

## IMPROVING THE INTEGRATION OF MATHEMATICAL EDUCATION IN THE TRAINING OF FUTURE ECONOMISTS

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### ABSTRACT

The article describes in detail the improvement of the quality of training of highly qualified economic personnel, training of competent specialists in improving the integration of mathematical education in the training of future economists.

**Key words:** Integration, integration of education, method, model competence, activity, type of activity.

### INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

The relevance of the problem of integration of mathematical education in higher education institutions of economic profile is due to the need to improve the quality of mastering mathematical knowledge, the development of creative abilities of future economists, the formation of students' needs for mathematical knowledge with a focus on their future specialty.

The goal of integrating mathematical education in the training of future economists is the mathematical competence of future economists in the field of market economy based on the unity and integrity of theoretical and practical knowledge.

The modern concept of higher economic education fully implements the specifics of studying mathematical disciplines. The cycle of mathematical disciplines for all directions of the bachelor's degree in the field of education "Economics" according to the State standard of higher education consists of a number of interrelated sections with an illustration in Economics. These include "Mathematics for economists", which includes linear algebra, elements of analytical geometry, mathematical analysis, and the initial concepts of the theory of differential equations.

The purpose of the discipline "Mathematics for economists" is to familiarize students:

- with the basics of linear algebra and elements of analytical geometry;
- with fundamental methods for the study of variables, especially functions, through the analysis of infinitesimals, which is based on the theory of differential and integral calculus;
- with the initial concepts of the theory of differential equations, which have a fundamental theoretical value and are used as the main mathematical models in natural science, technology and Economics, using modern analytical tools;
- with basic information and theoretical materials that are necessary for the construction and analysis of most mathematical models that take into account random factors when finding the optimal solution to economic problems.

Task of the discipline "Mathematics for economists" – preparing students' mathematical base that:

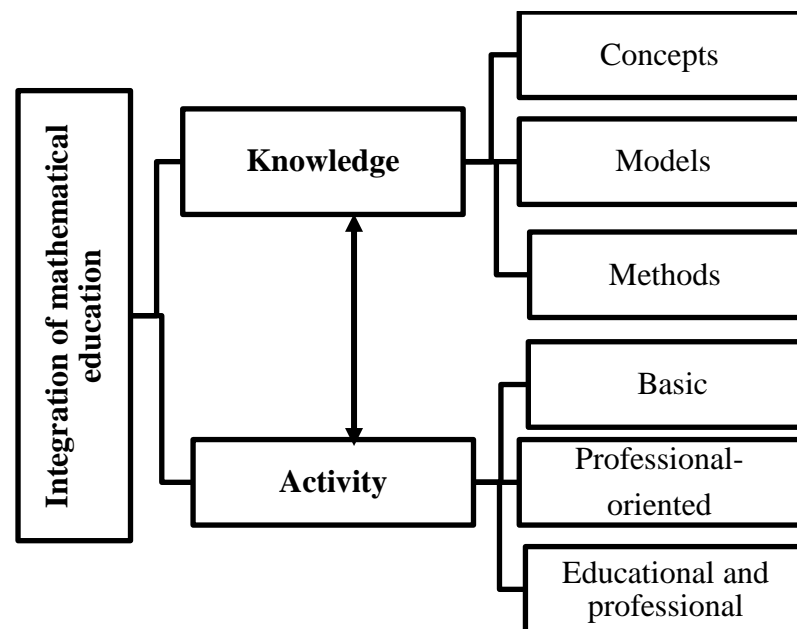
- necessary for the study of economic disciplines and many mathematical methods used in economic models;

– gives a better opportunity to acquire the theoretical and practical issues of the modern economy.

The article is devoted to the study of the problem of improving the integration of mathematical education in higher education institutions. It also shows the fundamental role of mathematical knowledge and skills of students in their future professional activities and the need to focus the choice of educational material content on the integration of mathematical and economic disciplines.

According to I.D.Zverev and V.N.Maksimova (2), integration processes represent the development of pedagogical science in all its aspects: in the system of knowledge, activity, relations among science and other forms of social consciousness, in the system of organization of science.

Integration of the content of mathematical education is carried out on the basis of knowledge (integrated content of educational material) and at the level of activities.



Integration of mathematical and economic knowledge in the course of studying the course "Mathematics for economists" can be effectively implemented based on the choice of the content of the training material (Table1).

