EgCAS

MANUAL

An easy graphic Computer Algebra System

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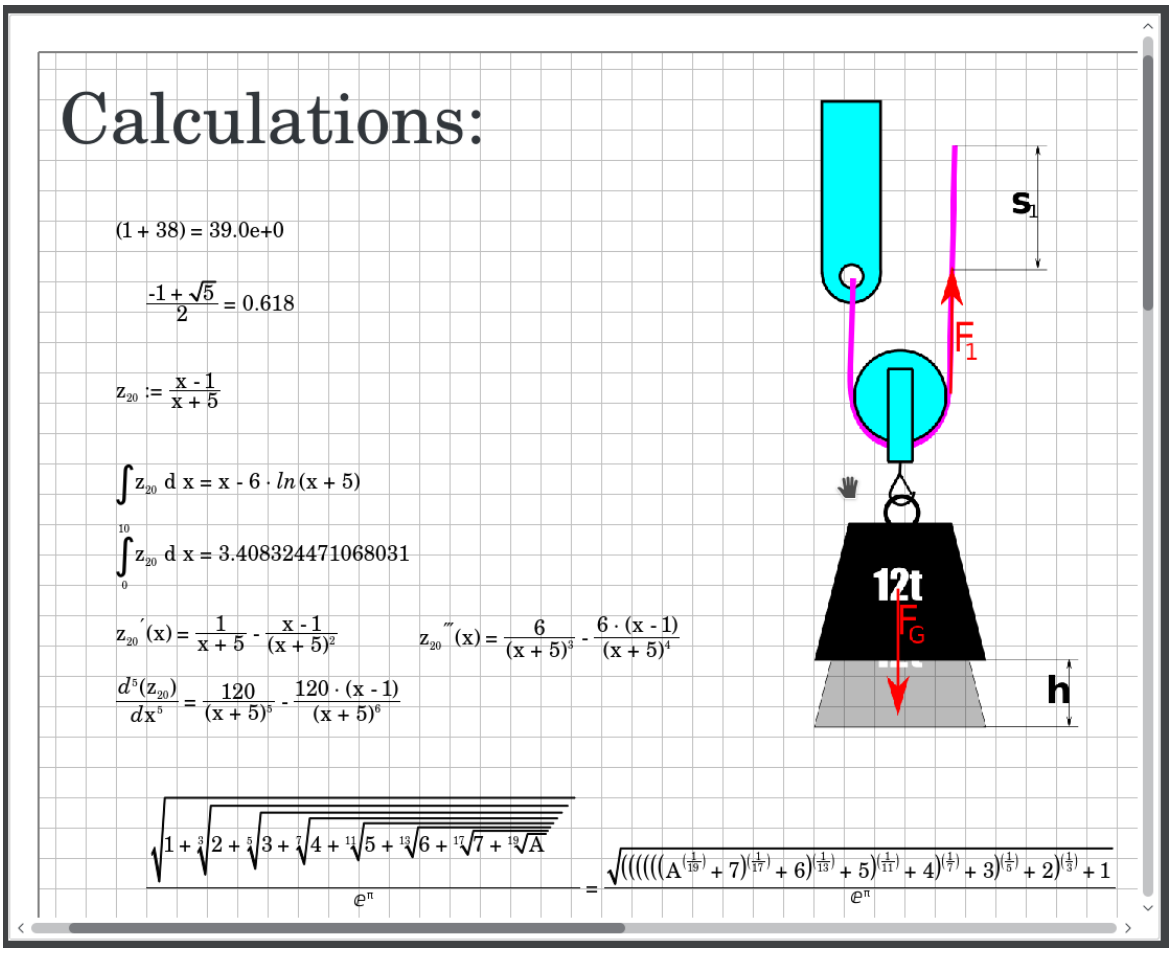

USER'S MANUAL

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1 General Information

1.1 Overview

EgCAS is a graphic Computer Algebra System. This means there is a graphic User Interface that allows the user to easily type in formulas and also insert Pictures and Text into the Calculation Document. This document can be saved and loaded again for further use and modification. Therefore it represents a electronic way to note formulas as one would do that on a piece of paper, but in an active manner. Active means that the used calculation Kernel recalculates the equations whenever the user changes the input.

1.2 System

EgCAS uses third party software to provide the functionality shown. Especially the CAS kernel used is an fundamental component of EgCAS. EgCAS utilizes the Maxima CAS kernel for its calculations. Therefore most functions that can be used with Maxima should also work in EgCAS.

1.3 Acronyms and Abbreviations

CAS: Computer Algebra System

2 Installation

The packages for the Platforms supported can be downloaded from https://egcas.github.io/.

Make sure to always download the most recent version since EgCAS is still in a very early state.

2.1 Windows

Supported Versions: Windows 10 (32 or 64 bit) or later is supported.

To install EgCAS on Windows just download the Installer form the Web and execute the Installer downloaded.

2.2 Linux

Supported Versions: Ubuntu 16.04LTS (64bit) and Ubuntu 18.04LTS (64bit) are supported. Other Debian based Distributions may work but are not tested.

