Use of Information Technology to Improve the Quality of Education

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ABSTRACT

The article examines the methodology of using innovation and information technology to improve the quality and efficiency of education in "Higher Mathematics". In solving economic problems, practical problems were solved using Mathcad software and the solution was analyzed.

Introduction

The use of innovative information technology in the educational process, especially in the performance of independent work, increases the quality and efficiency of education. The competency of the specialist in training is characterized by his fundamental training. The level of fundamental training is based on the ability to solve practical problems of mathematical apparatus [1-3]. It is necessary to analyze the practical results of the training specialist and to develop decision-making skills. The reduction of teaching hours in higher mathematics requires students to use information technology in the formation of mathematical competence. It is known that many calculations have to be done when solving some practical problems. Completing calculations using software programs (Mathcad, Maple, Matlab, etc.) increases the effectiveness of the lesson. It is advisable to use these programs when the student performs independent work. Assignments should be given to each student (classified) based on his psychological state and mathematical preparation [4-6]. Below we will consider solving some problems in the Mathcad program when performing calculations.

1. Financial and economic issues.

In financial economics, the concept of interest is one of the main concepts. The following formula is used to calculate interest

$$S = x_0 \left(1 + \frac{P}{100}\right)^N$$

Here x0- initial amount, P- annual interest, N- period. From here the following formulas arise:

$$x_0 = \frac{S}{\left(1 + \frac{P}{100}\right)^N}; \qquad N = \frac{\ln S - \ln x_0}{\ln(1 + \frac{P}{100})}; \qquad P = 100\left[\ln\left(\frac{S}{x_0}\right)^{\frac{1}{N}} - 1\right]$$

S, x_0, P, N - when three of the quantities are given, it is possible to find the fourth quantity.

Let's consider the calculation in the Mathcad program.

initial capital x_0, find the resulting amount if the annual interest rate is P and the period is N.

$$X0 := 5000$$
$$P := 3$$
$$N := 20$$

$$S := X0 \cdot \left(1 + \frac{P}{100}\right)^N$$

$$S = 9.031 \times 10^3$$

So, the final amount will be equal to 9031 UZS.

2 issues. Balanced International Trade Module Algorithm.

$$A = \begin{pmatrix} a_{11} & a_{12} & ... & a_{1n} \\ a_{21} & a_{22} & ... & a_{2n} \\ ... & ... & ... & ... \\ a_{n1} & a_{n2} & ... & a_{nn} \end{pmatrix}$$

A structural matrix is given. To construct the model, matrix A is determined to be the structural matrix. For this, the sum of each of its columns is equal to 1. Then it is necessary to determine the eigenvalue and eigenvector of the matrix.

Decomposition in memory

$$A := \begin{pmatrix} 0.2 & 0.3 & 0.5 & 0.6 \\ 0.1 & 0.2 & 0.1 & 0.2 \\ 0.3 & 0.2 & 0.3 & 0.1 \\ 0.4 & 0.3 & 0.1 & 0.1 \end{pmatrix}$$

We show that the sum of the column elements of the matrix is equal to 1:

$$\sum A^{<1>} = 1 \quad \sum A^{<2>} = 1 \quad \sum A^{<3>} = 1 \quad \sum A^{<4>} = 1$$

To determine the eigenvalue of a matrix, we use the following eigenvalue function:

$$\text{eigenvals}(A) = \begin{pmatrix} 1 \\ -0.412 \\ 0.043 \\ 0.169 \end{pmatrix}$$

Given

$$\text{eigenvec}(A,1) = \begin{pmatrix} 0.722 \\ 0.261 \\ 0.449 \\ 0.458 \end{pmatrix}$$

So, $(x_1, x_2, x_3, x_4) = (0.722; 0, 261; 0.449; 0.458)$

The method of using innovative information technology in improving the quality of education was considered. In this case, complex equations were shown in the Mathcad software system, showing the matrix of the international trade model as a structural matrix and finding its eigenvalues and eigenvectors in the Mathcad software system. This methodology plays an important role in improving the quality and efficiency of education.

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