MULTIDISCIPLINARY AND MULTIDIMENSIONAL JOURNAL
ISSN: 2775-5118 VOL.4 NO.6 (2025) I.F. 9.1

APPLICATION OF THE CENTRAL LIMIT TOREM TO SOLVING ECONOMIC ISSUES

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Annotation. Mathematical research methods occupy a special place in modern science and technology. With the development of information technologies and the expansion of their application in all spheres of human activity, the importance of mathematics has increased. This article discusses the application of probability theory to economic problems.

Key words: agricultural crops, standard deviation, economic problem, economic indicators, normally distributed value, central limit theorem, statistical distribution.

Probability theory is one direction of mathematics, and in all equations of natural sciences, theoretical physics, mathematical sciences, and the theory of global science, the theory of the national economy, and the national economy and technical processes are used in areas such as the planning and technical, automation and gross services.

Agricultural crops are planted in adequate large area, which is grown in the same shorite, that is, the thickness of plowing, feeding, irrigation, care of all types of agro-engineering is carried out the same. Therefore, the studied goal serves as the basis for viewing the central theory of the probability of the probability according to the Central Limit Teaor, as normal distributed.

The concept of probabology and characteristics of the central distribution of probabilities is used to solve the average monthly salary of workers, crops (cotton, wheat, rice, or yields of arena (cotton, wheat, and others, to yield the average percentage of agricultural plants.

Probability Theory and Mathematical Statistics Used to raise its economic indicators in all areas of national economics.

The current article is the concepts of the possibility of possibility to the economic issues of the economic issues of agriculture.

We now show the application of the probabic survey for economic issues in the cultivation of agricultural products.

Issue 1. The norm should be planted 45 kg of hair on the ground 45 kg. In fact, the amount of seeds that goes to 1 ha is a random amount, and its average square avendence is 5 kg, find the volume of 97% of the farm with the warranty.

Solution. With a random amount of X_i, we set the amount of pollen that goes to the ground for i, based on the condition of the matter, the seyalka should theoretically throw 45 kg of pollen every 1 to the ground, that is, they are distributed uniformly for all the area. $MX_i = 45kg,\ \sigma = \sqrt{DX_i} = 5kg\ (i = \overline{1,100})$. if we define the amount of locus with X going to 100 to Earth, it will be $\overline{X} = X_1 + X_2 + ... + X_{100} = \sum_{i=1}^{100} X_i$, (1), where $X_1 + X_2 + ... + X_{100}$ are mutually exclusive uniformly distributed random quantities, the conditions of the Central limit Theorem of probability theory are satisfied, and we can treat $\overline{X}$ as a roughly normal distributed random quantity, then according to (1) $M\overline{X} = \sum_{i=1}^{100} X_i = 100 \cdot 45kg = 4500kg = 4{,}5t.$

$$D\overline{X} = \sum_{i=1}^{100} DX_i = 100 \cdot 25kg = 2500kg = 2{,}5t.\ \sigma = \sqrt{D\overline{X}} = 50kg = 0{,}05t.$$

We set the amount of pollen that goes with $\beta -$ to 100 with a 97% guarantee on the ground. Based on the problem condition $P\{X < \beta\} = 0{,}97;\ n = 100 -$ being sufficiently large, we look at $\overline{X} -$ random quantities as N(4.5;0.05) – parametric normally distributed quantities. From the formula for the probability of taking a value lying at (α, β) intervals of $\overline{X} \approx N(a, \sigma)$ normally distributed quantities

$P\{\alpha < \overline{X} < \beta\} = \Phi((\beta - a)/\sigma) - \Phi((\alpha - a)/\sigma)$ (*) we use;

$P\{-\infty < \overline{X} < \beta\} = \Phi((\beta - 4{,}5)/0{,}05) - \Phi(-\infty) = \Phi((\beta - 4{,}5)/005 + \Phi(\infty),\ P\{-\infty < \overline{X} < \beta\} = 0{,}97$

because of $\Phi((\beta - 4{,}5)/0{,}05) + \Phi(\infty) = 0{,}97;\ \Phi(+\infty) = 0{,}5,\ \Phi((\beta - 4{,}5)/0{,}05) = 0{,}47,$

In connection with the normal distribution function (1,88) = 0.47

Will be $(\beta - 4{,}5)/0{,}05 = 1{,}88,\ \beta = 4{,}5 + 0{,}05 \cdot 1{,}88 = 4{,}594t$

