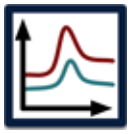
Plot



version 0.9
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plot.micw.de

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Plot Introduction

This documentation is valid for *Plot* version 0.9


Attach:Main/screenshot1small.png Δ|Screenshot

Plot is a scientific 2D plotting program for Mac OS X.

Plot is designed for everyday plotting, it is easy to use, it creates high quality plots, and it allows easy and powerful manipulations and calculations of data.

Basically *Plot* allows to work with multiple documents where every document consists of one or more XY data buffer. Unlike some other programs each XY data buffer is independent (without are shared X axis or so). In addition it is also possible to save individual X and Y error values for each data point.

There is also the possibility to add subviews (plots inside plots) to your document. A subview is completely independent with its own data buffers, graphic attributes etc.

Data can be imported from ASCII or binary files, directly from a MySQL database or with a custom import filter. It is also possible to insert data buffers by using copy and paste from other programs (e.g. Excel)

Plot supports many plotting styles like lines, symbols, grids, bars, filled areas,errorbars, automatic legend, text and graphic objects, etc.

The data buffers are managed by the *Data Inspector*.

To make plotting easy many attributes (e.g. axis ranges, axis labels) will be generated automatically but it is possible to change most graphic attribute by hand.

The main tool in Plot is the *Inspector* which controls all attributes of your document, show measured values and allow the mouse mode selection. The *Inspector* also controls the graphic attributes of the data buffers.

There is also a tool called *Data View* which allows direct manipulation of data points in a spreadsheet like table.

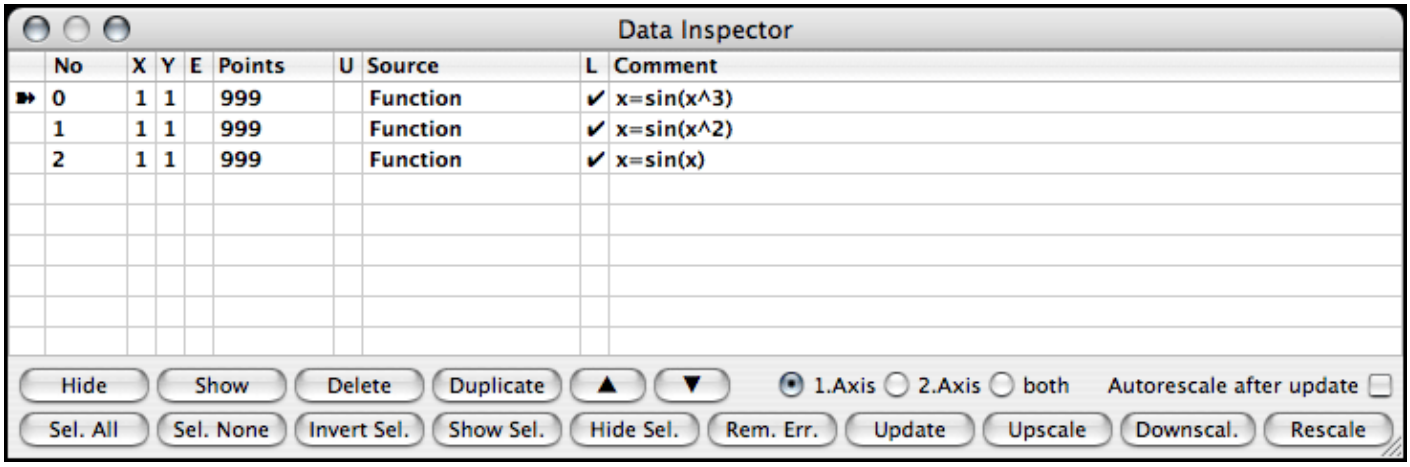
Plot has also a macro language with ~ 140 builtin commands. The macro language allow to automate complex tasks.

Last not least there is a *Calculator* for instant calculations.

Of course there are also several menu items which allow many operations.

Data Inspector

The *Data inspector* mainly controls the data buffer in your document. Each line represents a set of XY data. It is possible to select some buffers and transfer them via copy and paste to another *Plot* document.



Data Inspector

The columns in the *Data Inspector* show all important data about the buffer and allow some changes:

1. column: In this column appears an arrow which indicates the *working buffer*, e.g. if you select the *Data Style* Tab in the *Inspector* it show the attributes of the buffer with the arrow in front. Changing the working buffer is done by double clicking in this column.

No column: The number of the buffer. The buffer number can be useful for macro programming.

