GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ)
ISSN (E): 2347-6915
Vol. 11, Issue 12, December (2023)

THE SUFFICIENCY CONDITIONS FOR A FUNCTION THAT IS CONTINUOUS OVER EACH VARIABLE TO BE CONTINUOUS OVER BOTH VARIABLES

Ummatova Mahbubaxon Axmedovna-
Kokand State Pedagogical Institute
Senior Lecturer, Department of Mathematics

Gofurova Mavjuda Aliyevna
Kokand State Pedagogical Institute
Mathematics Department Lecturer

Yakubov Temurbek G'ulomjon o'g'li
Kokand State Pedagogical Institute
Mathematics-Computer Science Course 2nd Year Student

ABSTRACT

In the modern socio-cultural context, the need for creative individuals capable of developing rapidly in the theory and practice of world education and effectively solving problems for changing societies, having their own independent opinion, being able to manifest themselves in various aspects of human activity, conducting unconventional and specific intellectual-creative thinking, making operational decisions appropriate to the situation is emphasized. Creativism today is an important criterion for the creativity of a citizen of the 21st century, one of the main factors that determine its holistic development.

Keywords: Theorem, function, mathematical analysis, inequality, technology and technology, fixer

On the basis of the reform of the educational system in our republic, the formation of a competitive environment in the field of state and non-state educational institutions and education and human resources, the consistent development of the educational system, the adaptation of the educational and human resources training system to the processes of renewal carried out in society, the adaptation of the, certain work on improvement has been carried out due to the modern achievements of technology and technology. At the moment, such tasks as the creative-intellectual and spiritual-moral education of Educational people, the development of creativity skills in them, the creation of a normative, material-technical and information base that provides for the development and practical implementation of effective forms and methods of this were established.

In this article, we will study the theorems of what conditions a continuous function on each of its variables is a continuous function of two variables. The following example will help us in the study of these theorems.

$$\mathrm{f(x,y)} = \begin{cases} \dfrac{x * y_0}{x^2 + y^2}, \mathrm{(x,y)} \neq (0,0) \\ 0, \mathrm{(x \cdot y)} = (0,0) \end{cases}$$

In the course of mathematical analysis, it is known that two-variable

GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ)
ISSN (E): 2347-6915
Vol. 11, Issue 12, December (2023)

$z = f(x, y)$ function $\lim_{\substack{x \to 0 \\ y - 0}}(x, y) = f(x_0, y_0)$

while satisfying equality $p_{0(x_0,y_0)}$ is continuous at the point. In this example, it appears that a continuous function over each variable is not continuous over a set of variables:

From the truth, every fixated $y_0 = 0$ for, $\frac{x*y_0}{x^2+y^2} - x \in R$ is a continuous function of the variable. If $y_0 = 0$ bo'lsa (, 0) ≡ 0 - is a continuous function. It can be similarly shown that for each fixed point (x_0, y) - $y \epsilon R$ is a continuous function of the variable.

Theorem 2.1. If $f(x, y)$, $(x, y) \epsilon [0,1] \times [0,1]$ if the function is continuous on each variable and every fixed $x_0 \epsilon [0,1]$ for $f(x_0, y)$ is a monotone grower (decreasing) over a function variable, then $f(x, y)$ the function is a continuous function of two variables in one path.

Proof. We have a continuous on each of its variables and y∈[0,1] switch is a monotone grower on (x,y) , (x,y)∈[0,1] × [0,1] let the function be given by.

Optional one $[x_0, y_0] \in [0,1] \times [0,1]$ we get the point. by variable x f (x,y_0)

since the function is continuous, it is optional by definition

$\varepsilon > 0$ for the number $\exists \delta > 0$

number found, ∀x: $|x - x_0| < \varepsilon$ for points satisfying inequality

$| f(x, y_0) - f(x_0, y_0)| < \frac{\delta}{2}$ (1.1) the inequality holds.

