OK Geometry Delta

Version 21.1.1

- The most important new feature of version 21 of OK Geometry is the **module for creating deductive proofs**. The proving process is based on the Geometric Deduction Database method. If a property of a construction is successfully proved, the prover also generates a readable proof, otherwise the module can suggest points that need to be added to the construction to enable a proof. The module also creates a list of properties of the construction that it cannot prove. (Plus, 5)
- The **proof module** can prove individual properties of example constructions from a **generic construction**. The proof module is used to identify hard-to-prove properties of the entire family of examples in a generic construction. (Plus, 6)
- In this version, **archives of constructions** are used more extensively. Archives are special files that store a large number of constructions in a compact form. (Plus, 7)

Minor changes

- The way in which generic operations are created and used has been changed slightly. The form for **generic operations (rules)** is now also used for the creation **of proof-compatible operations**.
- The entries in the Main menu have been slightly reorganised.
- The creation of GeoGen inputs now allows some more initial objects.
- Parts of comments on constructions can now be highlighted with a command that is executed by right-clicking on the comment.
- Some **bugs** have been fixed.

Version 20.3.1

- A complete interface for **PatrikBak**'s program **GeoGen** for creating non-trivial proving problems has been created. In OKG it is possible to create input files for GeoGen and to visualise the GeoGen output files, which can be inspected as archives. GeoGen can be called as an external programme. Constructions from the GeoGen output file can be transferred in various ways to OKG. (Plus, 7)
- Some bugs have been fixed.

Version 20.2.1

The numerical procedures in implicit constructions have been improved.

Three methods for the creation of scenes of a configuration are now implemented. New scenes can be added **incrementally** (suitable for visualising the steps of Euclidean constructions), **differentially** (suitable for variants of adding objects to a configuration), and **as observed properties** (suitable for displaying as scenes the observations of OK Geometry). The scenes can be included in reports as figures or as animations in a HTML report file. (Basic, 4.3.6; Editor, 2.9; Editor 5.8).

Some bugs have been fixed.

Version 20.1.1

OK Geometry Basic:

Project reports can also be written in **.odt format,** which is used by LibreOffice. The project report form has been slightly modified: now contains the first icon (Task) and the size of labels is proportional to the size of the figure by default. (See Basic Manual, Section 4.3.7.)

The **size of the project panel** has been increased, now it can contain up to 30x90 icons. (See Basic Manual, Section 4.3.4.)

Icons in ***Free* arrangement** (*Arrange icons*|*Free*) now behave like entries in the diagram (*Arrange icons*|*Diagram*). You can colour them (according to the type of entry), create connections between them, adjust icons horizontally or vertically, etc. (See Basic Manual, Section 4.3.5.)

OK Geometry Sketch Editor:

Quadrilaterals (created as closed polylines) can now have **self-intersections**. However, highlighted quadrilaterals are automatically modified to quadrilaterals with the same vertices but no self-intersections (as they usually represent detected properties). (See Sketch Editor Manual, Section 4.4 - Polyline.)

A note on intersections with circles and conics has been added to the manual. (See Sketch Editor Manual, Section 4.3 – Intersections.)

A note on importing geometric magnitudes from GeoGebra has been added to the manual. (See Sketch Editor Manual, Section 4.1.1 – Note.)

The command *Transform*|*Other*|*Multiplication by grid* has been modified. (See Sketch Manual, Section 4.7 – Multiplication by grid.)

Minor changes in the documentation in some sections. (See Sketch Manual, Sections 2.8, 3.2, 4.2-Mark/Marker.)

A section on **representational attributes** of objects has been added. (See Sketch Manual, Section 6.)

OK Geometry Plus:

A group of commands for creating and observing **quadrilateral objects** has been added to the *Special* commands group. (See Plus Manual, Section 2.7.)

A new option *Special*|*Detect cyclic perspectivities* **interactively detects perspectivities**, orthological, cyclological and parallelogical perspectivities of triangles from cyclically constructed points. (See Plus Manual, Section 2.4.1.)

