



## VECTOR IN DIGITALIZATION CONDITIONS TEACHING METHODOLOGY

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### ABSTRACT

*This in the article digitization under the circumstances geometry in science vectors education methodology seeing Vectors are output. education methodology using geometry in science to students digital vectors geometric constructions based on create and analysis to do possible. In the article geometry in science vectors in teaching used main methods, for example, vectors algebraic and geometric description, their mutual their relationship to study, and digital technologies using geometry issues in solution applicable methods illuminated. Geometric objects digitization, their vector as modeling and education methods modern technologies training to the process integration to do shows.*

Digital of technologies development today's on the day all in the fields intense pace with done They are increasing. not only daily in our lives, maybe science, education, medicine, industry and other many important in the fields place Digital technologies are information digital in the form storage, transmission and again work opportunity giver technologies They are a collection of computer systems, software supply, artificial intelligence, machine study, cloudy like counting sectors cover Education in the system digital of technologies importance about telling if we are, education in the field digital technologies education and study processes noticeable at the level changed. Via the Internet education, online courses, virtual labs, simulation and interactive study tools to students and to students further effective study opportunities is creating. Digital technologies using remote education wide spread out and study process geographical restrictions eliminate Also, to the students complicated scientific concepts clear and simple in a way explanation for visual tools, 3D modeling and animations is being used.

Geometry in science digital of technologies role

Geometry in science digital technologies using complicated geometric shapes create and analysis to do much made easier. Computer graphics and CAD (Computer-Aided Design) systems using architecture, engineering and other sciences according to complicated projects done increasing. Geometric simulation and digital modeling through issues and shapes in real time to learn, to them various parameters change and to describe opportunity created.



Geometry in science geometric issues solution not only mathematician methods, maybe modern computer from programs use also through Geometric issues digital technologies using solution to the students own concepts to strengthen, practical skills to develop and further effective to the results to achieve help gives. Various kind in programs geometric issues solution process how its performance, its advantages and practical examples with how application seeing Let's go out.

### 1. GeoGebra: Dynamic geometry program

GeoGebra is geometry, algebra, statistics combined interactive program to the students geometry issues in real time in mode solution opportunity gives. Through GeoGebra various geometric forms create them edit and each other their connections show possible.

Problem: Triangle area using GeoGebra calculation.

Solution method:

1. Points Create: in GeoGebra three points A, B, C mark.

2. Vectors create:  $\overrightarrow{AB}$  construct vectors of and  $\overrightarrow{AC}$

3. Triangle Description: Triangle three side draw the shape create

4. The field Calculation: GeoGebra program automatic calculation from the tool using the triangle the area find.

Through GeoGebra geometric forms and vectors between relationships study and issues quickly solution to do possible. In the program work to the students geometry concepts visual in a way to see opportunity creates.

### 2. AutoCAD: Computer using design to do (CAD)

AutoCAD is mainly engineering and architecture in the fields used computer using design AutoCAD is a computer-aided design (CAD) program. geometric shapes, lines, straight corners, cylindrical and other forms Geometry in science and mainly constructs modeling and them analysis in doing is used.

Issue: True angular triangle area using AutoCAD calculation

Solution method:

1. Points Placement: In AutoCAD three dots  $A(0,0)$ ,  $B(4,0)$ , and  $C(0,3)$  Place the.

2. Lines Create: lines AB, AC and BC create

3. Triangle Create: Triangle complete create it, the area calculation for From AutoCAD's " AREA " command use.

In AutoCAD geometric constructions create very clear and detailed It will display shapes in 2D and 3D formats. to create opportunity gives.

### 3. Matlab: Mathematics modeling and analysis

Matlab is mathematician modeling and analysis for wide applicable program. Matlab using geometric shapes create, their analysis transfer and digital calculations done increase possible. Geometry issues in solution Matlab through vectors, lines and surfaces show and study possible.

Issue: Line and right of the line intersection point to determine.

Solution method:

1. Draw lines Create: Two right of the line equations For example,  $y = 2x + 1$ ,  $y = -x +$

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2. Intersection point calculation: from Matlab's solve function using both of the equation intersection point find.

3. Visualization: plot function using both the line to draw, to intersect point to describe.

```
Matlab Копировать код  
  
syms x y  
eq1 = y == 2*x + 1;  
eq2 = y == -x + 3;  
sol = solve([eq1, eq2], [x, y]);  
disp(sol)
```

Matlab using geometric issues clear and fast solution possible. Also, the results counts using to show, to understand makes it easier.

4. Wolfram Mathematica: Symbolic and digital calculation

Wolfram Mathematica is high level mathematician calculations for program divide, algebraic and digital issues solution for wide Geometry issues in solving, especially algebraic methods and from formulas use possible.

Issue: True line and of the circle intersection points find.

Solution method:

1. Straight line equation:  $y = 2x + 1$

2. Circle equation:  $(x - 1)^2 + (y - 2)^2 = 4$

3. Intersection point find: using Mathematica both equation together to cut, to cut points

Definition

```
Mathematica Копировать код  
  
Solve[{y == 2 x + 1, (x - 1)^2 + (y - 2)^2 == 4}, {x, y}]
```

Wolfram Mathematica geometry issues symmetrical and clear in solution effective is considered, because this program mathematician equations analytical in a way solution opportunity gives.

5. Scratch: Children for interactive geometry

Scratch is children for intended visual programming environment. Using Scratch geometric shapes create and issues in solution students algorithmic thinking develop. In Scratch geometric shapes move, rotate, and digital in format solution easy.

Problem: Square twist



Solution method:

1. Square create: Scratch's "pen" function using square drawing
2. Rotate: Rotate the square  $90^\circ$  and his/her movement animation to do

In Scratch geometric shapes create and manipulation to do to the students programming to study and geometry issues interactive in a way to solve help gives.

### Conclusion

Geometry issues various programs using solution to the students not only mathematician knowledge increases, maybe modern technologies application It also develops skills such as GeoGebra, AutoCAD, Matlab, Mathematica and Scratch. programs to the students geometry concepts visual in a way understanding, issues fast and clear solution opportunity gives. Geometry science in teaching this from programs use students knowledge in strengthening and the real world issues solution in doing important role plays. Digitization under the circumstances geometry in science vectors education methodology knowledge further deeper to understand help gives and to students geometric shapes clear and visual accordingly to describe opportunity creates. Algebraic and geometric descriptions using vectors study, geometry issues solution and the real world problems solution in doing effective methods presented Digital technologies and computer graphics using geometric constructions create and analysis to do processes to simplify, to students complicated issues quickly solution opportunity gives.

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