NOVATEUR PUBLICATIONS
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN No: 2581 - 4230
VOLUME 8, ISSUE 12, Dec. -2022

ABOUT FULL FUNCTION CHECK

D. Aroyev
Kokand State Pedagogical Institute

X . U. Abdusamatova
Kokand State Pedagogical Institute

ANNOTATION
This article explores some properties of a function whose equation is given in an implicit or parametric form.

Keywords: graph, function graph, coordinate system, stationary points.

To have a complete understanding of a known function, it is necessary to know all its properties. Thus, we have an idea about the topic of function in school textbooks. Checking and plotting any functions explicitly presented to us is not a big problem. But there are functions that are a little difficult to test such functions. As an example of such equations, one can give functions whose equations are given in the form of nonparametric and parametric forms. Testing such functions is a little tricky, and there is very little information on these topics in the existing textbooks.

In particular, there is no way to directly check a function whose equations are given in an implicit form. When checking such functions, you will have to use different methods. For example, there are such unexplored functions that it is convenient to check them, leading to a parametric representation. let's let's see on the next example

1 is an example. This $x \to y(x)$ draw the graph of the opaque function B, where $a > 0$

$$x^4 + y^4 = a^2\left(x^2 + y^2\right)$$

Solution. We check the graph of the function and build it using characteristic points. The graph of the function is symmetrical about the coordinate axes. We check the graph of the function in the 1st quarter. $x \ge 0,\ y \ge 0$ the function x is defined and continuous in all values. $y = tx$ Let us bring the curve to a parametric form by performing a substitution.

Since we test the feature in the first quarter $y \ge 0$.

$$x^4 + y^4 = a^2\left(x^2 + y^2\right) \Rightarrow x^4 + (tx)^4 = a^2\left(x^2 + (tx)^2\right) \Rightarrow x^2 + t^4x^2 = a^2\left(1 + t^2\right) \Rightarrow$$

$$x^2 = a^2\frac{1+t^2}{1+t^4} \Rightarrow x = a\sqrt{\frac{1+t^2}{1+t^4}}$$

$$y = tx \Rightarrow y = ta\sqrt{\frac{1+t^2}{1+t^4}}$$

x' va y' calculate derivatives .

$$x' = \left(a\sqrt{\frac{1+t^2}{1+t^4}}\right)' = \frac{a}{2}\sqrt{\frac{1+t^4}{1+t^2}}\ \frac{2t\left(1+t^4\right) - 4t^3\left(1+t^2\right)'}{\left(1+t^4\right)^2} = a\sqrt{\frac{1+t^4}{1+t^2}} \cdot \frac{t\left(1-2t^2-t^4\right)}{\left(1+t^4\right)^2}$$

find the stationary points by equating the first derivative to 0.

$$x'=a\sqrt{\frac{1+t^4}{1+t^2}}\ \frac{t\left(1-2t^2-t^4\right)}{\left(1+t^4\right)^2}=0\Rightarrow t\left(1-2t^2-t^4\right)=0\Rightarrow\ t_1=0,\ t_2=\sqrt{\sqrt{2}-1}$$

one. $t=0$ at a point $x=a;\ y=0$ changes the sign of the derivative from -to +. This is the low point.

2. $t=\sqrt{\sqrt{2}-1}$ at the point $x=a\sqrt{\frac{\sqrt{2}+1}{2}};\ y=\frac{1}{\sqrt{2}}$ derived gesture from + to - changes. it dot maximum .

We carry out similar checks for the derivative of.

$$y'=\left(at\sqrt{\frac{1+t^2}{1+t^4}}\right)'=\left(a\sqrt{\frac{t^2+t^4}{1+t^4}}\right)'=a\cdot\frac{1}{2}\sqrt{\frac{1+t^4}{t^2+t^4}}\cdot\frac{\left(2t+4t^2\right)\left(1+t^4\right)-4t^2\left(1+t^4\right)}{\left(1+t^4\right)^2}=$$

$$=a\cdot\frac{1}{t}\sqrt{\frac{1+t^4}{1+t^2}}\cdot t\cdot\frac{1+2t^2-t^4}{\left(1+t^4\right)^2}=a\sqrt{\frac{1+t^4}{1+t^2}}\cdot\frac{1+2t^2-t^4}{\left(1+t^4\right)^2}$$

find the stationary points by making the first order derivative equal to 0.