Formulae observation module now work faster. The related form has been slightly modified and a new button (*f()*) for evoking Formulae observation has been added to the main menu bar. (See Plus Manual, Section 4.1.)

All first 16342 ETC centres are now available for display and for use in detailed analysis. The extensive analysis (16342+bic) recognises most of the first 60 000 ETC centres. Most of the first 60 000 ETC centres can be displayed and are taken into account in reduced analysis (59994). (See Plus Manual, Section 2.2.)

New tests have been added to the triangle analysis: Is a triangle similar to a derived triangle of the reference triangle? Does a line contain infinite ETC centres? (See Plus Manual, Section 2.6.)

New commands/constructions have been implemented, e.g., Parabola through 4 points (*Advanced*|*Shapes*|*Other*), Fixed points of projectivity on a line, a circle, a conic (*Special*|*Various constructions*|*Point*).

Generic operations (rules) for points include some QA-quadrilateral centres. (See Plus Manual, Section 5.3.1.)

Generic operations (rules) contain all operations for quadrilateral objects. (See Plus Manual, Section 5.3.7.)

Users can now access the **archive of past constructions** and constructions archived during work (See Plus Manual, Section 6.)

Some bugs have corrected.

Version 19.4.1-3

OK Geometry Plus: The speed of **Observing formulae** has been significantly improved.

OK Geometry Basic: Data related to **numerical parameters** are now preserved when **imported** from other systems of dynamic geometry.

OK Geometry Basic: The way of representing **auxiliary lines** can now be set in **General options** form. The auxiliary lines can be turned on/off with the X button, as before.

OK Geometry Plus: **Triangle cubics** are now treated analogously to other triangle objects:

- If a curve, obtained as a **locus of points, implicit locus or implicit construction**, is a cubic, it is recognised as such (OK Geometry Editor, Section 4.8).
- There is a command to construct a cubic **passing through 9 points,** through **6 triangle centres**, etc. (OK Geometry Sketch Editor, Section 4.5)
- OK Geometry handles most of the triangle cubics from the **Gibert's Catalogue of triangle cubics (CTC)**. The CTC cubics can be **constructed** and are also part of the **Glossary**. In addition, they can be used in **generic constructions** (OK Geometry Plus Reference, Section 2.1.1, Section 2.3).
- **Triangle analysis** identifies CTC cubics and their triangle transformations, triangle centres on cubics, etc. (OK Geometry Plus, Sections 2.2 and 2.6).

OK Geometry Basic: New variants for representing objects have been added. **Please, refer to Section 6 of the Sketch Editor for details.**

- **Lines, segments, arcs** can be displayed with **extensions** (to make figures clearer).
- The **background of labels** can be transparent, white or with a halo effect.
- The **default reference triangle** can be initially labelled in two ways.
- The **colour of interiors of disks and polygons** can be different from their edge. Also, the user can set the **overlapping order** of the filled polygons and circles if the fill mode is solid.
- A new command for constructing **semicircles** has been added.
- A section (**Section 6**) with a comprehensive overview of visual representation of objects has been added to the **Sketch Editor Reference**.

OK Geometry Basic: The **presentation of the construction steps (and scenes)** has been improved. (See OK Geometry Basic, Sections 4.1.8 and 4.4.3.)

OK Geometry Plus: The user can select which properties are taken into account in **Advanced triangle analysis** (see OK Geometry Plus, Section 2.6.2).

OK Geometry Basic: The **Marker** command can now also be used to **comment objects**. A comment to an object appears only when the mouse is on that object. Comments to objects appear also in the presentation of the construction steps (see Sketch Editor, Section 4.2).

OK Geometry Basic: The **Semicircle** command as a special case of arc has been added (see Sketch Editor, Section 4.2).

OK Geometry Plus: The **Winding number** command has been added (see Sketch Editor, Section 4.2).

OK Geometry Plus: Some **new geometric tests** have been added: PointOnCubic, IsCubic, IsCentre, isTCentre (See Sketch Editor, Section 4.8).

OK Geometry Basic: The performance of the Implicit constructions and the Implicit locus commands has been improved (see Section 4.8).

Some bugs were corrected.