To install the packages on your system download the relevant package from the Web and install the package either via your graphic package Manager or just execute the following on command line:

```
sudo apt install egcas-0.0.3-ubuntu-bionic_amd64.deb
```

3 Getting started

3.1 Layout of the graphical User Interface

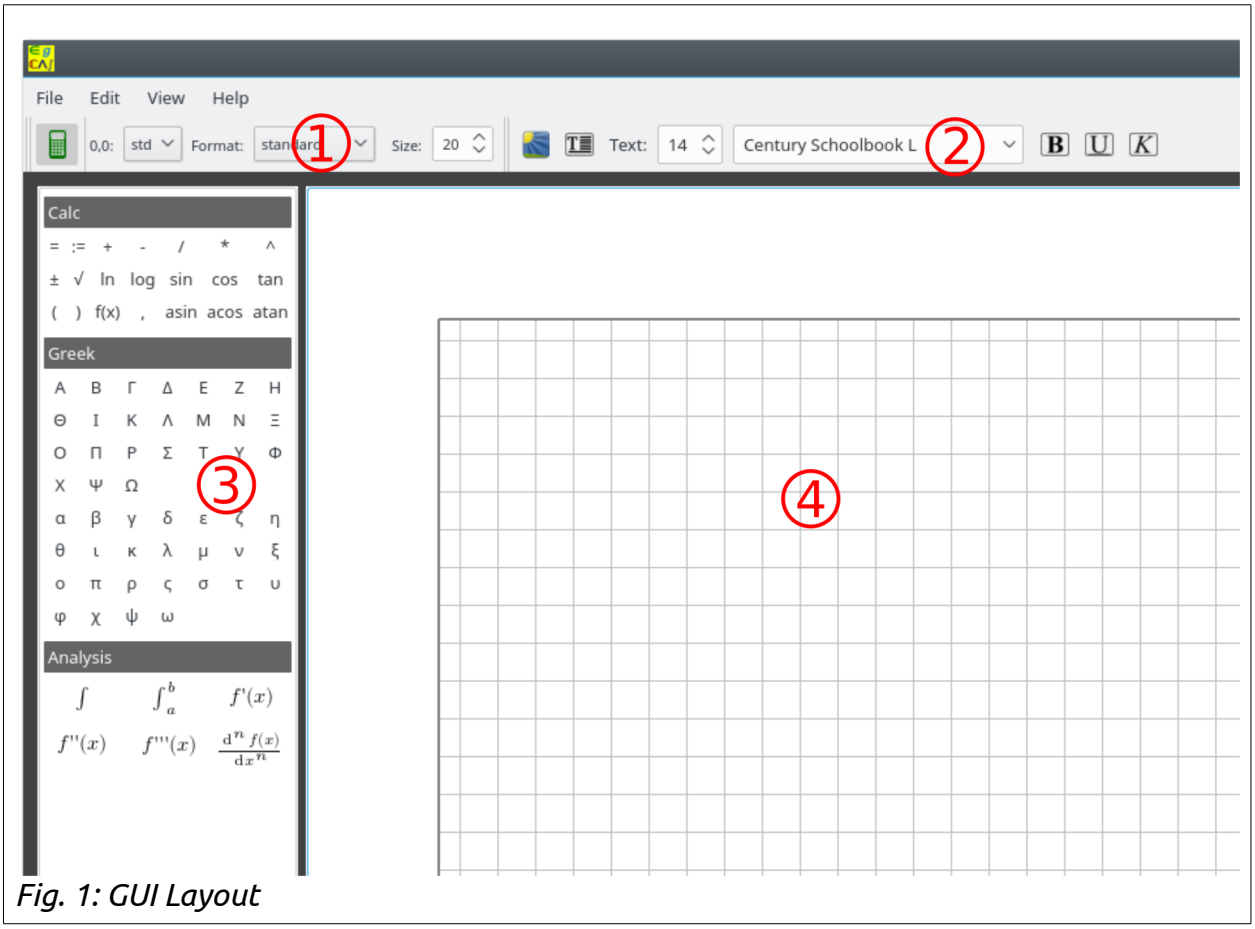

Fig. 1: GUI Layout

The GUI of EgCAS consists of the Main Menu, the math toolbar (1), the text toolbar (2) the calculation document (4) and the calculation toolbar (3).

3.2 Math toolbar

The math toolbar contains buttons which control the calculation of an equation.

The calculator symbol is activated if one loads the program. That means that the program automatically recalculates the document once the user changes an equation. It can be useful to deactivate the automatic calculation if there are calculations that need a long time for recalculation.

The next combo box in the toolbar determines the number of significant digits the result will have. E.g. if the result of an equation would be 0.0667593 and one would select 3, the result will be presented as 0.0668 to the user. If the user has selected an equation only the equation will be changed. If the user has no equation selected, it will be the standard configuration for the document.