Now $| f(x, y) - f(x_0, y_0)|$ we evaluate the subtraction.

For this $| f(x, y) - f(x_0, y_0)| \leq | f(x, y) - f(x, y_0)| + | f(x, y_0) - f(x_0, y_0)|$ (1.2)

we get inequality.

$y > y_0$ which is monotone according to the condition of growing every fixated$y$: $|x - x_0| < \delta$ at the point

$\varphi_y = f(x, y) - f(x, y_0)$

x − ba family of arbitrary continuous functions $y \to y_0$ decreasing when exactly zero tends to function. To the Dini theorem, known from the course of mathematical analysis according to $\varphi_y(x)$ the function tends exactly flat to the zero function.

That is, for an arbitrary number ε > 0, the number η > 0 is found such that ∀y: / y-y_0 / < η satisfies inequality ∀X at points and ∀x: / x-x_0 | < δ for points

| f (x, y) - f (x, y_0) | <δ/2 (1.3

the inequality is fulfilled.

Now combining the inequalities (1.1) , (1.3) and (1.2), when ∀x: |x − x_0| < δ ,y: |y − y_0| < η

| f (x, y) - f (x_0, y_0) / <ε / 2 + ε / 2=ε

we have inequality. This means that by definition f (x , y) of the function denotes continuity. (x_0 ,y_0) from an arbitrary choice of Point f (x, y the continuity of the function in the square [0,1] × [0,1] follows.

The theorem proved.

Theorem 2.2. If f (x, y) (x , y)∈[0,1] × [0,1] on each variable if is continuous and such a number $\mathscr{M} > 0$ is found, for arbitrary points x∈[0,1] and y_1, y_2∈[0,1

| f (x, y_1)- f (x, y_2) | ≤≤ |y_1-y_2| (1.4)

if the inequality is satisfied , then the function f (x, y) is a continuous of two variables is a function.

Proof. Suppose f (x , y), (x, y)∈[0,1] × [0,1], function every
is continuous on the variable and z is also a condition on the variable (1.4
let it be satisfied. We choose an arbitrary point (x_0 ,y_0)∈[0,1] × [0,1] and
| f (x_0, y_0) - f (x, y) | (1.5)
we evaluate the turnover. (1.4) condition ∃ > 0 for a number ∃ δ > 0
it is found that∀ z: |x_0-X| < δ for the points that satisfy the inequality
| f (x, y) - f (x, y_0)| <ε/2 (1.6
(enough to choose = ε / 2m).On the other hand
| f (x_0 ,y_0) − f (x , y)| ≤ | f (x , y)– f (x, y_0)| + | f (x, y_0) − f (x_0 ,y_0)| (1.7)
and under the theorem condition a number ∀ ε > 0, ∃η > 0 is found such that∀ y: |X − x_0| < η for points
| f (x ,y_0) − f (x_0, y_0)| <(ε)/2 (1.8
inequality is appropriate. Now combining (1.6), (1.8) and (1.7) inequalities,
∀x: / x − x_0 / < η and ∀y:|y_0-y / <δ for points satisfying inequalities (x, y

| f (x, y) - f (x_0, y_0) / <ε / 2 + ε / 2=ε

we have inequality.
So ε of continuity, δ is a function given by the Cauchy definition of
(x_0 .y_0) is a continuous function of two variables at a point .
(x_0 ,y_0) from the arbitrary point f (x_ (0 ,) y) of the function [0,1] + [0,1]
we have continuity in the square.

CONCLUSION

In the process of teaching, the student regularly teaches students how to think unusually, making them creative in independent, free thinking, search, perception of responsibility, conducting scientific research, analyzing, making the most of scientific literature, the main thing is to strengthen their interest in reading, science, educator and profession of their choice.