Version 19.3.1

OK Geometry Easy: The texts are also available in **Italian**.

OK Geometry Easy: Import from **Geogebra** files has been improved and some errors corrected.

OK Geometry Basic: The texts are now also available in **Italian.**

OK Geometry Basic: The ***Advanced|Shapes*** command of the Sketch Editor has been completely revised and improved (see Sketch Editor manual, section 4.8).

OK Geometry Plus: The ***Point|Triangle 3rd point*** command has been removed in the Sketch Editor. In fact, it has been integrated in the revised command *Advanced|Shapes|Triangle,description*.

OK Geometry Plus: The ***Advanced|Shapes*** command of the Sketch Editor has been completely revised and improved (see Sketch Editor manual, section 4.8).

OK Geometry Plus: Changing the levels of **analysis of triangle objects** works now faster and better (see manual, section 2.2).

OK Geometry Plus: New **ETC centres** have been added, currently up to 52238.

OK Geometry Plus: The observed formulae in the module **Observe formulae** can be converted to the form required by some CAS programmes **(Derive, Xcas/Giac, Maxima/wxMaxima**) for further algebraic processing (see manual, section 4.2.1).

OK Geometry Plus: The names of the measured quantities in the module **Observe formulae** can be written in brackets (e.g., [par]) or without brackets (e.g., *par*) (see manual, sections 4.3.1, 4.4.1)

OK Geometry Plus: Linking text to **Glossary** and **Whatis** explanation has been improved (see manual, section 2.1).

Some bugs have been fixed and some minor improvements have been made.

Version 19.2.1

OK Geometry Easy: The texts are also available in **German**.

OK Geometry Easy: The displayed results of **Observe** contain the information about the properties that were not observed due to excessive number of potential instances of properties (see manual, section 2.10)

OK Geometry Basic: The texts are now also available in **German.**

OK Geometry Basic: The displayed result of **Observe** contains the information about the properties that were not observed due to an excessive number of potential instances of properties (see manual, part I, section 4.2.4)

OK Geometry Plus: Many new entries have been added to the **glossary**. In addition, the text in and illustrations in several entries have been improved.

OK Geometry Plus: The entries in the **glossary** are now divided into three categories: Commands, Special (triangle entries), ETC-related entries (see manual, section 2.2.1).

OK Geometry Plus: Several new commands and operations for **triangle objects** have been added.

OK Geometry Plus: The form for selecting **triangle operations** has changed slightly: the radio-buttons for selecting the type of object to be created are now on the top of the form (see manual, section 2.3).

OK Geometry Plus: The group of **triangle commands *Special|Various constructions*** now optionally uses the reference triangle as the first argument (see manual, section 2.3).

OK Geometry Plus: The command **Object by triangle centres** displays a range of ETC centres (e.g. 100-500) much faster.

OK Geometry Plus: The **Cyclic construction** mode has been improved. In cyclic mode, the system detects construction steps that should not be treated as cyclic and treats them accordingly, thus avoiding the creation of multiple objects (see manual, section 2.4).

OK Geometry Plus: In the **Advanced triangle analysis** the name *Fast centres analysis* has been changed to *Two triangles centres* (see manual, section 2.6. and 2.6.5).

OK Geometry Plus: When **observing formulae,** it is possible to define new parameters as geometric quantities in the Sketch Editor and consider them in observing formulae (see manual, section 4.2.3).

OK Geometry Plus: The names of some **generic commands** have been slightly changed: Point to GPoint, Line to Gline, Circle to GCircle (see manual, section 5.3.1).

OK Geometry Plus: In the form **Manage generic construction** the user can now specify the examples to be reviewed using the command *More...|Set examples to review* (see section 5.3.6).

Some bugs have been fixed and some minor improvements have been made.

Version 19.1.1

A considerable part of the documentation was rewritten.

Some terminological changes were introduced in the Advanced Query module. Also, the auxiliarx objects (Y) are now listed at the beginning of the list of queried properties.

The Observe algebraic formulae module has been significantly improved. The terminology used in the module has also been changed.

The Generic mode of work no longer exists. It is now part of the Plus mode.

