Volume 2, Issue 11, November 2024 **ISSN (E):** 2938-3757

DEFINING THE LAW FOR THE DISTRIBUTION OF AVERAGE MONTHLY EXPENDITURES IN THE ZARAFSHAN AND SURKHANDARYA RIVERS

Khanimkulov B. R.
Associate Professor, Department of Mathematics and Geometry Teaching Methodology, Chirchik State Pedagogical University

Abstract
In analytical groups, quantitative features are mainly used. They are also applied when constructing distribution rows. When grouping, on quantitative characteristics, questions arise about the number of groups and value - the width of the interval. These indicators are interconnected, the more groups are cut, the less the interval, and vice versa.

Keywords: water in the reservoir, full elections, incomplete elections, conditions of regularity Kramer-RAO, Fisher's information.

ОПРЕДЕЛЕНИЕ ЗАКОНА РАСПРЕДЕЛЕНИЯ СРЕДНЕМЕСЯЧНЫХ РАСХОДОВ В РЕКЕ ЗАРАФШАН И СУРХАНДАРЬИ

Ханимкулов Б. Р.
Доцент кафедры методики преподавания математики и геометрии Чирчикского государственного педагогического университета

Аннотация
В аналитических группировках в основном применяются количественные признаки. Они применятся также при построении рядов распределения. При группировке по количественным признакам возникаю вопросы о числе групп и величине – ширине интервала. Эти показатели между собой связаны, чем больше будет нарезано групп, тем меньше будет интервал, и наоборот.

Ключевые слова: воды в водохранилище, полные выборы, неполные выборы, условия регулярности Крамера-Рао, информация Фишера.

Introduction

In analytical groupings, quantitative features are mainly used. They are also used when constructing distribution series. When grouping by quantitative features, questions arise about the number of groups and the size - the width of the interval. These indicators are interconnected, the more groups are cut, the smaller the interval will be, and vice versa.
When solving the problem, it is necessary to take into account the range of variation, the variation series, which is the difference between the maximum and minimum values of the feature.

Licensed under a Creative Commons Attribution 4.0 International License.

The relationship between the number of groups n and the number of units in a population N is expressed in the formula of the American scientist Sturgess $n = 1 + 3.322\ LgN$. This dependence can serve as a guide when determining the number of groups in the event that the distribution of units of the population by a given characteristic approaches a normal distribution.

The interval size in this case is determined by dividing the range of variation by the number of groups:

$$h_0 = \frac{Q_{max} - Q_{min}}{1 + 3{,}222\text{LgN}}$$

Note where – h_0 is the interval width

Qmax – water flow of the Tupalang River for the period 1928 – 1962 , m3 / sec

Qmin – min water flow m3 / sec

According to our grouping: 1- interval, % of hit – 41.6, i.e. 180 cases; 2- interval, 23.6% – 102 cases; 3- interval, 13% - 56 cases; 4- interval, 10.6% - 46 cases; 5- interval, 7.3% - 32 cases; 6- interval, 1.3% - 6 cases; 7- interval, 0.2% - 1 case.

The Zarafshan River near the Dupula Bridge hydropostTwelve groups were formed along the Zarafshan River. 1 – interval, % - 50.57; 2 – interval, 17.11; 3 – interval, 7.5%; 4 – interval, 2.5%; 5 – interval, 3.26; 6 – interval, 5.76%; 7 – interval, 5.38%; 8 – interval 4.23%; 9 – interval, 1.53%; 10 – interval, 1.34%; 11 – interval, 0.57%; 12 – interval, 0.19%.

The above example shows that the water consumption of the Zarafshan and Surkhandarya rivers obeys an exponential law.

Exponential distribution. One of the distributions most frequently encountered in reliability theory is the one-parameter exponential distribution, defined by the probability density function:

$$f(x;\theta) = \begin{cases} \frac{1}{\theta} e^{-\frac{x}{\theta}}, x \geq 0 \\ 0, x < 0 \end{cases}$$

$$F(x) = \begin{cases} \frac{1}{\theta}, \int_0^x e^{-x/\theta}\, dx = 1 - e^{-\frac{x}{\theta}}, x \geq 0 \\ 0, x < 0 \end{cases}$$

Reliability functions

$$R(t) = \begin{cases} \int_t^\infty e^{-x/\theta}\, dx = e^{-x/\theta}, x \geq 0, \\ 1, t < 0, \end{cases}$$

$$h(t) = \frac{1}{0} \frac{e^{-t/\theta}}{e^{-t/\theta}} = \frac{1}{\theta}$$

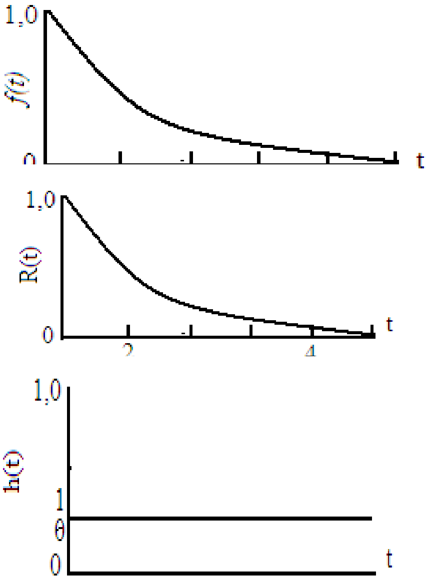
Licensed under a Creative Commons Attribution 4.0 International License.