X column: Shows if the buffer belongs to the first (left) X axis or to the second (right) X axis of the plot. Can be changed by double clicking the column.

Y column: Shows if the buffer belongs to the first (bottom) Y axis or to the second (top) Y axis of the plot. Can be changed by double clicking the column.

E column: This column indicates that the buffer contains error values.

Points column: Number of data points in the buffer.

U column: Indicates if the buffer should automatically update from dynamic data sources like MySQL. You can change the state by double clicking the column.

Source column: The source of the data. This column is editable.

L column: If checked the buffers comment will be shown in the automatically generated legend. You can change the state by double clicking the column.

Comment column: As the name says. This column is editable.

At the button of this inspector appears a gallery of buttons:

Hide and **Show** hides or shows all selected buffers. Hidden buffers will not displayed but the data are still available for later use. The hide/show state of a buffer can also be changed by double clicking the **Points** or **No** column.

Delete delete all selected buffers.

Duplicate duplicates all selected buffers.

Up, **Down** with this buttons you can move the current working buffer up and down. The order in the *Data inspector* is also the order in which the buffer will be plotted.

The **1.Axis, 2.Axis, both** radio button defines if operations like rescale take effect on both axis or only on one of them.

If **Autorescale after update** is selected the document will be rescaled after data update from dynamic sources like MySQL.

Sel. All: Select all buffers.

Sel. None: Unselect all buffers.

Invert Sel.: Inverts the buffer selection

Show Sel.: Shows only selected buffers

Hide Sel.: Hide only selected bufferrs.

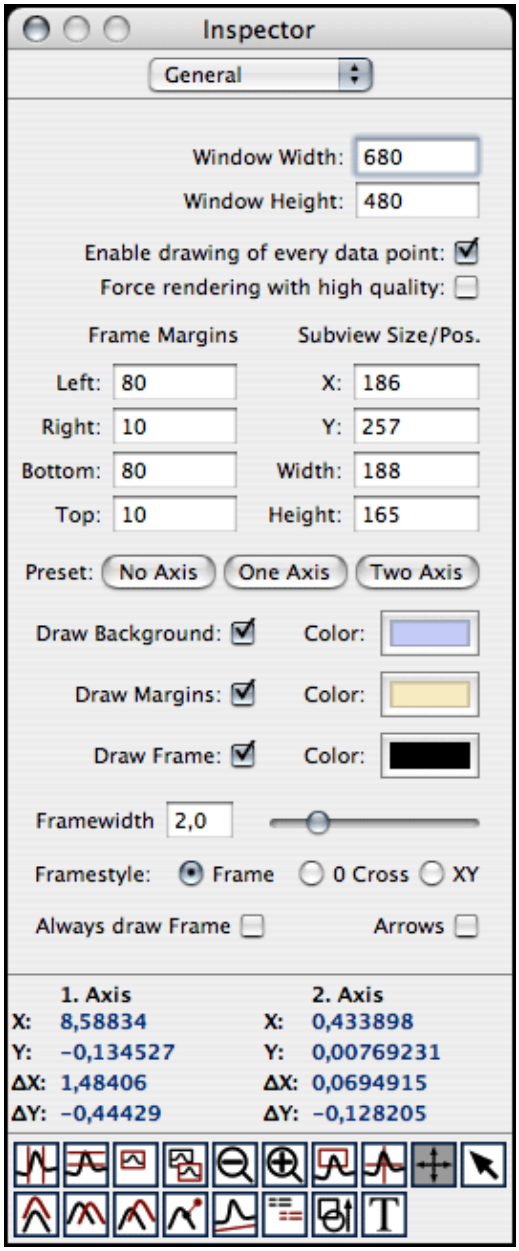
Rem. Err.: This function removes error values from all selected buffer. For large buffers this can reduce the file size.

Update: Buffers with dynamic data sources like MySQL will be updated.

Upscale and **Downscal.**: Increase or lowers the range of the plot.

Rescale: Rescales the plot so that every datapoint is just visible.

