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MATHEMATICAL METHODS OF FIGHTING VS COVID-19

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Аннотация. Ушбу мақола, коронавирус (COVID-19) пандемиясига қарши курашиш бўйича, математик муносабатлар орқали, аналитик фаразлар мисоллар кўринишида ёритилди.

Аннотация. В данной статье рассматриваются аналитические гипотезы в виде примеров математических взаимосвязей в борьбе с пандемией коронавируса (COVID-19).

Annotation. This article has covered analytical hypotheses in the form of examples of mathematical relationships in the fight against the coronavirus (COVID-19) pandemic.

Калит сўзлар. Коронавирус (COVID-19), математик муносабат, математик мулоҳаза, функция, лимит, аниқ интеграл, Ибн Синонинг математик нисбати, хлорли аралашма.

Ключевые слова. коронавирус (COVID-19), математическое отношение, математическое обоснование, функция, лимит, интеграл, математическое соотношение Ибн Сино, вирусная инфекция.

On January 31, 2020, President Shavkat Miromonovich Mirziyoyev at a meeting with scientists, young researchers, heads of research institutions and representatives of the manufacturing sector said, “Mathematics is the basis of all exact sciences. A child who knows this science well will grow up to be smart, open-minded and successful in any field, ”he said.

"Mathematical science, which laid the foundation stone of our great ancestors, is becoming more important today due to the rapid development of modern branches of science and technology ..." said the President of the Republic of Uzbekistan Sh.M.Mirziyoev in July 2019. support ”[1].

This decision means that in order to perfect knowledge not only in the field of mathematical sciences, but in all fields, it is necessary to have clearly goal-oriented plans and real results.

Currently, following the outbreak of coronavirus infection (COVID-19) in 2019, the disease is spreading like an avalanche around the world, creating many epicenters. In this common difficult situation, all countries should take care of each other and help each other

should show. In order to find ways to combat and overcome this pandemic, the staff of the World Health Organization, as well as health care organizations of the Republic of Uzbekistan, are constantly conducting scientific and practical research.

In order to implement measures to prevent the entry and spread of this coronavirus (COVID-19) pandemic in the territory of the Republic of Uzbekistan, on the basis of the Decree of President Sh. Mirziyoyev dated January 29, 2020 No. F-5537 [2] Resolution of the Republic of Uzbekistan "On additional measures against the spread of coronavirus infection"; The Republic of Uzbekistan has adopted resolutions "On ensuring sanitary and epidemiological well-being and safety of the population, the organization of coordinated activities of state and economic authorities and organizations responsible for preventing the spread of coronavirus infection, protection of life and health of citizens."

Unlike many scientists and colleagues, it makes sense to state some mathematical ideas and hypotheses to get rid of this Coronavirus (COVID-19) pandemic, fight it, and find ways to overcome it.

First of all, let's talk a bit about what this coronavirus (COVID-19) is and how it can pose a threat to humans: Coronaviruses are a fast and widespread, life-threatening, a number of infectious diseases such as respiratory syndrome (MERS) and SARS (SARS). a large group of viruses that cause honey. New coronavirus (2019-nCoV, or later severe acute respiratory syndrome-2 coronavirus or

SARS-COV-2) was first detected in Wuhan (China). This is a new type of coronavirus that has not been previously identified in humans [3].

Given that the incubation period of COVID-19 lasts an average of 1 to 14 days, the World Health Organization recommends that people not infect themselves with the coronavirus and use these mass methods of prevention: protective medical mask, protection from crowded places, keeping a distance of 2 meters in the middle, good room ventilation, attention to personal hygiene, proper nutrition, exercise, not shaking hands, not leaving the house during quarantine, etc. [3].

Mathematics teaches to be able to anticipate a few steps and find problems in an analytical way. Mathematics also teaches us to be careful and responsible for our own actions.
Leonardo Da Vinci said, "If any study of people is not proved on a mathematical basis, that study will never be true."
Mathematical considerations are mainly studied in relation to the function y = f (x). Here, comparing the function y = f (x) with the function Human = f (COVID-19), we consider the following considerations to be appropriate:

1). $COVID-19 = \underset{Person \to \begin{cases} home \\ cleanliness \end{cases}}{\boldsymbol{lim}} \boldsymbol{f}(COVID-19) = \mathbf{0}$

2). $\boldsymbol{Illness} = \int_{2\ m\ distance}^{\textbf{Stay at home}} \boldsymbol{f}(COVID-19)\ \boldsymbol{d}(\boldsymbol{cleanliness}) = \mathbf{0}$

3). $\boldsymbol{Illness} = f(COVID-19) = \begin{cases} 0, & if\ ("stay\ at\ home")\ and\ ("cleanliness") \\ \infty, & if\ (going\ out)\ and\ (neglecting) \end{cases}$

We can say that these considerations correspond to the laws of function, function limit, and function integral. So, this means that the policy of our state in the fight against the coronavirus (COVID-19) pandemic is well established.