Properties

Properties of the Exponential Distribution

Characteristic function	$M_x(t) = (1-\theta i)^{-1}, t < 1/\theta$
Average	$\mu = \theta$
Dispersion	$\sigma^2 = \theta^2$
The third central moment	$\mu_3 = 2\theta^3$
The fourth central moment	$\mu_4 = 9\theta^4$
Asymmetry coefficient	$\eta = 1$
Coefficient of kurtosis	$\alpha_3 = 2$
Characteristic function	$\alpha_4 = 9$

$$f(t;\theta) = \begin{cases} \frac{1}{\theta} e^{-t/\theta}, t \geq 0, \\ 0, t < 0 \end{cases}$$



$$R(t) = e^{-t/\theta}, t \geq 0$$

$$h(t) = \frac{1}{\theta}$$

Figure 1. Functions *f (t), R (t)* and *h (t)* for the exponential distribution

Notes

1 The exponential distribution is a special case of both the gamma distribution and the Weibull distribution .

2 This distribution is characterized by a constant water flow rate 1/θ, which also serves as a parameter of the distribution. A constant water flow rate means that the probability of water flow does not depend on how long it has been flowing before the moment in time under consideration.

Licensed under a Creative Commons Attribution 4.0 International License.

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

Table 1. - Histogram of the Surkhandarya river basin at the Shurchi village hydropost 1931-1962.

No.	range , m3 / sec	Number of months falling within the interval (pcs)	% hit	Sum	
1	11.7-28.9		28.9	89	
2	29-97.72		47.7	147	
3	97.73-132.13		6.1	19	
4	132.14-166.54		4.8	15	
5	166.55-200.95		4.8	15	
6	200.96-235.36		3.57	11	
7	235.37-269.77		2.27	7	
8	269.78-304.18		13	4	
9	304.19-338.59		13	1	
				111.46	308

Determination of the step interval at the Shurchi hydropost

$$h_0 = \frac{Q_{max} - Q_{min}}{3.303 + inN} = \frac{221 - 5{,}71}{3.303 + in372} = 36.54$$

$h_1 = Q_{min} + h_o = 5.71 + 18.27 = 24.16$

$h_2 = h_1 + h_0 = 24.16 + 36.54 = 60.70$

$h_3 = h_1 + h_0 = 60.70 + 36.54 = 97.72$

$h_4 = h_1 + h_0 = 97.24 + 36.54 = 133.78$

$h_5 = h_1 + h_0 = 133.78 + 36.54 = 170.32$

$h_6 = h_1 + h_0 = l70.32 + 36.54 = 206.86$

$h_7 = h_1 + h_0 = 206.86 + 36.54 = 243.4$

Table 2 - Histogram of the Surkhandarya river basin , Tupalang river right in Tupalangsky reservoir .

No.	Interval consumption m3 / sec	Number of months falling within the interval (pcs)	% hit	sum	
1	5.71-24.16		41.6	180	
2	24.17-60.70		23.6	102	
3	60.71-97.24		13	56	
4	97.25-133.78		10.1	46	
5	133.79-170.32		7.3	32	
6	170.33-206.86		1.3	6	
7	206.87-243.4		0.2	1	
				97.6%	433

Determination of the width of the interval of the river. Surkhandarya village Zhdanova

$$h_0 = \frac{Q_{max} - Q_{min}}{3.303 + inN} = \frac{329 - 117}{3.303 + in372} = \frac{317.3}{9.22} = 34.41$$

$h_1 = Q_{min} + h_o = 11.7 + 34.41 = 28.9$

$h_2 = h_1 + h_0 = 28.9 + 34.41 = 63.31$

$h_3 = h_1 + h_0 = 63.31 + 34.41 = 97.72$

$h_4 = h_1 + h_0 = 97.72 + 34.41 = 132.13$

$h_5 = h_1 + h_0 = l32.13 + 34.41 = 166.54$

Licensed under a Creative Commons Attribution 4.0 International License.