The OKExamples directory of examples has been reorganised and significantly expanded.

A new reporting scheme (mosaic) has been added.

The ->S button for adding scenes (in Plus mode) was removed.

Many triangle objects (triangle centres, circles, conics) have been added.

Some minor bugs have been fixed.

Version 18.1.10

A new module for observing algebraic formulae has been added in the Plus and Generic mode. It detects algebraic relations between geometric quantities in dynamic constructions.

Several new triangles objects have been added, in particular circles and conics.

New triangle centres (up to 46863) added to the centres database.

Some minor bugs were fixed.

Version 18.1.9

The generic constructions (former family of constructions) have been radically redisegned, from the very concept to the related to the commands for construction and managing. Generic constructions are now available in a new mode of work (Generic). The related module is expanded and significantly modified. The documentation has also been completely rewritten.

An option for displaying indexes in labels has been added.

Some minor bugs were corrected.

Version 18.1.8

Significantly improved and simplified the management of families of constructions, now treated as generic constructions.

A new command (Triangle 3rd vertex) added for the construction of points.

New triangle centres added (up to about 44000).

Some minor bugs were corrected.

Version 18.1.7

Implementation of families of constructions in Plus mode. Constructions can be individually displayed and treated as ordinary constructions. The whole family can be scanned to identify the constructions with specified properties,

Some minor bugs were corrected.

Version 18.1.6

Advanced query: new auxiliary points and new auxiliary objects added.

Advanced query: improved help for showing description of auxiliary points.

Image export: size of exported image can be now set in pixels or cm.

Image export: size of marks (text size, line width, point size, etc.) in image can now be proportional to image size or as set in OK Geometry; in both cases the sizes of marks can be additional adjusted for each type of mark.

Some minor bugs were corrected.

Version 18.1.5

Introduced the keyboard key F8 to switch Help on/off at any time (in addition to existent ways of switching).

Introduced the keyboard key F7 to switch between exact and perturbated view at any time (in addition to existent ways of switching).

In Plus mode a simple way a simple scenes viewer is added in the group of commands for scenes. The related button has two green rectangles. The command allows the visualisation of scenes on a copy of the current construction. Thus, while viewing scenes of a construction (even if no scene has been declared) it is possible to modify the copy of the construction, export, it save it etc. without affecting the current construction.

A simple way of adding scenes to the construction is now possible in the Plus mode in the Sketch editor with the ->S button (adjacent to the buttons for saving/retrieving icons). First, the ground scene is declared (use ->S button). Then there are two ways of working. If one documents the construction process then the process is cumulative, so that at the desired steps of the construction process one declares a new scene (with the ->S button). In this way the scenes show the construction process. The other way is to add new objects to the ground construction and declare this as a new scene. Repeating this one obtains a series of scenes each representing the ground scene with just one property. This is useful for showing several properties separately as scenes of in just one construction.

An iconised construction with several scenes can be now exported as a single SVG image with separate views. This is obtained by making a report of the icon(s). The report must be in the form of

'Scenes then text' in the SVG format. If another image format is chosen then the scenes are shown in separate images.

New ETC triangle centres have been added. OK Geometry now considers about 40 000 of them.

OK Geometry can be used now also on the secondary monitor of a computer.

Some minor bugs were corrected.

Version 18.1.4

Some minor bugs corrected.

Version 18.1.3

Advanced query is significantly improved and extended. By default it is turned on in Plus mode, but can be turned off in the Observation part of the configuration form. Advanced querry is not operable in Easy or Basic working mode.

Auxiliary points in advanced query can be exported to the construction as part of the observed property. They are labelled as Y followed by digits, e.g. Y2141.

In displaying observed properties the lines and circles that are not defined by known points on them (and are labelled as {number}) are labelled in the graphic diplay with the proper number.

In exporting images it is now possible to set the background as transparent or non-transparent.

Some minor bugs corrected.

Version 18.1.2

It is possible to set a layer (1-5) for a filled shape with the Anchor button. Layers are visible only when the solid hatch is used for filling ovelapping shapes.

Version 18.1.1

Improved commands/operations

Corrections in importing files from other systems of dynamic geometry.