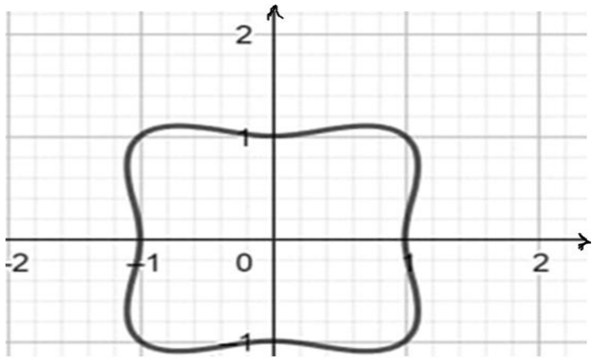
$$y'=a\sqrt{\frac{1+t^4}{1+t^2}}\cdot\frac{1+2t^2-t^4}{\left(1+t^4\right)^2}=0\Rightarrow\ 1+2t^2-t^4=0\Rightarrow\ t=\sqrt{\sqrt{2}+1}$$

Around this point, we define the signs of the derivative.

$t=\sqrt{\sqrt{2}+1};\ x=a\frac{1}{\sqrt{2}};\ y=a\sqrt{\frac{\sqrt{2}+1}{2}}$ changes the sign of the derivative from + to -. This is the maximum point. Now we find the intersection points of the graph of the function with the axis and the axis. $x=0;\ x^4+y^4=a^2\left(x^2+y^2\right)\Rightarrow y^4=a^2y^2\Rightarrow y=a$

We have found the following points . minimum $A:\left(x=a;\ y=0\right)$ point . $B:\left(x=0;\ y=a\right)$ y axis intersection point

$C:\left(x=a\sqrt{\frac{\sqrt{2}+1}{2}};\ y=\frac{1}{\sqrt{2}}\right)$ x axis maximum $D:\left(x=a\frac{1}{\sqrt{2}};\ y=a\sqrt{\frac{\sqrt{2}+1}{2}}\right)$ point y maximum point Having designated the found points in the Cartesian coordinate system, we will construct a curve in the first quarter. Then we reflect it symmetrically about the axis and get the following result.



Summing up from the article, we can say that when checking some functions and plotting their graphs, various unusual methods can be used. Direct testing of features presented in a particularly undisclosed form can be challenging. Even finding the domain of definition given such functions is a problem. Therefore, it is much more convenient to work with such functions, making them parametric. Working with such methods also encourages students to think more broadly.

Literature

1. Khudaiberganov G., Vorisov A., Mansurov H., Shoimkulov B. Lectures on mathematical analysis. I T.: "Varis-nashriyat". 2010 - 374 p.
2. Azlarov. T., Mansurov. Kh., Mathematical analysis. T.: "Uzbekistan". 1 t: 1994 . -416 p.
3. Gaziev A., Israilov I., Yakshab e v M. "Examples and problems from mathematical analysis" T.: "New century generation" 2006.
4. Demidovich B.P., "Collection of problems and exercises in mathematical analysis" Proc. Allowance for universities . M .: Astrel Publishing House LLC AST Publishing House LLC, 2003 - 558 [2] art.
5. ABDUNAZAROVA, D. T., PAIZIMATOVA, M. S., & SULAIMONOV, M. M. W. (2015). THE PROBLEM OF PREPARING FUTURE TEACHERS FOR INNOVATIVE PEDAGOGICAL ACTIVITIES. In Youth and the 21st Century 2015 (pp . 284-288).
6. Abdikarimov , R. A., Mansurov, M. M., & Akbarov, W. Y. (2019). Numerical study of the flutter of a viscoelastic rigidly clamped rod taking into account the physical and aerodynamic nonlinearities. Bulletin of the Russian State University for the Humanities. Series: Informatics. Information Security. Mathematics , (3), 94-107.
7. Abdikarimov, R. A., Mansurov, M. M., & Akbarov, U. Y. (2019). Numerical study of a flutter of a viscoelastic rigidly clamped rod with regard for the physical and aerodynamic nonlinearities. ВЕСТНИК РГГУ, 3, 95.
8. Mansurov , M., & Akbarov , U. (2021). FLATTER OF VISCOELASTIC FREE OPEROUS ROD AT THE END. Scientific Bulletin of Namangan State University , 3 (3), 36-42.
9. Zhumakulov , Kh . K ., & Salimov , M . (2016). ABOUT THE METHODS OF CARRYING OUT AND THE STRUCTURE OF THE PEDAGOGICAL EXPERIMENT. Chief Editor , 80.
10 Esonov , M. M. (2013). Methodical techniques of a creative approach in teaching the theory of images. Vestnik KRAUNTS. Physical and Mathematical Sciences , 7 (2), 78-83.
11. Esonov , M. M., & Zunnunova , D. T. (2020). The development of mathematical thinking in geometry lessons through tasks for the study of image parameters. Vestnik KRAUNTS. Physical and Mathematical Sciences , 32 (3), 197-209.
12. Zharov, V. K., & Esonov , M. M. (2019). TRAINING STUDENTS OF MATHEMATICS IN SCIENTIFIC RESEARCH METHODS ON THE BASIS OF SOLVING A COMPLEX OF GEOMETRIC PROBLEMS. Continuum . Maths. Informatics. Education , (4), 10-16.
13. Esonov , M. M., & Esonov , A. M. (2016). Implementation of the methodology of creative approach in the classroom of a special course on the theory of images. Vestnik KRAUNTS. Physical and Mathematical Sciences , (1 (12)), 107-111.
14. Esonov , M. M. (2017). Constructing a line perpendicular to a given line. Vestnik KRAUNTS. Physical and Mathematical Sciences , (2 (18)), 111-116.