So it turns out that the amount of pollen that goes to the ground by 100 with a guarantee of at least 97% is 4594kg. $(\beta - MS_n)/\sqrt{DS_n} = 1{,}88$ (97% - with warranty)when the norm is known

$$\beta = MS_n + 1{,}88\sqrt{DS_n} = na + 1{,}88\sqrt{n} \cdot \sigma$$

Using the formula, it is possible to determine from the very beginning, how many seeds of seeds should be ordered for farm planting. Where $MS_n = A_n = na,\ \sqrt{DS_n} = \sqrt{n} \cdot \sigma = B_n, n -$ total cotton is planted land area, a-1 is the amount of seeds planted by the norm per Area, $\sigma -$ mean quadratic deviation.

Issue 2. Each ball, which was checked before the dialing of cotton harvested in the film, and it was found that its average square avoidance was found. Each ball is the normal distributed buncheous bakery number $X \approx N(6;1)$ to assess the following:

1. The probability that the number of SIPs opened in the Acorn, optionally obtained from a cotton swab, will be in the range of $P\{4 < x < 8\}$

2. 1 Sinner cotton fiber value is $ 250, the amount of income taken from 1 hectares;

Solution. 1) The potentials required by formula based on the $X \approx N(a;\sigma)$ amount distributed normally (*) are the severe choice. Since the question of the matter is $a = 6,\ \sigma = 1,\ \alpha = 4,\ \beta = 8$

$P\{4 < x < 8\} = \Phi((8 - 6)/1) - \Phi((4 - 6)/1) = \Phi(2) - \Phi(-2) = \Phi(2) + \Phi(2) = 2\Phi(2)$.The Function of the Lapla is to consider $\Phi(2) = 0{,}4772$ of the values table

$$P\{4 < x < 8\} = 2\Phi(2) = 2 \cdot 0{,}4772 = 0{,}9544 = 0{,}95$$

This means that every ball opened at least 95% of cotton cotton is in the range of cotton gobils (4; 8).

2). If there are an average of 100,000 balls of cotton per hectare, and an average of 4 grams of cotton is produced from 1 boll, and considering that 1 quintal is 100,000 grams, it follows that with a 95% yield, the yield from 1 hectare will be in the range of (16; 32) quintals/hectare.

Let's assume that if 33% of the fiber is produced, then with a 95% guarantee, the yield for fiber will be in the range (5.28;10.56) t/ha.

According to the conditions of the problem, if the income from 1 ha of land is in the range of (1320;2640) $, a farmer who plants cotton on 100 ha will earn (132000;264000) $.

Issue 3. When fishing, the weight of the fish has a normal distribution with parameters $\alpha = 375g,\ \sigma = 25g$, and find the probabilities that the weight of a single fish caught is: 1) from 300g to 425g; 2) at most 450g; 3) more than 300g.

Solution. Let us denote the weight of the fish by a random variable X. We calculate the probability that a normally distributed quantity $X - N(\alpha,\sigma) -$ will take a value lying within the interval (α,β) using the formula (*).

Based on the condition of the issue: $a = 375g;\ \sigma = 25g;\ \alpha = 300g,\ \beta = 425g$

1) $P\{300 < X < 425\} = \Phi((425-375)(25) - \Phi((300-425)(25) = \Phi(2) - \Phi(-3) = \Phi(2) + \Phi(3)$

Using the table of values of the Laplace function, if we take into account that $\Phi(2) = 0{,}4772;\ \Phi(3) = 0{,}4965 -$, then

$$P(300 < X < 425) = 0{,}4772 + 0{,}49865 = 0{,}97585$$

2) $P(X < 425) = P(0 < X < 450) = \Phi((450-375)(25) - \Phi((0-375)(25) = \Phi(3) - \Phi(-15) =$

$= \Phi(3) + \Phi(15) = \Phi(3) + 0,5; (\Phi\Phi(> 5) = 0,5;$

$P(X < 425) = 0,49865 + 0,5 = 0,99865;$

3) $P(300 < X) = P(300 < X < \infty) = \Phi(\infty) + \Phi(3) = 0,5 + 0,49865 = 0,9986$

Based on the solutions to the problem, the probabilities of conditions 1, 2, and 3 are the probabilities of reliable events, so when fishing, the conditions specified in the problem are fulfilled.

In conclusion, it can be said that the central limit theorem of probability theory can be applied to all agricultural issues, drawing practical, economic conclusions, and predicting yields with sufficient certainty.

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