The next combo box is the number format the result will have. There are the configurations standard, scientific, engineering and integer.
Standard: selects automatically the most suited format
Scientific: Scientific notation is used
Engineering: Engineering notation is used (Exponent is dividable by 3)
Integer: The result is rounded to the next integer value

The size field sets the font size of the equation document wide.

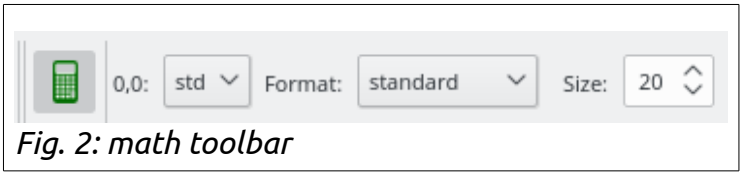

Fig. 2: math toolbar

3.3 Text toolbar

With the text toolbar one can insert pictures and text.

When inserting a picture by clicking on the first button, the user has to select a graphic file to insert into the document. When selecting the picture a blue triangular sign will be shown at the right lower edge. By moving this edge the size of the picture can be adjusted.

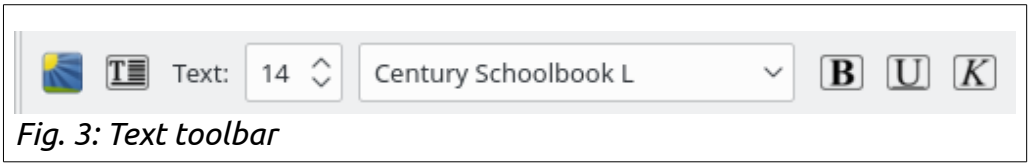

Fig. 3: Text toolbar

With the next button text can be inserted into the document. If a text field is unselected and one wants to change the text, this can be done by double clicking on the text. The buttons for size, font type, … again act on the whole document or just one equation depending on the fact if a equation is selected or not.

3.4 Calculation toolbar

The calculation toolbar contains all math symbols and functions that are necessary to write calculations.

The sections can be folded by clicking on the section header.

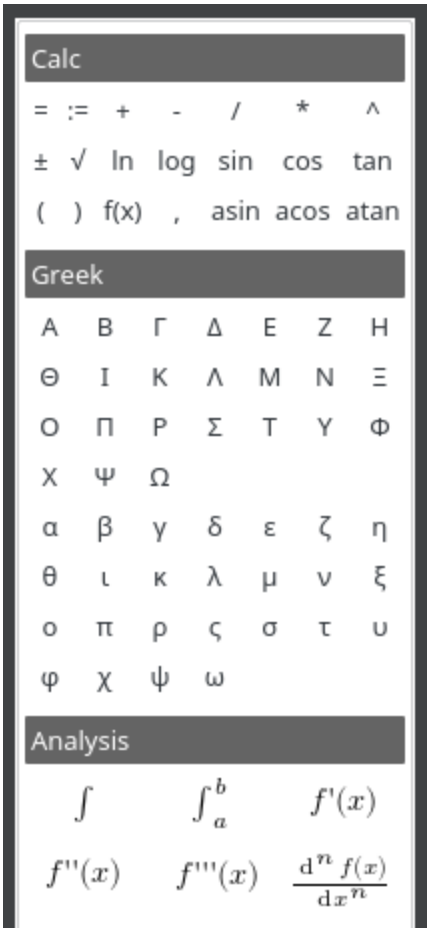

Fig. 4: Elements toolbar

3.5 The first equation

3.5.1 First Example

Click into the calculation view. You will see a crosshair.

Type the following:

```
15.3+61=
```

Now press Enter. You will see the Result in the calculation sheet.

We can enter algebraic equations just by typing numbers and variables like in

a calculator. A few rules to respect:

Assignments have to be entered by typing a colon ":"

if you want the result of a calculation type equal sign "=".

variables must begin with a letter

3.5.2 Second Example

This time we will use a variable. Type the following:

```
x:126.58
```

Press Enter and move the cursor to a position below the term.

```
56.9+x/3=
```

Press Enter. Now you can see the result of the calculation.

4 Working with a document

4.1 Moving Elements

All elements in a document (equations, pictures, text) can be moved around in the document by dragging them with the mouse. Also if the crosshair is shown before some elements, they can moved downwards one grid width by pressing **Enter**. They can be moved upwards the document by pressing **backspace**.

4.2 Editing Elements

All elements can be edited by double clicking on them. Pictures cannot be edited.

4.3 Equations

4.3.1 Enter Variables

Variables must start with a letter. Variables can also have indexes. Indexes can be entered by pressing **Crtl + -** .

4.3.2 Selecting a Operation

To select an operation next to the current cursor press **Space**. Now the operation next to the cursor will be underlined. When entering an operation next (e.g. a division) the fraction will include the formerly selected operation.

Example:

Enter the following:

```
4+6 SPACE SPACE
```

Now 4+6 is underlined.

```
/3 CURSOR_RIGHT = ENTER
```

As a result you can see the fraction 10/3.