Use of Information and Communication Technologies for Teaching Mathematics

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Definition and Scope of Multimedia

WHAT IS MULTIMEDIA??

MULTI

Many or more than one

MEDIA

Medium of Communication
What is Multimedia?

- **Multimedia** is content that uses a combination of different content forms such as text, audio, images, animations, video and interactive content. Multimedia contrasts with media that use only rudimentary computer displays such as text-only or traditional forms of printed or hand-produced material.
Multimedia is an interactive communication process that uses an integration of five main elements such as texts, graphics, audio, video and animations. Multimedia has improved our lives in many ways. Multimedia has played an important role in other fields, such as business, arts, medicine.
Media Information Environments

- Text
- Sound
- Video
- Graphic arts
- Animation
- A variety of forms of training, expanding the number and availability of various sources of information, ensuring the convenience of its receipt

  - Rationalization and acceleration of the processes of cognition of the studied disciplines

  - Reduction of contradictions between the increasing flow of information and the limited time for its study

  - Improving the general cultural level of students, promoting their aesthetic education
Problems of using presentation in the educational process

In publications on the methodology for preparing multimedia presentations:

• the capabilities of computer programs and the design of slides are updated, but not the technology for the effective use of presentations for educational purposes;
• didactic and ergonomic features of the use of presentations in the educational process have not been studied;
• scientifically based technologies for the effective use of presentations in the teaching of academic disciplines have not been developed taking into account the specifics of their content.
General slide design requirements

• the slide is not oversaturated with text;
• fonts are large enough and easy to read;
• text placement is combined with the visual range;
• high-quality visual objects, and the color of the slide is not too bright, not tiring the audience;
• text and graphics are differentiated by significance using fonts, colors, backgrounds, etc.
• Animations, audio and video effects are consistent with the objectives of the presentation and do not distract from the content of the message.
Usage and application multimedia

• Multimedia finds its application in various areas including, but not limited to, advertisements, art, education, entertainment, engineering, medicine, mathematics, business, scientific research and spatial temporal applications.
Addition of vectors. The rule of the polygon.
Example. Are the vectors collinear?

\[ \vec{a} \{2; 6;-3\}; \quad \vec{b}\{6;18;-9\} \]

\[ \vec{a} = \vec{b} = 3 \vec{a} \] или \( \vec{a} = \frac{1}{3} \vec{b} \)

Vectors \( \vec{a} \) and \( \vec{b} \) collinear.
Ellipse

An ellipse is the set of all points in a plane such that the sum of the distances from two fixed points (foci) is constant.

$$|F_1M_1| + |F_2M_1| = 2a$$
$$|F_1M_2| + |F_2M_2| = 2a$$
$$|F_1M_3| + |F_2M_3| = 2a$$

$$|F_1F_2| = 2c$$

$c < a.$
Body trajectories

$V_0 = 0$

$V = V_1$

$V_1 < V < V_{II}$

$V = V_{II}$

$V = V_{III}$

straight line

circle

ellipse

parabola

hyperbola
Hyperbolic paraboloid

Parallel $xOy$: \[
\frac{x^2}{a^2} - \frac{y^2}{b^2} = 2pz_0
\]

Parallel $yOz$:
\[
-\frac{y^2}{b^2} = 2pz - \frac{x_0^2}{a^2}
\]

Parallel $xOz$:
\[
\frac{x^2}{a^2} = 2pz + \frac{y_0^2}{b^2}
\]
Cycloid
Hypocycloid

\[
\frac{a}{b} = 2 \\
\frac{a}{b} = 3 \\
\frac{a}{b} = 4 \\
\frac{a}{b} = 5 \\
\frac{a}{b} = \frac{5}{3} \\
\frac{a}{b} = \frac{7}{3} \\
\frac{a}{b} = \frac{8}{3} \\
\frac{a}{b} = \frac{9}{4}
\]
Astroid is a plane curve described by a point M of a circle of radius $r$ rolling along the inside of a circle of radius $R = 4r$. In other words, an astroid is a hypocycloid with a module $k = 4$.

\[
\begin{align*}
  x &= a \cos^3 t, \\
  y &= a \sin^3 t,
\end{align*}
\]
Graphic method for solving linear programming problems

Step 1. Constructing a range of acceptable values for $x_1$ and $x_2$

Step 2. A straight line (5) is drawn along the direction:

$$V = \text{grad}(Z) = \{3, 3\}$$

Step 3. A straight line is drawn (6) perpendicular to the straight line (5)

Step 4. The straight line (6) moves in a straight line (5) to the upper point of contact with the area.
The role of multimedia content in math education

- Classes using presentations update the activity-oriented and personality-oriented approaches to learning.
- Finding a student in several educational environments simultaneously increases the throughput of information channels.
- The use of hypertext and animation effects deepens the perception of mathematical concepts.
- Search, analysis, selection and structuring of information improve information competence and develop critical thinking.
- Visual, sound, animation effects provide interactive access to information.
- Work with electronic reference resources, including the Internet, increases student learning motivation.
- The inclusion in the presentation of portraits of great mathematicians contributes to the expansion of cultural horizons.
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При наличии у Вас доступа к созданию тестов - "Преподавателю".
Animation
Thank you for your attention!

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