15. Esonov , M. M. (2016). PRACTICAL BASES OF TEACHING IMAGE METHODS TO SOLVING PROBLEMS IN THE COURSE OF GEOMETRY. In Theory and Practice of Modern Humanities and Natural Sciences (pp . 155-159).
16. Esonov , M. M. (2014). Designing the study of "Image Techniques" in the context of a creative approach to problem solving. In Theory and Practice of Modern Humanities and Natural Sciences (pp . 259-265).
17. Ergasheva , HM, Mahmudova , OY, & Ahmedova , GA (2020). GEOMETRIC SOLUTION OF ALGEBRAIC PROBLEMS. Scientific Bulletin of Namangan State University , 2 (4), 3-8.
18. Marasulova, Z. A., & Rasulova, G. A. (2014). Information resources as a factor of integration of models and methodologies. Vestnik KRAUNC. Fiziko-Matematicheskie Nauki, (1), 75-80.
19. Mamsliyevich, T. A. (2022). ON A NONLOCAL PROBLEM FOR THE EQUATION OF THE THIRD ORDER WITH MULTIPLE CHARACTERISTICS. INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & INTERDISCIPLINARY RESEARCH ISSN: 2277-3630 Impact factor: 7.429, 11(06), 66-73.
20. Mamsliyevich , TA (2022). ABOUT ONE PROBLEM FOR THE EQUATION OF THE THIRD ORDER WITH A NON-LOCAL CONDITION. INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & INTERDISCIPLINARY RESEARCH ISSN: 2277-3630 Impact factor: 7,429 , 11 (06), 74-79.
21. Muydinjanov , DR (2019). The Holmgren problem for the Helmholtz equation with the three singular coefficients. e-Journal of Analysis and Applied Mathematics , 2019 (1), 15-30.
22. Letter , Б. M. (1994). Get the best results from your favorite
23. Ergashev , A. A., & Tolibzhonova , Sh. A. (2020). The main components of the professional education of a teacher of mathematics. Vestnik KRAUNTS. Physical and Mathematical Sciences , 32 (3), 180-196.
24. Zunnunov , R. T., & Ergashev , A. A. (2021). Bitsadze-Samarsky type problem for mixed type equation of the second kind in a domain whose elliptic part is a quarter of the plane. In Fundamental and Applied Problems of Mathematics and Informatics (pp . 117-20).
25. Zunnunov , R. T., & Ergashev , A. A. (2016). A problem with a shift for a mixed-type equation of the second kind in an unbounded domain. Vestnik KRAUNTS. Physical and Mathematical Sciences , (1 (12)), 26-31.
26. Zunnunov , R. T., & Ergashev , A. A. (2017). Boundary value problem with a shift for a mixed type equation in an unbounded domain. In Actual Problems of Applied Mathematics and Physics (pp . 92-93).
27. Zunnunov , R. T., & Ergashev , A. A. (2016). A problem with a shift for a mixed-type equation of the second kind in an unbounded domain. Vestnik KRAUNTS. Physical and Mathematical Sciences , (1 (12)), 26-31.
28. Zunnunov , R.T., & Ergashev , A.A. (2016). PROBLEM WITH A SHIFT FOR A MIXED-TYPE EQUATION OF THE SECOND KIND IN AN UNBOUNDED DOMAIN. Bulletin KRASEC. Physical and Mathematical Sciences , 12 (1), 21-26.
29. Ergashev , A. A., & Talibzhanova , Sh. A. (2015). Technique for solving the Bitsadze-Samarsky problem for an elliptic type equation in a half-strip . In Theory and Practice of Modern Humanities and Natural Sciences (pp . 160-162).

