



# **CAD+GIS** Pythagoras

The ultimate CAD + GIS application

## ***Pythagoras 11.00***

**What's new?**



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## **1. Basic Module**

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### **Moveable Control panel**

The control panel at the left side of the screen has now been split into 2 parts: the informative part at the top and the part that contains all drawing functions at the bottom. These 2 small windows may be moved freely over the screen. The position of the windows will be saved and recalled the next time Pythagoras starts up.

### **Changing the background color**

You can now change the color of the background drawing area in Pythagoras. Up until now, it has always been white. This setting may influence the visibility of certain symbols, lines, texts and hatchings.

### **Double-clicking objects**

When double clicking objects, a number of tab-options are available. The standard characteristics of each object are available in a first tab-option. There is a new tab-option pertaining to database information, linked to the object which was double-clicked. For polygons, there is an additional tab-option with information on the polygon. This tab-option replaces the polygon window in the control panel.

### **Clicking objects using the right mouse button**

Clicking objects using the right mouse button allows you to do the following:

- Change User Defaults
- Change Graphic attributes
- Open Link
- Copy and Paste attributes

If database information is available, additional capabilities pertaining to these data will be available, e.g. changing data attributes, copying and pasting data.

## **Entering CDZ information**

When a path has been selected, CDZ information relative to this path can now be entered without using the Road Design module.

C means the cumulative distance along the path. D means the perpendicular distance either left or right of the path. Z is the elevation.

These values can also be viewed in the control panel. When exporting selected points in CDZ format, an offset-list will be created containing: Pointnumber/C/D/dZ/X/Y/Z/Comment.

## **Saving the active layer per drawing**

The layer that is active when closing a document will be made active again when the document is re-opened.

## **Changing the elevation of 2D curves**

The elevation of 2D curves can be changed by double-clicking the curve while holding down the CTRL key.

## **Colors**

24 bit colors are now supported. When selecting a color (multiple colors), RGB (Red - Green - Blue) and HSL (Hue - Saturation - Luminance) can be specified.

## **Customized Toolbars**

***Menu View***

The menu View - Toolbars can now be used to turn on or off specific Toolbars. This allows you to customize your Pythagoras environment the way you like.

## **Viewport**

***Menu Tools - Create Viewport***

Using a Viewport, you can show part of a drawing at a different scale inside the main drawing. The Viewport can also have a different look than the main drawing: layers on/off, a different View (see further), etc. A viewport can be made larger or smaller (click and drag the corners), and can be moved around on the drawing. Up to 16 Viewports can be defined per drawing.

## **Find (CTRL+F)**

***Menu Edit - Find***

The new FIND function now allows you to search for standard characteristics (area, length, etc.) of the standard Pythagoras objects (polygons, lines, etc.). A future version of Pythagoras will allow you to save the Find-parameters.

## **View Options**

***Menu View***

What was previously called "Show information" (accessible using CTRL+I), has been renamed "Display View". This is because there are now many more options available than in previous versions of Pythagoras.

There are now 4 different tab-options: Layers, Show, DTM and Thematic maps.

- **Layers:** here you can specify which layers need to be turned on/off.
- **Show:** here you can specify which information is visible in the drawing. 'Show point comments' and 'Show point elevations' have been added.
- **DTM:** here you can specify the DTM that is shown, as well as the color of the triangulation. A DTM or the difference between 2 DTMs can be colored based on elevation or based on slope.
- **Thematic maps:** here you can specify the "theme" that is shown (see further).

Before specifying a number of these settings, a "View" should be defined. Such a view contains a set of parameters that control the visibility of your drawing. You can switch between views using the Pythagoras Toolbar. A View can also be linked to a print-sheet or to a Viewport.

## **Thematic Maps**

***Menu View***

A thematic map is a kind of filter that is applied to an existing drawing, used to highlight specific objects. Any standard Pythagoras object (points, lines, arcs, paths, polygons, etc.) and their characteristics (length, elevation, area, etc.) may be used to define a thematic map. The "Thematic Maps" option is used to specify the parameters that define the "theme" of a map. Multiple thematic maps can be placed on top of one another. These thematic maps can serve to illustrate and/or analyze projects.

A thematic map can even be defined using the result of a calculation (e.g. area/1000).

The number of categories (classes) used in a specific thematic map can be freely specified, but Pythagoras can also fill-out the range of values automatically.

**Export DXF/DWG*****Menu File-Import***

The graphic characteristic of an active thematic map are applied to the selected object when exporting to a DXF or DWG-file (also with Save As ...).

**Printing*****Menu Print***

You can now print a previously-defined "View" (see above). This View can still be modified using one of the available Tab-options. In addition to the 4 Tab-options relating to Display Views, there are 2 additional Tab-options: 'Print' and 'Print Options' that allow you to specify additional print options.

**Increased limits****Max. number of objects**

Increased from 65000 to 4 million, even without the XL-module.  
By default, this number is set to 1 million in order to make efficient use of the available RAM-memory.

**Polygon / path: number of points**

Increased from 5000 to 32000 points.

**Curve: number of points**

Increased to 65000 points.

## ***2. Importing data collector***

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### **Codes → lines**

Codes assigned to measured points in the field, are now also assigned to the lines that connect these points.

