

SYSTEM OF EQUATIONS

Abdurashitov Raxmatullo Abduxamitovich

Xusenov Zikrillo Raxmatillo o'g'li

Adxamov Xasanboy Abdusalom o'g'li

Abstract:

In this article, a system of equations related to mathematics, as well as how to use it, will help everyone to work with the equation.

Keywords

Equation, function, mathematics, system, type, line, level, method.

Introduction

The system of equations represents problems in mathematics that require the simultaneous solution of several equations. These systems are often used to determine the values of interdependent variables. The system of equations is one of the main sections of mathematics and is widely used in scientific research, technology and everyday life.

Types of systems of equations

The system of equations can be divided into three main types:

1. System of linear equations

In this type of system, all equations are first-order. For example:

The following methods are used to solve such a system:

- Substitution method (representing one variable and putting it in another equation;
- Elimination method (simplification of the system by eliminating the variable;
- The method of matrices (through mathematical determinants or other algebraic means).

2. System of nonlinear equations

In these systems, at least one of the equations is nonlinear. For example:

Analytical or numerical methods are used to solve such systems.

3. System of differential equations

These systems contain several differential equations and aim to find the derivative of the variables. For example:

Such systems are widely used in solving physical and technical issues.

Practical application of the system of equations

The system of equations is widely used in the following areas:

- * Economy: when calculating the balance of market supply and demand;
- Engineering: in the analysis of mechanics, electrical circuits and structure;
- * Physics • in the study of the laws of Motion of bodies and thermodynamics;
- Computer science: in algorithms and modeling;
- * Geometry: analysis of spatial shapes and location determination.

Example

Solving a system of linear equations:

Substitution method:

1. From the first equation we express:
2. We put in the second equation:
3. We put the found value in the first equation:

Conclusion

The system of equations is one of the powerful tools in mathematics, helping to solve complex problems. The study of these systems not only opens the way to understanding the theory, but also to their application in various practices.

General concepts about ChTS. If several equations are considered together, they are called a system of equations. When all equations in a system of equations are linear (order 1), such a system of equations is called a system of linear equations. When a set of unknown numbers in a system of equations is replaced by a set of known numbers, when all the equations of the system become mirrors, such a set of numbers is called the solution (root) of the system of equations. If such a set of numbers is one, then the system of equations has a single solution, this system is called defined (assignment, specific), and this system of equations is called together. If a shared system has more than one solution, such a system is called a non-explicit system. Such systems are called equivalent if the system of shared equations has the same set of solutions. If a system of equations does not have a single solution, such a system is called a system that is not shared. A system formed by multiplying one equation of a given system of equations by a number different from 0 and adding a term to another equation

is equivalent to a given system (this property will be used a lot in the future). Just as in many areas of Science and technology, so is the economy mathematical models of their problems are expressed through a system of linear equations. We look at an example from economics to build a system of linear equations. Example 1. The enterprise produces three types of products using three types of raw materials. Production characteristics .

Determine the volume of production on the types of products using the given raw material stock. Solution: we set the size of the products to be produced with $1 \ 2 \ 3 \ x$, x , x , respectively. Type 1 refers to a product, type 1 raw material, and Type 1 raw material, which goes to produce type $5 \ 1 \ x$ Type 1 product, since its consumption for one is 5 units. Similarly, the 1st kind of raw material consumption that goes to produce 2,3-type products is $12 \ 2 \ x$, $7 \ 3 \ x$, respectively, for which the following equation is reciprocal: $5 \ 1 \ x + 12 \ 2 \ x + 7 \ 3 \ x = 2000$.

The mathematical model of the problem consisted of a system of three linear equations with three names. This problem is solved by finding a solution to the system of equations. We look at the solution of such a system of equations in general

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(1) the system is known to us from the middle school course . We are familiar with the methods of applying, applying and graphing it in the end of the solution. Here (3.1) we get to know another way to solve the system, ya", a way to solve it using determinants. We add the first equation of the system in terms of A22, the second-A12: $(a_{11}a_{22}-a_{21}a_{12})X=b_1a_{22}-b_2a_{12}$.

(2) also add the first equation of the system by adding-A21, the second SI to a11 $(a_{11}a_{22}-a_{21}a_{12}) U=b_2a_{22}-b_1a_{12}$

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