

GEOGEBRA3D

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Extended abstract

The new version of GeoGebra 5.0 provides a module for dynamic geometry in 3D. With this new module it is possible to create constructions of spatial geometry in connection with planar geometry. The procedure is analogous to the usual work in the graphics view used previously and requires no change in the operation of the program.

Originally GeoGebra was designed as a program for the dynamic combination of geometry and algebra. Over time additional modules were added as for example spreadsheet and a computer algebra system (CAS). Currently work is proceeding on an extension for a 3D module which allows the representation of objects in a three dimensional coordinate system. The currently available beta version (November 2013) is already well advanced and provides an inside sight into the future version 5.0.

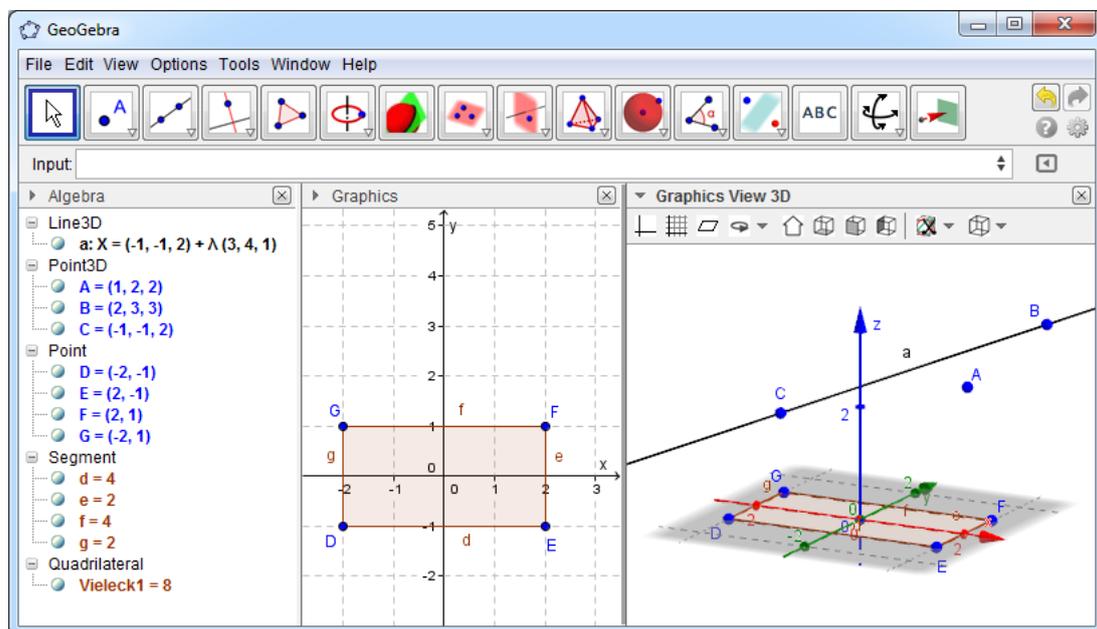


Fig. 1: GeoGebra 3D with algebra, graphics and graphics view 3D

The geometric objects created in Graphics View 3D are displayed as usual in algebraic form. In combination with the computer algebra system GeoGebraCAS thus a geometrical representation and a mathematical treatment of the problem are possible.

In GeoGebra, the individual modules are dynamically linked. If a change is made in one module (e.g. in the graphics view), this also has an impact on all other modules. Likewise, GeoGebra allows the dynamic interaction of the two-dimensional graphics window with the three-dimensional. In Figure 1 you can see a rectangle shown in the graphics view and also in the Graphics View 3D.

Figure 1 also shows the 3D toolbar with a new set of modes for working in the Graphics View 3D and the design bar placed in the window on the right.

Users can choose between different projections such as

 View towards xy-plane
  View towards xz-plane
  View towards yz-plane

Besides there are different types of projections like parallel project, perspective projection and others available. By changing the type of projections an object can be displayed in different ways.