We know Abu Ali Ibn Sina (980-1037) as the father of medicine, but he was also a mature mathematician and a great scientist who contributed to the development of the science of mathematics, both scientifically and practically. Ibn Sina used analytical methods of mathematics to study the history of disease, to find a cure for diseases, and to make ointments from natural herbs. Ibn Sina introduced the idea of relation to mathematics A / B = C / D ⇆ B / A = D / C.

Today, this rule of mathematics is also used in medicine around the world. We liken this commentary of Ibn Sina to the following:

$$\frac{\boldsymbol{A}(\text{patients with coronavirus})}{\boldsymbol{B}(\text{healthy people})} = \frac{\boldsymbol{C}(stay\ at\ home\ and\ cleanliness)}{\boldsymbol{D}(disorder)} \quad \leftrightarrows$$

$$\leftrightarrows \quad \frac{\boldsymbol{B}(\text{healthy people})}{\boldsymbol{A}(\text{patients with coronavirus})} = \frac{\boldsymbol{D}(disorder)}{\boldsymbol{C}(stay\ at\ home\ and\ cleanliness)}$$

Consider the following "Chlorinated Water" in the fight against coronavirus [4].
In matters of mixtures brought to differential equations, it is generally assumed that the intensity of the mixture is very high, that is, at any given time the mixture is homogeneous, that is, the substances added to the mixture are uniformly mixed. If the amount of component (chlorine) R is known to be constant over a period of time, the rate of change of the total mixture volume $\boldsymbol{v}(\boldsymbol{L/c})$ The concentration of the component (chlorine) in the mixture $\boldsymbol{\Delta t}$ over time $\boldsymbol{\Delta V = p \cdot v \cdot \Delta t}$ can be seen to have changed. However, as

a rule, the amount of concentration depends on time, the change in component volume $p(t)v\cdot\Delta t$ ва $p(t+\Delta t)v\cdot\Delta t$ lies between the cones:

$$p(t)v\cdot\Delta t > \Delta V > p(t+\Delta t)v\cdot\Delta t$$

If this is an inequality Δt as $\Delta t \to 0$ If we go to the limit, we get the following differential equation $V'=pv$.

According to sanitary norms, 3% to 1% chlorine mixture should be used in the open and 0.5% in the closed [4].

Masala. The tank contains 150 liters of 4% chlorinated water mixture. Fresh water is added to the tank at a rate of 4 liters per minute (4 l / min) and the mixture in the tank is discharged at a rate of 6 l / min. How much mixture is left in the tank after one hour and what is the concentration of chlorine in it? [4].

The solution to the problem. Let's assume $V(t)$ - t time is the volume of chlorine in the tank measured in liters (time t is measured in minutes). This means that 2 liters more liquid comes out of the tank every minute t over time the mixture remains in the tank (150-2t) and the amount of chlorine in it $V(t)/(150-2t)$ will be.

It wasn't that big Δt from the tank over time $6\Delta t$ This is if a liter of mixture goes out Δt assuming that the amount of chlorine in the mixture does not change over time $6\Delta t$ in a mixture of volumes $V(t)\cdot 6\cdot\Delta t/(150-2t)$ amount of chlorine. In fact, the amount of concentration (chlorine) decreases, so the following inequality is reasonable:

$$-\Delta V = V(t) - V(t+\Delta t) < V(t)\cdot 6\cdot\Delta t/(150-2t)$$

Similarly, on the other hand, we create the following inequality:

$$-\Delta V = V(t) - V(t+\Delta t) > V(t+\Delta t)\cdot 6\cdot\Delta t/(150-2t)$$

This is two inequalities Δt as , Δt If we exceed the limit of zero, we come to the following differential equation for the rate of decrease of the amount of chlorine in the mixture $-V'=6\cdot V/(150-2t)$. This is not in line with sanitary norms.