Changed the presentation of the list of potentially detected geometric properties.

Improved command for labelling points.

Improved command for conforming icons in Project view. The command for conforming icons is moved to the context menu.

Improved module for exporting images of a construction and the report of a project.

Improved module for expressing numbers as radicals.

In exact display the first horzontal/verical guides are coloured blue and the following in red.

The display of found properties can be restricted to those involving a specified objects. It is possible to set the level of restrictions.

Several minor improvements and corrections.

Added

New triangle centres added. For centres over 32000, their transformation is not considered in the analysis.

Width of lines in a construction can be increased/decreased by a factor.

A transformation can be applied to objects with a right click on the transformation section.

Added a test for tangency for conics.

Added the construction of a tangent to a conic, parallel to a given line.

In Project view it is possible to copy icons within project or between different projects.

An F1 button (call to Glossary) is added in Editor Menu (Plus mode). The Glossary (F1) now considers the construction commands as well as explanations.

User can at any time choose between the exact ot perturbed mode of displaying configurations.

Figures can be exported in SVG format. It is possible to export figures also via Inkscape.

Discontinued

Users cannot add new test for numerical relations between geometric quantities.

Export of figures does not use Ghostcript any more. Ghostscript is thus not required anymore.

Updated

The translation to Czech is updated. *Thanks to* ***Irena Strausova***!

Updated and improved documentation.

Added several triangle centres and bicentres.

Version 17.2.2

Thanks to Ercole Suppa for many helpful suggestions.

Changed the appearance of the blue dot. Also changed the modality of exact (static) and perturbed view. Now each is constant and can be changed anytime. However, some constructions do not the exact (static) view.

The glossary and command index now show information from documentation, including the path to the commands. Furthermore, the command can be called from the glossary.

The reviewing construction steps form now shows also scenes.

Improvements in importing constructions from Cabri and GeoGebra.

The program now warns if the constructed locus is a line, circle, conic.

Added a visual help for Shapes and Check commands.

New triangle centres added.

Augmented the number triangle centres.

Slightly modified the way of using WhatIs ans Glossary help in text windows. The Edit help level can be 0-3.

Added a list of triangle commands. Useful for searching a command with a description.

Significantly improved Editor help system, both in commands glossary and in help widget.

Modified form for remodelling objects. The attributes (colors, width, type of line/point) can be changed for single objects or for multiple objects (button More). Objects to be modified can be selected according to the colour, type, shape of pointed objects. For example, selecting blue colour and pointing to a green circle one can colour to blue all green objects or all circles or all green circles.

The command Inversion to circle is moved to Transformations. Inversion can be applied to circles, lines, points.

A significant change involves the representation of sketches. The sketch can be shown in 2 modes:
1. The perturbed mode (blue dot) - all free points are randomly moved in each representation.
2. The exact mode (gray dot) - the objects are shown as they were defined (though usualy not shown), thus without perturbation. This mode is used in making ikons, exporting sketch etc. In this way we can obtain purely horizontal/vertical lines, if desired.
By default and whenever an observation is done the mode automatically turns to perturbation mode.
Whenever an icon or export is done the mode turns automatically to exact.
The user cna change the mode by a left click to the blue/gray dot.

When two consecutive points are drawn in exact mode the program checks if they are approximately horizontal or vertical. If this is the case the program sets the coordinates so that a perfect horisontal/vertical alignment is obtained. Note that his occurs only in exact mode and the alignment is visible only in exact mode.

A new command 'Action|Visually align 2 points' in Sketch is added. With this command two free points in a construction are aligned horizontally or vertically (whichever is closer). Not that the perfect alignement is visible only in the exact mode or when the sketch is printed, copied, iconised.

It is possible to visualise the construction steps in the current sketch. Use the command Commands|Construction steps. To move forth and back use mouse, Left-Right keyboard or mouse scroll.

Several new triangle objects have been added.

The 'Triangle index' command is improved. Right click at the explanatory text shows the options, which allow a direct link to glossary, direct link to triangle index, and copy of the (unformated) text to clipboard. There is also a hidden command for obtaining the list of objects in the index: write 'Indice' (no braces, case sensitive) in the search area.