Table 1

Section of the course "Mathematics for economists"	Economic knowledge
Numeric sets	Costs, revenue, profit, loss, cost of production, efficiency. Labor productivity and productivity, average values, median, fashion. The problem of economic content to calculate the percentage.
Numerical sequences and their limits	Bank loans and interest. The method of simple interest. Amortization of the loan. Calculating credit interest using the compound interest method. The build-up coefficient and the amount of the build-up Deposit.
Functions and graphs. The limit of a function and continuity	Fixed and variable costs. Total cost function. Gross income and profit the market (equilibrium) price. Aggregate demand and aggregate supply. Macroeconomic equilibrium.
Differential calculus	Elasticity of supply and demand. The rate of change in revenue, cost, and profit functions. Marginal value. Tasks for minimizing costs and maximizing profits.
Differential calculus of the function of many variables	Linear production functions. Multi-factor production functions and marginal productivity production Growth and partial derivative functions of several variables. Permanent production lines and marginal indicators of the economy. The economic meaning of the differential of the production function. Maximizing profits from the production of various types of goods. Resource saving.
Integral calculus	Consumer surpluses and producer surpluses. Finding gross income, total expenses, and gross profit using the marginal revenue, cost, and profit functions. Finding the volume of issue proposals by the known functions of the elasticities of supply and demand. Finding the volume of production using the Cobb-Douglas production function. Determining the inequality of income distribution among the population (Gini coefficient)
Differential and difference equations	Natural growth and Bernoulli's problem of cultivation. Growth of cash deposits in the Bank. Inflation and the rule of magnitude 70. Growth in output of deficit products. Growth in the socio-economic sphere, taking into account saturation. Disposal of funds. Production growth with investments. Business cycle model of Samuelson Hicks. Autonoob different market model. Dynamic Leontev model. The Model Of Solow.
Rows	The model of perpetual annuity

The proposed table allows us to conclude that in order to ensure the formation of integrated knowledge of future economists, the course "Mathematics for economists" needs to be filled with professional-oriented knowledge.

The process of integrating mathematical education involves various activities (table 2).

Table 2

Type of activity	The content of the activity	Means of performing activities
Basic activity	Knowledge of the terminological apparatus of mathematics, its main ideas and methods. Ability to establish links among economic objects, relationships, and processes and the corresponding mathematical apparatus. Mastering methods and techniques for solving applied problems of economic content.	Lectures and practical classes; subject tasks
Professional - oriented activity	The development of mathematical methods and models as a basis for the solutions of economic problems. Selection, justification and application of mathematical methods to solve economic problems. Inclusion of students in the activities of economic and mathematical content using forms and methods of active learning. Implementation of complexity, continuity and systematic application of applied problems of economic content in various topics in mathematics.	Integrated lesson; solving professional - oriented economic problem; solving creative problems; problem situations; business games; educational discussions.
Educational and professional activity	Mathematical modeling of economic objects, their systems and processes. Preparation of multi-stage tasks for planning, optimization and forecasting of economic processes. Application of mathematical methods preparation of research papers, course work and final qualification work.	Course and final qualification papers; research work.

One of the indicators of the integration of mathematical education is the degree of its implementation (communication in science, interdisciplinary communication, integrity).

The level of communication in science is carried out within the framework of the course "Mathematics for economists". At the level within the science, base knowledge, skills and qualifications are formed in the students as a result of mastering such sections as "linear and analytical geometry", "mathematical analysis", "differential equations".

Students master the basic view of mathematical activity. For example, calculate the determinant, find the inverse matrix, solve the system of linear equations, calculate the function limit, find the function derivative, extremum, the exact integral, solve the differential equation, etc.

The next level of mathematical education integration is the degree of interdisciplinary communication. The degree of science of communication pursues the course "Mathematics for economists" and the integration of general economic subjects (theory of Economics, microeconomics, macroeconomics, finance, etc.). At this level, the integration of Educational Sciences is carried out on the basis of mathematics, but each of the subjects in the interaction retains its own conceptual framework. At this level, students will master the integration of mathematical and economic knowledge in the process of solving practical issues of economic content. Speaking of practical issues of economic content, we understand the issues expressed in the language of Economic Sciences in order to master the methods of application of mathematical knowledge and skills in the economy in the process of solving them.

The degree of integrity is a high degree of integration of mathematical education, and by using mathematical knowledge professional problematic situations are solved.

The level of integrity is carried out in the process of preparation of production practice, research work, course work in special subjects and graduation qualification work in the preparation of future economists.

Implementation of activities (basic, professional - oriented and educational-professional) on the basis of integrative educational materials ensures the integration of mathematical education, leads to the formation of mathematical competence in the student.

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