THE IMPORTANT ROLE OF MATHEMATICS IN SOLVING PROBLEMS IN PHYSICS

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Abstract: This article is engaged in resolving the issues of the role and importance of mathematics in physics to learn. Mathematical methods, equations, graphics and technical computing solutions for the analysis and modeling of physical phenomena is an important tool that is shown. In the article the mathematical engaged in solving issues cited the example of to demonstrate the role of physical hardware.

Key words : Application of Mathematics in Physics, modeling of physical phenomena, Connection between mathematics and physics.

The connection between the deep and the sciences of mathematics and physics has a long history. It's the phenomena of physics to study the nature of this event, the clear definition of mathematics for modeling and analysis provides the tools and language. It would be very difficult without the physical laws mathematical methods to understand and apply. In particular, plays a key role in solving physical problems in mathematics.

Today, attention in the field of mathematics is increasing more and more. In particular, on May 7, 2020, the Presidential Decree "On measures to improve the quality of education in the field of mathematics and develop scientific research" was established. During the past years, a number of systematic works aimed at bringing the science and education of mathematics to a new level of quality have been carried out:

firstly, necessary conditions were created for the invitation of mathematicians working in high-level scientific centers and the implementation of international scientific researches;

secondly, a system was introduced to encourage the work of our young people and their mentors who are winning international science Olympiads;

thirdly, in order to closely connect higher education and scientific research, the Academy of Sciences V.I. A new and modern building of the Romanovsky Institute of Mathematics has been erected. Funding of fundamental research in the field of mathematics was increased by one and a half times, supercomputer, modern equipment and tools were provided by the state from budget funds;

fourthly, a trainee-research institute was introduced as the primary stage of supply of personnel with a scientific degree;

fifthly, the Republican Council on Science and Technology was established under the chairmanship of the Prime Minister to determine the issue of rapid elimination of problems in the field of science, strengthening of interaction between science, education and production at the Government level.

Methods

This article is to study the role of science in mathematics in physics, led to use of the following methods:

Analysis of the literature: physical sciences mathematical methods of solving problems of mathematics and physics applied by the interaction of scientific articles and be engaged in the sources studied.

Examples of analysis: examples of the application of mathematical methods in solving different physical problems were showing up.

Logical conclusions: on the basis of the obtained data and examples mathematical logical conclusions about the role of the apparatus in physics issued.

Results

Mathematics in solving physical problems performs the following tasks:

Modeling: the modeling of physical phenomena and the mathematical equations to represent qonuniyat allows. For example, newton's laws of motion, Maxwell's equations as physical laws expressed in mathematical form.

Calculation: Mathematical physical measurements are analyzed using the results of actions, great physical illnesses (speed, acceleration, energy and others).

Graphic imaging: physical phenomena and mathematical functions, and understand the basis of visual graphs allows to analyze. For example, motion graphics, and graphics of vibration.

Differential and integrated account: dynamics of this mathematical methods for the analysis of physical sizes is important in areas such as changing elektrodinamika. For example, the speed and acceleration calculate the electric and magnetic fields of study.

Vector and matrisa are: physics in the areas of design as well as having a big (power, speed, area) is characterized by the vector. While vector is used for the analysis of complex systems and work with matrisa.

Examples:

Kinematika: mathematical equations, studying the movement of solids was passed through the distance, speed and acceleration.

Elektrodinamika: the relation between electric and magnetic fields are studied using the maxwell equations and.

Mechanics: to keep the law and mathematical formula is characterized by impulses of energy and the analysis of complex mechanical systems.

as a result of solving complex problems in physics, a system of two unknown equations appears as follows.

Let's consider the solution of the following problem.

We use Kramer's method for this :

$$\begin{cases} 4x_1 + 3x_2 = 14 \\ 5x_1 - x_2 = 8 \end{cases}$$

Yechish: $\Delta = \begin{vmatrix} 4 & 3 \\ 5 & -1 \end{vmatrix}$ = -4-15 = -19

$\Delta_1 = \begin{vmatrix} 14 & 3 \\ 8 & -1 \end{vmatrix}$ = -14-24 = -38 $\Delta_2 = \begin{vmatrix} 4 & 14 \\ 5 & 8 \end{vmatrix}$ = 32 – 70 = -38

$x_1 = \dfrac{\Delta_1}{\Delta} = \dfrac{-38}{-19} = 2$, $x_2 = \dfrac{\Delta_2}{\Delta} = \dfrac{-38}{-19} = 2$.

Summary

Mathematics is an integral tool in solving physical problems. Qonuniyat it clear definition of physical modeling, calculation and allows the analysis. The mastering mathematical methods of physics to solve practical issues and a deep understanding is necessary. This article showed once again that depends on the interaction of the sciences of mathematics and physics.

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