Version 17.1.8

Thanks to Ercole Suppa for many helpful suggestions.

Small changes in colouring explanatory text for triangle objects/commands.

An index of triangle objects has been added. It is accessible at Commands|Triangle index.

Added export of sketches to emf vectorised format. This is done via an external progem Inkspace that needs to be installed by user.

Modifications in making reports. Now three types of reports are (basically) possible: htm (with image pictures, LaTeX (with vector images), doc (with image pictures or emf pictures).

Several new triangle items added.

Improved command Conform icons. Icons can be just redrawed using changed parameters (e.g. suppress perturbations, change hatch mode)

Version 17.1.7

Thanks to Ercole Suppa for many helpful suggestions.

Improved export of images in pdf format.

Improved display of coloured text in comments.

Improved options of filling objects (Mark area). It is possible to control density of filling in random and solid fills.

Added option of writing reports in TeX format. After eventual elaboration of TeX file nicer reports can be made.

Several new triangle items added.

Most forms (e.g. selecting Special commands, resuts of Triangle analysis) can be extended in width/height.

Improved process of writing up a record in doc format: images need not be unlinked any more. Formats of reports (htm, doc, pdf) are also improved.

The first ikon (Task) now serves explicitely as title ikon. Can be changed, but not deleted, canoot change the first position in report.

In importing/reading construction the user can decide whether to preserve the current project or not.

Added possibility of solid fill (besides dither and random) in marking areas.

Version 17.1.5.

Thanks to Ercole Suppa for many helpful suggestions.

Added export of construction in vectorised formats (ps, pdf, epsi).

Added export of Ok Geometry constructions to static Geogebra constructions. Useful for export in various image formats in GeoGebra (e.g. EMF format).

Version 17.1.3

Improved editor of scenes.

Version 17.1.1

Documentation is updated. Including the translation to Slovenian and Czech. Thanks to Irena Strausova.

Modified way of representing perturbation of points (now blue dot on display). Right click on blue dot display a useful for options.

Colour selection (for colouring new objects or modifiy existing objects) is simplified.

Added the option of selecting icons to be included in the printed report.

Added the importing of constructions form C.a.R.

Removed the command Toggle label.

Added a limit of displayed properties for very common triangle objects.

Added new ETC points (currently abut 32000 in total). Points above 16000 are used in a reduced way and with less accurate tests.

Some buttons for commands added in Sketch editor (Midpoint, Bleach, etc.).

Added test in Triangle analysis: points are detected also using projectivities ABCXi -> ABCXj for reasonably small i,j.

Change in Triangle analysis: besides the variable centre now user numerical parameters can be changed as well for iterative analysis. Filtering of properties significantly changed.

Improved inspection of points and objects in Observation. Points can be declared as unknown. This is a much more friendly way of of filtering found relation. Consequently, explicit filtering relation has been removed.

Version 16.1.8.

Added the option of copying attributes of an object to all scenes in an icon.

Added new ETC points (currently abut 16000 in total).

Version 16.1.6

Labels in sketch can be positioned also with mouse.

Some new commands added in Sketch menu (e.g. insimilicentre, exsimilicentre).

Added interaction in Glossary of triangle items (clicking on explanatory text displays glossary related to clicked word).

Added new ETC points (currently about 13 000 in total).

Added possibility of displaying object as transparent (in Scenes and Big icons).

Subscripts in labels are not any more displayed in sketches.

Version 16.5.

Ikon names can be edited directly in Report view.

Improved usage of Triangle variable centre.

Added control button for (non)displaying auxiliary lines in sketches.

Users can choose whether preserve current project when reading a new construction from file.

By default icons are now ordered in a matrix fashion.

Added a new representation of icons as a flowchart in Report view.

Added import of construction from JGEX (format txt).

User can control gamma in importing images.

Version 16.4

Some tests in Triangle analysis are now ignored if the analysed triangle is a right triangle.

Version 16.3

F2 can be used to save current work.

Size of labels in report files can be set independently of the size on display. The same holds for width of lines, text , points.