REFERENCES

1. Ахмедовна, Умматова Махбуба. "РОЛЬ ЗАДАЧ ТЕОРИИ ЧИСЕЛ ПРИ ПОВЫШЕНИИ МАТЕМАТИЧЕСКИХ ЗНАНИЙ УЧАЩИХСЯ." Ученый XXI века 1-2 (2017).
2. Умматова, М., Г. Ахмедова, and О. Махмудова. "Практическая направленность в обучении математике." Теория и практика современных гуманитарных и естественных наук. 2014.
3. Ummatova, M., and M. Yakubjanova. "About the history of complex numbers."
4.Умматова, Махбуба, and Темурбек Ёкубов. "ОСНОВНЫЕ ВИДЫ СЛОЖНЫХ СУЖДЕНИЙ." *Interpretation and researches* 1.1 (2023).
5. Умматова, Махбуба, and Саодатхон Кабирова. "МАТЕМАТИЧЕСКАЯ ЛОГИКА–КАК НАУКА О ФОРМАХ И ЗАКОНАХ ПРАВИЛЬНОГО МЫШЛЕНИЯ." *Interpretation and researches* 1.1 (2023).
6. Axmedovna, Ummatova Maxbuba. "FACTORS FOR DEVELOPING STUDENTS'CREATIVITY SKILLS." *Galaxy International Interdisciplinary Research Journal* 11.4 (2023): 349-352.
7. Davronovich, Aroyev Dilshod, et al. "MUTUAL ONE-VALUE REFLECTION AND

AUTOMORPHISMS." *International Journal of Early Childhood Special Education* 14.7 (2022).
8.Ummatova, Mahbuba Axmedovna, and Olimaxon Oxunjonovna Rahmonova. "ELEMENTAR MATEMATIKADA ANTISIMMETRIK KO'PHADLAR." INTERNATIONAL CONFERENCE DEDICATED TO THE ROLE AND IMPORTANCE OF INNOVATIVE EDUCATION IN THE 21ST CENTURY. Vol. 1. No. 10. 2022.
9.Axmedovna, Ummatova Mahbuba, and Ilhomjonova Shahnozaxon Ilhomjonovna. "TALIMDA BIOLOGIYA VA MATEMATIKA FANLARINING OZARO ALOQASI HAQIDA." BARQARORLIK VA YETAKCHI TADQIQOTLAR ONLAYN ILMIY JURNALI 2.12 (2022): 816-817.
10. Ummatova, Mahbuba Axmedovna, and Abdurahim Tursunboyevich Mamatqulov. "AL-XORAZMIY ASARLARINING AMALIY AHAMIYATI HAQIDA." INTERNATIONAL CONFERENCE DEDICATED TO THE ROLE AND IMPORTANCE OF INNOVATIVE EDUCATION IN THE 21ST CENTURY. Vol. 1. No. 10. 2022.
11. Ahmedovna, Ummatova Mahbuba, and Esonov Munavvarjon Mukimjonovich. "METHODOLOGY OF PERFORMING PRACTICAL INDEPENDENT WORK." Open Access Repository 8.12 (2022): 171-176.
12. Nosirovich, Nosirov Sobirzhon, and Ummatova Makhbuba Ahmedovna. "AUTOMORPHISM OF NUMERICAL SYSTEMS." Open Access Repository 8.12 (2022): 197-201.
13. Ummatova, M. A. "DIDACTICAL AND PRACTICAL FUNCTIONS OF MATH CLASS." Galaxy International Interdisciplinary Research Journal 10.12 (2022): 259-262.
14. Axmedovna, Ummatova Maxbuba. "ROLЬ ZADACh TEORII ChISEL PRI POVЫShENII MATEMATIChESKIX ZNANIY UChAЩIXSYa." Uchenыy XXI veka 1-2 (2017).
15. Ummatova, M., G. Axmedova, and O. Maxmudova. "Prakticheskaya napravlennost v obuchenii matematike." Teoriya i praktika sovremennых gumanitarnых i yestestvennых nauk. 2014.
16. Ummatova, M., and M. Yakubjanova. "About the history of complex numbers."