algebraists today. Al-Khwarizmi's treatise is the first in a long series of mathematicians' research on algebra. “Al-Khwarizmi's creative activity was focused on the study of nature, the application of scientific methods of knowledge. His work helped to shape the natural-scientific and progressive philosophical ideas of the Middle East”. [5]

It should also be noted that, unlike other stages of development of science, “Muhammad al-Khwarizmi also applied the methods of quantitative research he invented to the realities of social life. He studied the four aspects of human relations of his time: the treaty, the pledge, the will, and the slave trade (jallobliq)”. [6] Positive knowledge was gained in a purely scientific way. This knowledge became the basis for establishing legal relations between people and establishing interpersonal relations in society.

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