

СЕКЦІЯ XVI. ФІЗИКО-МАТЕМАТИЧНІ НАУКИ

USING HIGHER MATHEMATICS IN THE REAL WORLD

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Of course, higher mathematics is studied in various specialties in almost all higher education institutions, but not everyone understands its purpose and general benefit to humanity. Even those who teach higher mathematics at the university cannot tell where and how mathematical analysis or analytical geometry is used, let alone other people.

One thing is certain, everything is clear with ordinary mathematics, we use it in many areas of our lives and do not even think about it. There are many examples of this application, such as: calculating the price in a store, planning a meeting time, find out the average salary by region of a programmer, but with higher mathematics, it is somewhat more difficult.

First, let's find out what higher mathematics is:

Higher mathematics is a course for the mathematical training of modern specialists, basic mathematical knowledge necessary for solving practical tasks in the field of professional activity, and analytical thinking skills, not only for quantitative calculations but also methods of researching complex processes occurring in nature and society.

Various fields of science require knowledge of higher mathematics to understand and solve problems, such as economics or engineering. Here are some professions that require advanced mathematics:

- financial analyst;
- trader;
- radio technician;
- various professions of engineers
- economist;
- astronomer;
- logistician;
- programmer.

And now we will consider which sections of higher mathematics are necessary for some specialists.

Higher mathematics consists of various branches of mathematics studied throughout the course in educational institutions. These fields still include school knowledge, but they are more refined and revealed in new ways from other sides.

As for geometry, in the seventh grade, we all met with it, and already in the first year we study this science in more depth and now its name is analytical geometry. It studies geometric bodies through a coordinate system, and these bodies can be expressed as algebraic equations. In this way, algebra and geometry were combined.

Analytic geometry also had a very specific and crucial application in the field of astronomy. An example of this is Johannes Kepler, a German mathematician, and astronomer, who determined that an ellipse is a curve that best corresponds to the motion of Mars because an ellipse is ideal for conducting an orbit exactly like the planet he studied [1].

And in general, analytical geometry is used in many sciences related to space, for example, to calculate the routes of asteroids or to calculate the path to Venus. If you have the desire to become an astronomer or simply connect your life with the space theme, then you cannot do without higher mathematics.

With the knowledge of higher mathematics, it becomes possible to calculate very complex combinations and problems - this is what mathematical analysis deals with. It is he who studies derivatives, integrals, limits, series, and other complex functions. With its help, you can confirm or deny certain information, based on the result of past opinions, which is exactly what is needed for the analysis of financial market forecasting, that is, for analysts.

Mathematical analysis is closely related to statistics because it is this discipline that deals with the collection, organization, and presentation of data. The more accurate and complete sample the system will have, the better the result will be [2]. And this is what a financial analyst who wants to very successfully build his career needs to know well because without this knowledge he will not be able to do anything.

With the advent of the computer, there was an expansion in mathematics to calculate computer problems and functions. The section that deals with this are called discrete mathematics.

Discrete mathematics studies the properties of structures of a discrete nature, such structures are relevant to the theory and practice of designing, using computers, and programming. Discrete mathematics studies not only this but also finite structures and graphs.

As I mentioned earlier, discrete mathematics is used in areas related to computer technology, such as artificial intelligence, neural networks, machine learning, and others. Let's consider all this in more detail.

Artificial intelligence as a new subdivision of mathematical and computer sciences appeared due to the need to find solutions to such classes of problems, which are usually trivial for a person to solve manually, often even without special mental loads, but are too complex for the usual methods of compiling computer programs and digital data processing.

Furthermore, artificial intelligence was created as a new computer technology due to the need to solve simple tasks mainly done by humans and process digital information, without the need to supervise and expend the forces we need for more complex tasks.

The majority of machine learning tools consist of techniques of mathematical statistics, numerical methods, mathematical analysis, optimization methods, probability theory, and graph theory.

An artificial neural network is a set of artificial neurons connected in a certain way, each of which is a mathematical function of several variables, the values of which for each neuron are set by its inputs, that is, connections with other neurons or with input values [3].

Mathematics is used not only to accounting or calculate exercises, but to consider information, and how to do it better and more efficiently. Mathematical logic is responsible

for this - a science that uses mathematical methods to study thinking. Thus, it is used both for natural sciences (physics, chemistry, biology, and others) and for exact sciences.

Mathematical logic is needed even in board games to calculate correct moves and complex combinations, especially in games such as monopoly or checkers. In chess, above all, logic is needed to calculate one's own and the opponent's moves, also strategy considerations.

All our technics are built on mathematical logic, without it there would be no computer, no phone, and no other gadgets because the methods and functions of logic are ideally suited to become the basis of the system's intelligence. It all works like this: with the help of mathematical logic, languages, and applications for computing machines are written, and thanks to them, all processes in the system are managed. That is why mathematical logic is so important!

Today, higher mathematics is the basis of natural sciences, an effective tool for their development and research. Without it, it is impossible to become a successful specialist, especially if your field is related to numbers and figures. Therefore, do not miss class from higher mathematics! Knowledge of mathematics makes it possible to think logically, and knowledge of higher mathematics makes a person educated and knowledgeable in various fields.

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