

**VIRTUAL VIEWING OF GRAPHS OF COMPLEX
FUNCTIONS IN MATHEMATICS LESSONS USING
ARTIFICIAL INTELLIGENCE CAPABILITIES**

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Annotation: *This article presents the issues of using artificial intelligence capabilities in teaching the topic of complex functions and their graphs in mathematics lessons.*

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A number of important Decrees and Presidential Resolutions have been adopted in Uzbekistan to improve the quality of teaching exact sciences and ensure the continuity of science and education. They set the priority tasks of adapting curricula to international standards, expanding the network of specialized schools, and improving the qualifications of teachers.

The use of artificial intelligence technologies in the modern educational process is increasingly expanding. In particular, the introduction of SI elements in mathematical disciplines makes it possible to organize the educational process more effectively and based on an individual approach.

Main directions and measures being implemented:

Network of specialized schools: Boarding schools with deep specialization in exact and natural sciences are being established, and curricula

are being adapted to the requirements of international assessment programs (PISA, TIMSS).

Incentive system: Bonuses are established for teachers of specific subjects who have national and international certificates.

Updating the methodological base: Textbooks are being rewritten based on international experience (for example, the advanced experience of Finland and Singapore), with special attention being paid to connecting subjects with practice.

In recent years, AI technologies have been widely used in the educational process. In particular, adaptive learning platforms, intelligent tutoring systems, automated assessment systems, and computer-aided teaching methods help to improve the quality of mathematics education. The effectiveness of these technologies and their impact on the quality of education have been thoroughly analyzed in various scientific sources. Methods The following methods were used in this study

Displaying graphs of complex functions in mathematics lessons based on artificial intelligence (AI) dramatically increases visual understanding. During the lesson, students and pupils are given the opportunity to observe the properties of functions interactively and in real time.

Below are the stages of effective lesson organization and recommended modern AI tools:

1. Visualization and Analysis (Step-by-Step)

- **Quick Function Graphing:** When students have difficulty graphing complex functions on paper, AI graphs equations in seconds.
- **Interactive Transformations:** Lively show how the graph moves when parameters in functions (e.g., coefficients of (k) , (b) , (a)) change.
- **Step-by-Step Solutions:** AI not only explains the properties of the graph, but also calculates its derivative and integral.

2. Best AI Tools for Use in the Classroom

- Desmos: You can change the coefficients of a function using the slider function and observe complex changes in real time.

- GeoGebra: The most convenient program for visualizing the graphs of complex functions in 2D and 3D format by connecting geometric shapes and functions.

- Mathos AI: An artificial intelligence calculator that graphically displays complex expressions, limits, and derivatives and explains step-by-step solutions.

- Wolfram Alpha: A great platform for analyzing ready-made complex functions or inequalities, determining their extrema points, and properties using SI.

3. Lesson methodology

1. Problem statement: Students are presented with a complex function (for example, $y = \frac{\sin(x)}{x^2+1}$).

2. Visualization using AI: The function is entered into the program and the graph is displayed on the classroom screen.

3. Hypothesis testing: Students independently check the intervals of increase/decrease and asymptotes of the graph using SI tools.

4. Conclusion: Based on the obtained graphs, properties are summarized.

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