If t=45 If we stop pouring clean water into the tank after a minute and take the mixture out of it, 150–2·45 = 60 liters of mixture will remain in the tank and the amount of chlorine in it will remain $V(45)=6|(45/75)-1|^3$ and 0,0064=0,64 % According to sanitary norms, it can be used indoors [4].

Naked-science.ru According to the publication, the use of a mathematical model allows scientists to accurately calculate the number of coronavirus infections, diagnose and realistically assess the pandemic situation, through which it is possible to analyze the situation and organize appropriate preparations [7].

Infection Control and Hospital Epidemiology In an article published in the journal, Stephen Krantz, a professor at the University of Washington, suggests that a more accurate picture of the pandemic situation should be obtained by applying a mathematical model to the original real situation [7]. In order for the calculations to be objective, as many additional factors as possible should be taken into account in the modeling. Such factors include, in particular, population density and the structure of the population in certain areas by age category.

Srinavasa Rao, a mathematical modeling expert, argues that “practical preparation for a pandemic should depend on the real situation among the population, no matter how many patients are registered”. “The more accurate the indicators are, the more we will know the real situation with

the pandemic, the more we will be able to assess how long the viral pandemic will last. The information, which is as close as possible to the real situation, will help government officials and the medical system to understand exactly what scenario to prepare for, ”added Srinavasa Rao.

The above mathematical modeling methodology proposed by scientists can allow medical professionals around the world to more fully assess the scale of the problem and better visualize the epidemic landscape.

As another example, consider an interesting problem called "Mathematicians do not infect themselves."

Example: There are two men, two women and two right gloves. Men and women have different diseases (4 different infections). The two men want to shake hands with each woman. Can only men wear two right gloves to greet each other so that they do not infect each other?

Answer: Yes it can be done as follows.

Male 1: puts two right gloves on top of each other and first greets the 1st female, leaving the outer glove in the female hand (the inside of this glove is clean). He then greets the 2nd woman and leaves the glove on that woman (this glove has a virus on the stone as well as inside).

Male 2: 1 female greets him wearing a glove (clean inside) in his hand. The 2nd woman with the glove in her hand puts this inside the glove in her hand and greets this woman as well.

The solution of this problem is based on the equation $2 + 2 = 2 \cdot 2$, that is, the equation n + n ⟦= n⟧ ^ 2 has a solution in a single natural n = 2.

Mathematical problem-solving is the process of introducing people to the existing beauties of the universe and using it to teach the much-needed discipline and logical thinking in mathematics. This is very important because a person who has learned to think logically in mathematics can apply it to any area of life they want.

In conclusion, the process of perfect study of mathematics carries out two goals in parallel: first, it carries out mathematical laws, proofs, formulas, mathematical interpretation; secondly, the laws, proofs, methods of using formulas not only in mathematics but also in other fields are shown, as a result of which we have to conduct scientific research applying mathematics to many other fields.

REFERENCE:

Resolution of the President of the Republic of Uzbekistan dated July 9, 2019 № PQ-4387 "On state support for the further development of mathematics education and science, as well as measures to radically improve the activities of the Institute of Mathematics named after VI Romanovsky of the Academy of Sciences of the Republic of Uzbekistan."

Decree of the President of the Republic of Uzbekistan Sh. Mirziyoyev dated January 29, 2020 No F-5537 "On measures to prevent the entry and spread of the coronavirus (COVID-19) pandemic in the territory of the Republic of Uzbekistan."

Li Xinhua, Gao Fu Public Recommendations on Measures to Protect against Coronavirus Infection // Translated by NamSU professors / - 2020. -32 b.

Grinshpon.Ya.S. Geometricheskie, fizicheskie i ekonomicheskie zadachi, svodyashchiesya k differentsialnym uravneniyam // Uchebnoe posobie / -Tomsk, -2011, -s.74

Rozikov.U.A., Mamatova.N.X. Mathematics and life // - Academy of Sciences of the Republic of Uzbekistan "Science". - Tashkent. -2020. -128 b.

Zulfixarov I.M., Iskandarov.D.X., Mamatov.F.U. Adherence to the law of "integral" in the development of students' mathematical thinking // International scientific conference "Modern problems of differential equations and related sections of mathematics" / -g.Fergana, FerGU. -12-13.03.2020. –St 308-311.

https://daryo.uz (16.04.2020 й.)