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TEACHING CREATING SOFTWARE IN SOLVING INTEGRAL MODELS

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ABSTRACT

In this work, to find exact and approximate solutions of integral models using the object-oriented programming language Delphi 7.

Keywords: Delphi 7 programming language, mathematical model, optimal solution, exact solution, approximate solution.

INTRODUCTION

Mathematical models built as a result of modeling integral problems in higher education are often expressed in the form of different types of integral equations. Depending on the nature of the structured model, the solution of these models is solved using methods for solving integral equations. In the process of solving these equations, a sequence of operations is performed, such as various approximate calculations or analytical substitutions. We mentioned above that this process can be simple or complex depending on the structure and nature of the model. If the process is complex, in these cases it is advisable to create a software algorithm and develop software suitable for the computer operating system after choosing the method of solving the model. It is known that in the mathematical modeling of some objects it is necessary to determine the surface area and volume of the body, the center of gravity of the body and the moment of inertia, the amount of work done under the influence of a force. These quantities, on the other hand, lead to the precise integration of a given function in a range. However, depending on the nature of the problem under consideration, the function under the integral takes on the appearance that as a result it is not always possible to integrate it precisely. In this case, the integral has to be approximated. There are several ways to approximate the exact integral. Let's take a look at some of these methods.

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LITERATURE REVIEW AND METHODOLOGY

The flow of matter. [a, b] is a continuous function f (x) defined in the interval as follows

$$I = 4\int_a^b f(x)dx \qquad (1.1)$$

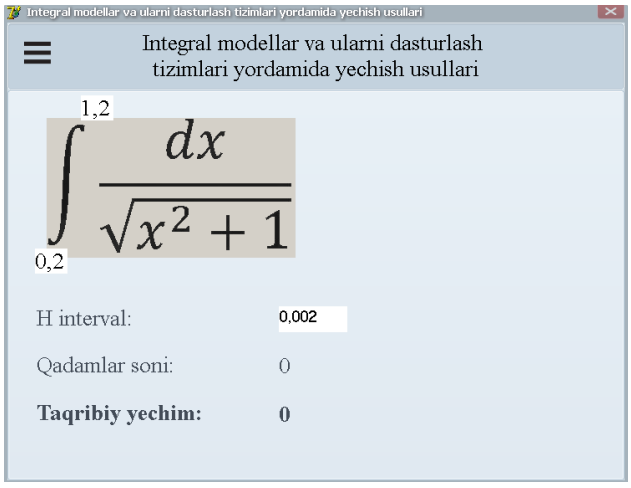
require the calculation of the integral with a given accuracy ε.

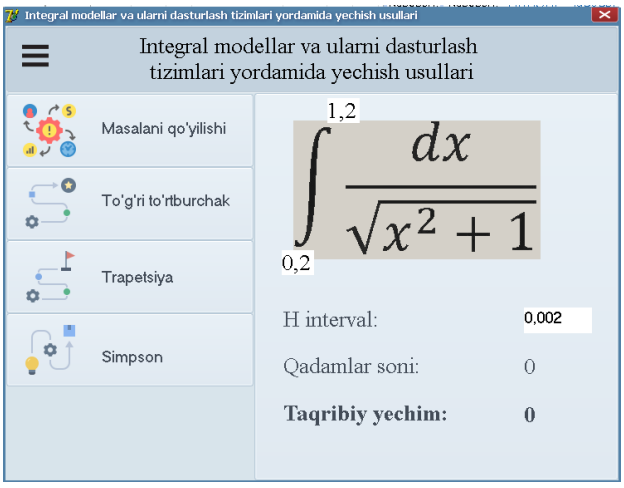
DISCUSSION

It is known from the higher mathematics course that if the function f (x) is given in the interval [a, b], then (1.1) is a definite integral x = a, x = b, u = f (x) curves bounded by lines and the abscissa axis represents a linear trapezoidal surface. Below (1.1) we present a number of approximate solution methods for the approximate calculation of the exact integral software in the Delphi 7 programming environment.

$$\int_{0.2}^{1.2} \frac{dx}{\sqrt{x^2+1}}$$

The program text is generated based on the algorithm of the above methods and the following result dialog box is generated in the Delphi7 programming environment.