Note: Options, if specified, are not assigned to the lines.

### **Stationing using Leica equipment**

During stationing and measuring the previous station point, Pythagoras no longer expects exactly 0.0000gon. Any possible discrepancy will be calculated into all measured angles. One requirement: the measured line needs to follow the station-record that contains the measurement to the opening-point (backsight point).

### **3. DTM**

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#### **Maximum number of DTMs**

***Menu Calculations***

The previous limitation of 32 digital terrain models has been increased to 256.

#### **Customized cross-sections**

***Menu Calculations***

You can now specify the content of the "legend" at the bottom of a cross section, as well as the layout. Also, the difference between 2 digital terrain models can be shown.

#### **Reference objects in cross-sections**

***Menu Calculations***

Reference objects can be added to cross-sections. E.g. power lines, sewers, gas lines, etc. These objects need to be selected along with the path before selecting the menu option Calculations - Cross section. The graphic characteristics such as color and layer will be respected.

This function allows you to create cross-sections without a DTM in the background, thus solely based on reference objects.

#### **Colorizing a DTM**

***Menu View - Display View***

When a minimum of 1 DTM is present, it can be colorized based on elevations or slopes. The specified parameters can be saved in a View.

#### **Combining 2 DTMs**

***Menu Calculations***

This option is used to calculate the difference between 2 terrain models, the result of which is saved into a new DTM. This proves useful when calculating areas of cut/fill between original and project DTM.

## **4. Road Design**

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### **The new object "Road"**

### ***Menu View - Road Design***

In order to start road design, a path first needs to be created and selected. Then, when activating road design by selecting the menu option View - Road Design, the path will be converted to a "Road" object and 3 windows will be shown: the horizontal plan window, the cross section window and the profile window, each of which has its own control panel.

### **Designing horizontal alignment**

The object "Road" allows you to design and/or modify the horizontal alignment interactively. The design process allows you to take into account speed-limitations. Intersection points (IPs) can be added, deleted or modified. Horizontal transition curves can also be automatically created.

### **Superelevation**

The design process allows you to take into account superelevation parameters in the curves.

### **Increased limit**

The number of reference objects that can be added, has been increased to 5000.

## **5. Pythagoras GIS**

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### **Database management**

***Menu File - Database***

Manages the makeup of the databases: allows you to define tables (databases) and columns (fields).

### **Import Shape-files**

***Menu File-Import***

While importing Shape (\*.shp) files, database information can be imported along with the graphic information. Existing tables will be automatically imported and the corresponding field filled out.

### **Import Table**

***Menu File-Import***

When a database structure is present, you can have Pythagoras automatically create and fill-out the necessary fields while importing a text-file. A "key" first needs to be defined, however: this is the link between a line in the text file and the object in Pythagoras. Typically, this key will be placed in the object-comment field of the Pythagoras object.

### **FIND (CTRL+F)**

***Menu Edit - Find***

Using the new FIND function, you can now also search for characteristics inside a database (tables, columns) of standard Pythagoras objects (polygons, lines, etc.) that are linked to the database. This way, powerful searches can be performed and can be combined with regular search functions based on graphic characteristics.

A future version of Pythagoras will allow you to save the find-parameters.

### **Mail Merge**

***Menu File - Database Management***

This new function allows you to send a personalized form letter based on selected Pythagoras objects. So called placeholders are used:

<\*tablename.columnname\*> for database information

and

<#objecttype.characteristic\*> for characteristics of standard Pythagoras objects.

Pythagoras will create a personalized document for each of the records in the table, based on a pre-defined form letter. These form letters need (for the time being) to be created as Pythagoras (prototype) documents.

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**Export table*****Menu File – Export***

Pythagoras can export an existing table in a Pythagoras drawing as text- or database file. This could also be accomplished in conjunction with a selection made using the FIND function. The presence and sequence of columns in the text file can be specified.

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**Export Shape files*****Menu File – Export***

3D Shape files can be created directly from within a Pythagoras drawing. If database tables are present in the Pythagoras drawing, they will be exported along with the Shape file. This export can also be accomplished in conjunction with a selection made using the FIND function.

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**Thematic Maps*****Menu View***

A thematic map is a kind of filter that is applied to an existing drawing, used to highlight specific objects. Any attributes that are present in a Pythagoras database may be used to define a thematic map, and may be combined with graphic characteristics of Pythagoras objects.

The "Thematic Maps" option is used to specify the parameters that define the "theme" of a map. Multiple thematic maps can be placed on top of one another. These thematic maps can serve to illustrate and/or analyze projects.

A thematic map can even be defined using the result of a calculation (e.g. area/1000).

The number of categories (classes) used in a specific thematic map can be freely specified, but Pythagoras can also fill-out the range of values automatically.

**Special case:** spatial interpolation. This technique is used when a value is available for certain points (known in XY), and you would like to see a visual representation of the spatial interpolation of these values.

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**Legend*****Menu View***

This new function creates a legend based on database objects that appear in the active thematic map. Characteristics can be assigned to the legend, it can be made smaller or larger (by clicking and dragging the corners), it can be moved, etc. When the legend looks the way you like it, it can be "frozen" in place.