5. Рахмонов Нодиржон Рахмонжон ўғли. - “Самарқанд вилоятини инновацион ривожлантириш: муаммо ва ечимлар” Самарқанд – 2020. (357-359 бетлар)

6. The Potential Impact of COVID- 19 on GDP and Trade. A Preliminary Assessment. Policy Research working Paper-9211. The World Bank Group. www.worldbank.org

7. Farkhod Mulaydinov (2020). Econometric Modelling of the Innovation Process in Uzbekistan, International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 02, 2020, Pages 359-367, ISSN: 1475-7192, https://doi.org/10.37200/IJPR/V24I2/PR2 00343.

8. www.stat.uz Ўзбекистон Республикаси давлат статистика қўмитасининг расмий веб сайти

9. "On priority measures to mitigate the negative impact of the coronavirus pandemic and the global crisis on sectors of the economy." Decree of the President of the Republic of Uzbekistan. Tashkent, March 19, 2020, №. PD-5969

10. The Changing Nature of Work. The 2019 World Development Report. The World Bank Group. www.worldbank.org

11. Electronic Newspaper: www.gazeta.uz

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POSSIBLE DIFFERENTIAL EQUATIONS THAT CAN REDUCE THE ORDER

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Abstract: This article explains how to reduce the order of the main integration method for all types of high-order equations or to bring this equation into a low-order equation by substituting variables into it.

Key words: simple differential equation, differential equation, integral, product, Cauchy problem, function.

What are the differential equations before we consider the differential equations that can be reduced in order? we can find the answer to the question. In the equations studied so far, the unknowns consisted of numbers. In mathematics and its various applications, we encounter the study of equations involving functions and their derivatives (or differentials) in an unknown place. Such equations are called differential

equations. An equation is called a simple differential equation if the unknown function sought in the differential equation depends on only one arbitrary variable (argument).

The first textbook on differential equations in Uzbek was written by academician T.N. It was written by Qori-Niyazi in the 1940s. The textbook, which also describes the application of the theory of differential equations to the solution of practical problems that meet modern requirements, was written by academician MS Saloxiddinov and prof. Published by GN Nasriddinov (Tashkent, "Uzbekistan", 1994).

symbolically the n-order differential equation

F (x, y, y ', y (n-1), y (n)) = 0 (1)

apparently or if this equation is solved with respect to an n-order product,

y (n) = / (W, y (n-1)) (2)

can be written in the view.

The general solution of an n-order differential equation depends on x and n arbitrary variables:

u = g (x, C l, C 2, ..., Cn).

Therefore, in order to distinguish a particular solution from a general solution, some additional conditions must also be given that allow the identification of arbitrary variables. These conditions determine the values of the function in question and all its derivatives up to (n-1) -order (including y) at a point, ie at x = xo

y (X0) = U0, y '(xQ) = y1, ..., yn-1) (xQ) = y n-1 (3)

can be created by giving. (3) The system is called the system of initial conditions. The problem of finding a special solution of the given differential equation (3) satisfying the system of initial conditions (3) is called the Cauchy problem. The problem of integrating a higher-order differential equation is more difficult than the problem of integrating a first-order equation and does not always lead to the integration of the first-order equation. However, for all types of higher-order equations except linear equations, the main method of integration is to reduce the order, that is, to reduce the given equation to a lower order equation by replacing the variables in it. However, it is not always possible to reduce the order of the equation. We consider below the simplest types of n-order equations that allow us to reduce the order of the equations.

1. Reducing the order of this equation y = (/ x) (4) is done by serial integration:

v "M / (x) dx + Ci; y (n" 2) = / (/ (f (x) dx + C1) dx + c2 = / dx / (f (x) dx + Cix + c2

j.n-1

y = / dx / dx ... J / (x) dx + Ci ^ - + C2 —-— + ... + Cn;

2. The function y and its derivatives y ', y' '... y (k-1) are not explicitly involved.

F (x, y (k), y (k + 1) y (n-1), y (n)) = 0 (5)

the order of the differential equation

y (k) = z; y (k + 1) = z '; ... y (n) = z (n-k)

using substitutions, k is reduced to a unit: F (x, z, z '... z (n-k)) = 0

3. The free x variable did not participate in the disclosure

F (y, y ', y' ', ... y (n)) = 0 (6)

The order of the equation:

is reduced to one unit by switching.

4. The function F (x, y, y ', y' ', ... y (n)) is homogeneous with respect to y, y', y '', ... y (n),

F (x, y, y ', y '', ... y (n)) = 0 (7)

the order of the equation is reduced to one by replacing y = e-.

5. The left side of the equation is a definite product. In this case, the reduction of the order of the equation to one unit is done by direct integration.

In conclusion, of course, such a case is rare. In some cases, such an appearance of the equation is achieved through some artificial form substitutions.

References:

1. R. Turgunbaev "Collection of examples and problems from the course of differential equations". Tashkent. 2007 y.

2. J. Oramov "Differential equations" textbook Tashkent. 2013 y.