Using this program, it is possible to solve arbitrary integral equations on the basis of the given conditions (1.1) Calculate the integral equation using the rectangular method. Results obtained in the Delphi7 programming environment:

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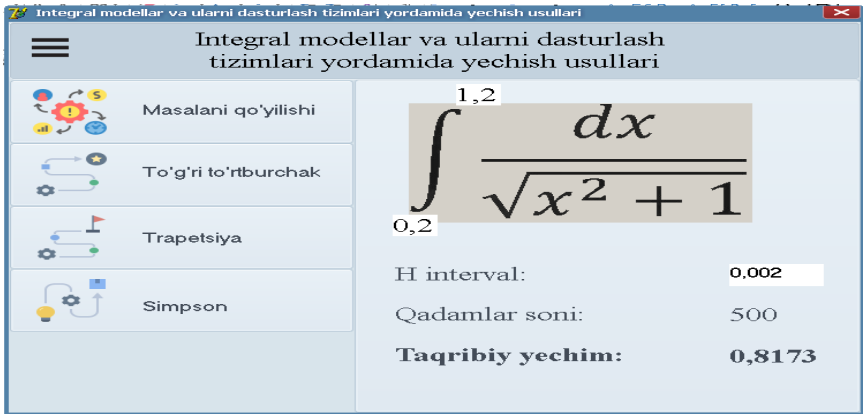

Fig. 2 Approximate the integral equation using the trapezoidal method. The result obtained in the Delphi7 programming environment:.

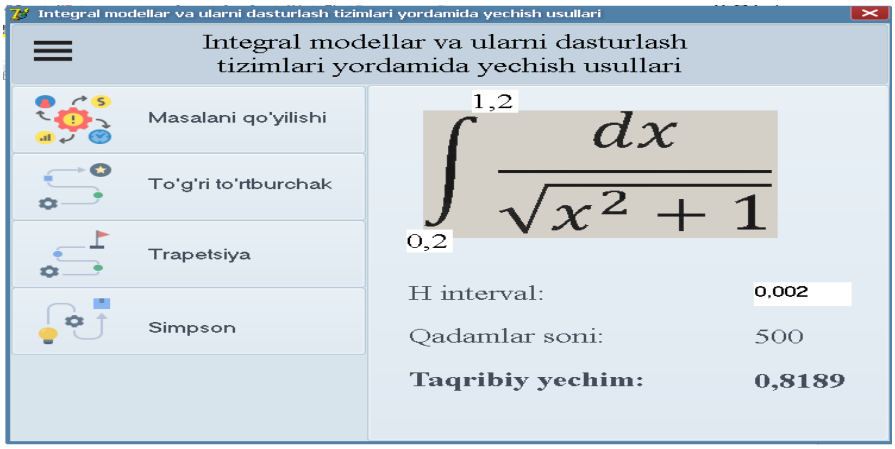

Figure 3

(1.1) approximate the integral equation using the trapezoidal method. Results obtained in the Delphi7 programming environment:

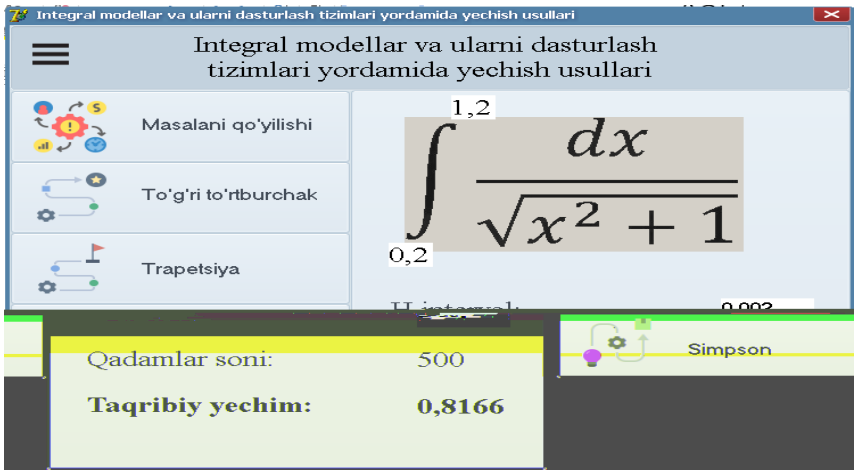

Fig. 4

(2,3,4) - As can be seen in the figures, the methods of solving the integral equation in the form of a rectangle, trapezoid, simpson are given.

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CONCLUSION

Denmak can solve any specific problem in several ways. If the real process in question can be expressed with sufficient accuracy through mathematical relations, it will be possible to solve this problem by constructing a mathematical model. Solving a problem in this way is called the process of mathematical modeling.

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