Alyaviya , O., Yakovenko, V., Ergasheva , D., Usmanova, Sh., & Zunnunov , H. (2014). Evaluation of the intensity and structure of dental caries in students with normal and reduced function of the salivary glands. Stomatologiya , 1 (3-4 (57-58)), 34-38.

30. Marasulova , Z. A., & Rasulova, G. A. (2014). Information resource as a factor of integration of models and methods. Vestnik KRAUNTS. Physical and Mathematical Sciences , (1(8)), 75-80.
31. Rasulova, G. A., Akhmedova , Z. S., & Normatov , M. (2016). METHODS OF STUDYING MATHEMATICAL TERMS AND ENGLISH LANGUAGE IN THE PROCESS OF TEACHING. Student of XXI century , 65.
32. Rasulova, G. A., Akhmedova , Z. S., & Normatov , M. (2016). EDUCATION ISSUES LEARN ENGLISH LANGUAGE IN TERMS OF PROCESSES. Uchenyi XXI veka , (6-2 (19)), 62-65.
33. Rasulova, G. (2022). CASE STADE AND TECHNOLOGY OF USING NONSTANDARD TESTS IN TEACHING GEOMETRY MODULE. Eurasian journal of Mathematical theory and computer sciences, 2(5), 40-43.
34. Ergasheva, H. M., Mahmudova, O. Y., & Ahmedova, G. A. (2020). GEOMETRIC SOLUTION OF ALGEBRAIC PROBLEMS. Scientific Bulletin of Namangan State University, 2(4), 3-8.
35. Muydinjonov, Z., & Muydinjonov, D. (2022). INFORMATION, COMMUNICATION AND TECHNOLOGY (ICT) IS FOR TEACHER AND STUDENT.
36. Muydinjonov, Z., & Muydinjonov, D. (2022). VIRTUAL LABORATORIES. Eurasian Journal of Academic Research, 2(6), 1031-1034.
37. Muydinjanov, D. R. (2019). Holmgren problem for Helmholtz equation with the three singular coefficients. e-Journal of Analysis and Applied Mathematics, 2019(1), 15-30.
38. Rahmatullaev, M. M., Rafikov, F. K., & Azamov, S. (2021). On the Constructive Description of Gibbs Measures for the Potts Model on a Cayley Tree. Ukrainian Mathematical Journal, 73(7), 1092-1106.
39. Rahmatullaev , M., Rafikov , F.K. , & Azamov , SK (2021). About constructive descriptions of measures Gibbs for the model Potts on the tree Kelly . Ukrains ' kyi Mathematychnyi Zhurnal , 73 (7), 938-950.
40. Petrosyan, V. A., & Rafikov, F. M. (1980). Polarographic study of aliphatic nitro compounds. Bulletin of the Academy of Sciences of the USSR, Division of chemical science, 29(9), 1429-1431.
41. Formanov, S. K., & Jurayev, S. (2021). On Transient Phenomena in Branching Random Processes with Discrete Time. Lobachevskii Journal of Mathematics, 42(12), 2777-2784.
42. Nosirov, S. N., Aroyev, D. D., Sobirov, A. A., & Umirzakova, M. B. (2022). Mutual Value Reflection and Automorphisms. Specialusis Ugdymas, 1(43), 2450-2454.
43. Nosirovich, N. S., Davronovich, A. D., & Abdurashid og'li, S. A. (2021). SOME PROPERTIES OF THE DISTANCE BETWEEN TWO POINTS. Journal of Ethics and Diversity in International Communication, 1(1), 54-56.
44. Sulaymonov , MMOGL (2022). GEOGEBRA DASTURI VOSITASIDA PLANIMETRIYA MAVZULARIDA MA'RUZA MASHG'ULOTINI TASHKIL ETISH. Central Asian Research Journal for Interdisciplinary Studies (CARJIS) , 2 (6), 35-40.
45. PAIZIMATOVA, M. S., ABDUNAZAROVA, D. T., & SULAIMONOV, M. M. W. (2015). THEORY AND METHODS OF TEACHING MATHEMATICS AS AN INDEPENDENT SCIENTIFIC DISCIPLINE. In FUTURE OF SCIENCE-2015 (pp . 389-393).