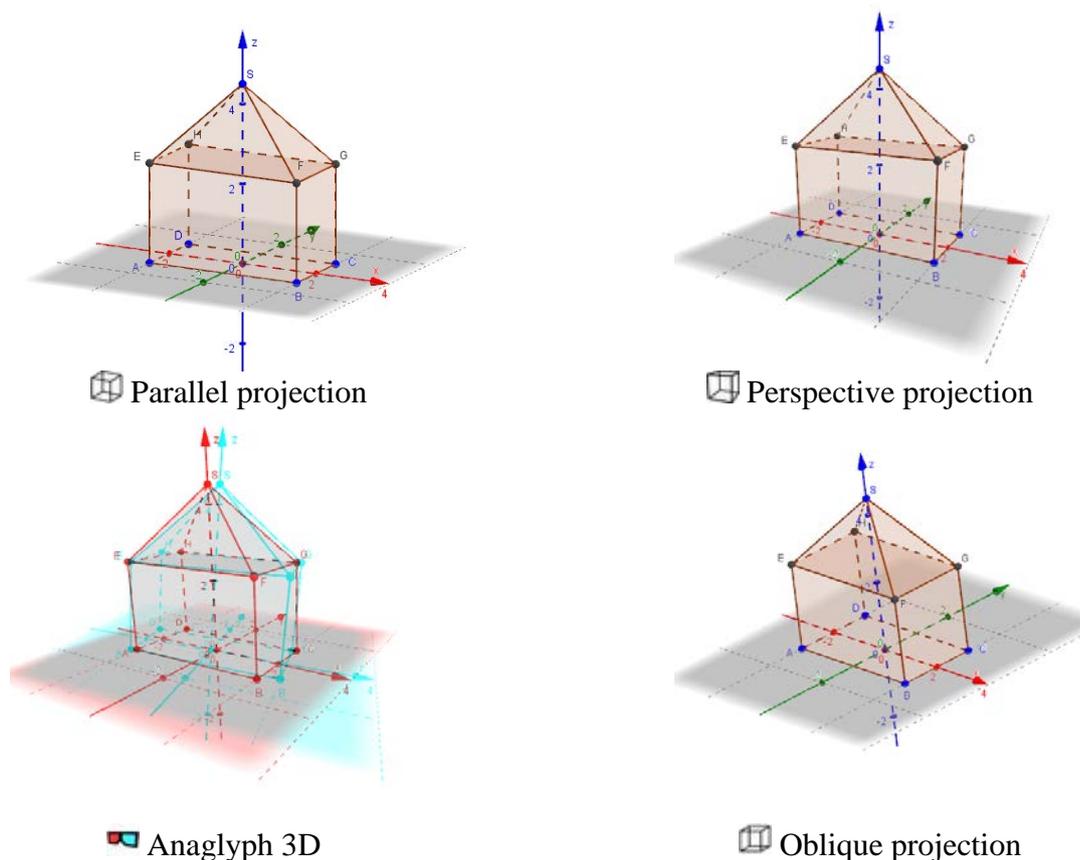


Fig. 2: The different projections in GeoGebra 3D

But also other geometric objects like cylinders, cones, spheres etc. can be displayed in GeoGebra 3D.

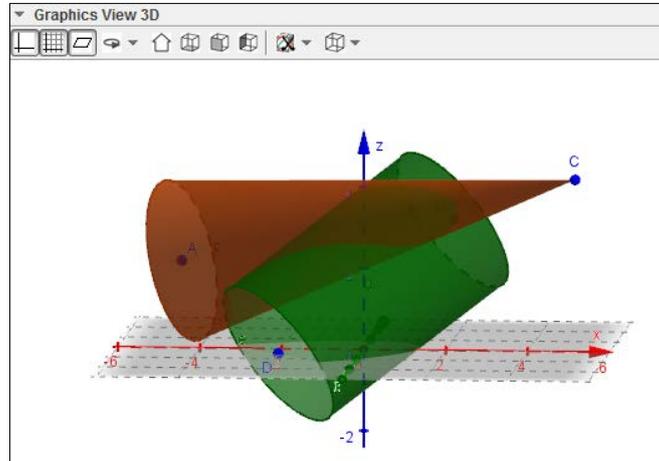


Fig. 3: Cylinder and cone

In the lecture examples from analytical geometry, calculus and some applications in natural science are presented. They are described in detail in the journal "South Bohemia Mathematical Letters".

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