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

$h_6 = h_1 + h_0 = 166.54 + 34.41 = 200.95$
$h_7 = h_1 + h_0 = 200.95 + 34.41 = 235.36$
$h_8 = h_1 + h_0 = 235.36 + 34.41 = 269.77$
$h_9 = h_1 + h_0 = 269.77 + 34.41 = 304.18$
$h_{10} = h_1 + h_0 = 304.18 + 34.41 = 338.59$

REFERENCES:

1. Гмурман В.Е. Терия верятностей и математическая статистика. Учебное посбие. М.: Высшая шкла, 2008.
2. Кремер Н.Ш. Терия вероятностей и математическая статистика. -Ì.: ЮНИТИ, 2001.
3. Mamurov E.N., Adirov T.X. Ehtimollar nazariyasi va matematik statistika. T.: «Iqtisod - Moliya», 2007.
4. Гмурман В.Е. Рукводство к решению задач по «Теории вероятностей и математический статистике». Учебное пособие. 11-издание. М.: 2008.
5. Abdushukurov A.A. Ehtimollar nazariyasi va matematik statistika.Toshkent 2010 y.
6. Xashimov A, Mamurov E, Adirov T.X. Ehtimollar nazariyasi va matematik statistika. T.: «Iqtisod -Moliya»,2012 й.
7. Сейтов А. Ж., Кудайбергенов А. А., Хонимкулов Б. Р. Моделирования двумерного неустановившегося движения воды на открытых руслах на основе проекционного метода. сборник докладов Республиканской научно-технической конференции «Инновационные идеи в разработке информационно-коммуникационных технологий и программных обеспечений» 15-16 мая 2020 года. САМАРҚАНД. Стр. 60-63.
8. Хонимкулов Б. Р. Исследование взаимозависимости между испарением с водной поверхности водо-хранилища Катта-курган и расход воды реки Зарафшан у гидропоста мост Дуппули. Academic Research in Educational Sciences, 2020 г. 1(2), 56-60.
9. Ханимкулов Б. Р. Зарафшон дарёсида сувнинг сарфини ГТК ёрдамида ҳисоблаш. Ўзбекистон “Агро илм” 2020 йил №12. 80-82бетлар.
10. Ханимкулов Б.Р., Юсупов М.Р. Метод прогноза расхода воды рек на основе гидротермического коэффициента. Экономика и социум. №8(87) 2021.
11. Maxmudova D.M., Xanimkulov B.R. Probability theory. Handbook. Order № 302 of the Ministry of higher and secondary special education dated September 9, 2022.
12. Xanimkulov B.R. A dissertation abstract was presented in his dissertation on the topic “Methodology and for the use of mobile teaching technologies in integrated lessons” for the degree of Doctor of Philosophy in Pedagogical Sciences. Chirchiq – 2023.
13. Xanimkulov B.R. (2023) Scientific and methodological aspects of teaching “Computer science and Information Technology” in secondary schools. Physics, mathematics, and computer science. Scientific and methodological Journal. 6, 135-141.
14. Xanimkulov B.R. (2024) Modeling the teaching process” Computer science and Information Technology" based on mobile technologies. Vocational education № 2, 196-198.
15. DAUKEYEVA, N., & ASADULLAYEVA, M. IKKINCHI TARTIBLI SIRTLARNI O’QITISHDA MAPLE DASTURI IMKONIYATLARIDAN FOYDALANISH. ILMIY AXBOROTLARI, 120.

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

Licensed under a Creative Commons Attribution 4.0 International License.

16. Daukeyeva, N. (2024). System Of Problems Based On Competent Approach From Geometry In Academic Lyceums. Pedagogical Cluster-Journal of Pedagogical Developments, 2(9), 75-82.
17. Universitetic, N. R. C. D. P. (2023). MATEMATIKA FANINING RAQAMLI TEXNOLOGIYALARGA BO'LGAN EHTIYOJI. Academic research in educational sciences, 4(CSPU Conference 1), 303-304.
18. Razokova, N. K. (2023). SONLARNI 99 SONIGA KO' 'PAYTIRISH. GOLDEN BRAIN, 1(10), 167-172.
19. Radjabov, Baxtiyor, and Adolat Darmonova. "AHMAD AL-FARG 'ONIY VA MIQYOSI NIL. FARG 'ONIYNING DUNYO GIDROLOGIYA FANIGA QO 'SHGAN HISSASI." " Science Shine" International scientific journal 17.1 (2024).
20. Seitov, A. Z., & Khanimkulov, B. R. (2020). Mathematical models and criteria for water distribution quality in large main irrigation canals. Academic research in educational sciences, (2), 405-415.
21. Roxmonqulovich, X. B. (2024). MAKTABLARDA RAQAMLI TA'LIM RESURSLARI VA TA'LIMNING TEXNIK VOSITALARI BILAN BOG 'LIQLIGI: Yangi O'zbekiston taraqqiyotida tadqiqotlarni o'rni va rivojlanish omillari. Yangi O'zbekiston taraqqiyotida tadqiqotlarni o'rni va rivojlanish omillari, 6(1), 92-95.
22. Roxmonqulovich, X. B. (2024). Umumta'lim maktablarida "Informatika va axborot texnologiyalari"

Licensed under a Creative Commons Attribution 4.0 International License.