Inspector

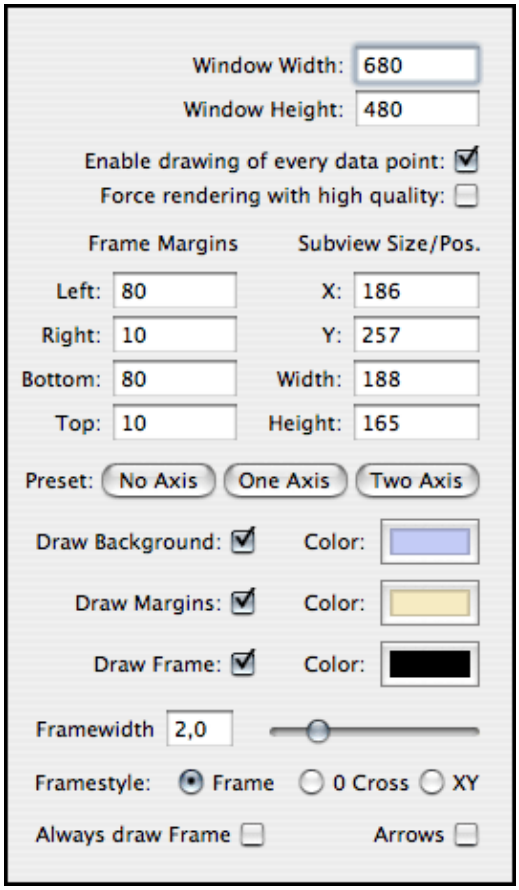


Inspector

with the *Inspector* you can control every attribute of your document. The *Inspector* is divided into three parts. The upper area is the main part with different tabs. The middle part show values e.g measured with the crosshair mouse mode. In the lower part of the *Inspector* you can select the mouse mode which controls the behavior of the mouse in your document.

The following *Inspectors* are available:
General Inspector
Data Style Inspector
Axis Inspector
Axis Format Inspector
Error Bars Inspector
Legend Inspector
Calculations Inspector

General Inspector



General Inspector

The *General Inspector* controls some general attributes of your document.

Window Width, **Window Height**: The size of the window in pixel. Useful to generate two documents with the same size.

Enable drawing of every data point: If checked *Plot* draws always every data point. Typically *Plot* decides how many data points will be plotted and the result is reasonable. In some cases enabling this option can enhance your plot.

Force rendering with high quality: *Plot* automatically decides how to render your plot. Checking this option forces to render always in highest quality (which can dramatically slow down **Plot** on huge data sets).

Frame Margins: The margins between window and plot frame. You can use the mouse to control the framesize if you choose the select tool mouse mode.

Subview Size/Pos.: The size and location of the currently selected subview.

Preset: Allows easy selection of margin preset for plot with one or two axis.

Draw Background: Defines the background color inside the plot frame and if the background should be drawn.

Draw Margins: Defines the background color on the margins and if the margin background should be drawn.

Draw Frame Defines the color of the plot frame and if the frame should be drawn.

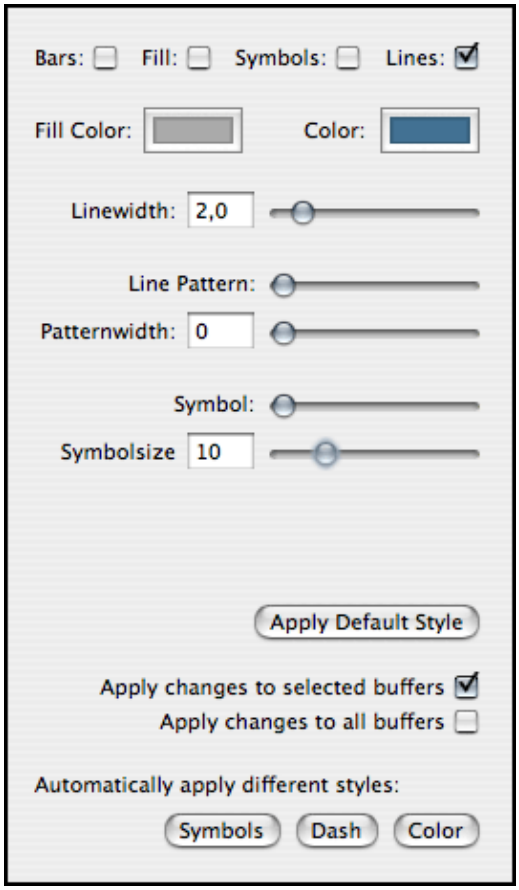
Framewidth: Defines the width of the frame.

Framestyle: Allows to select different framestyles. If *Frame* is selected a full frame will be plotted, *XY* style plots only a line on the X and Y axis, *0 Cross* draws a XY cross at the null position.

Always draw frame: Forces to plot a full frame even if your framestyle is *XY* or *0 cross*.

Arrows: Draw arrows and the line ends for framestyle *0 Cross* and *XY*.

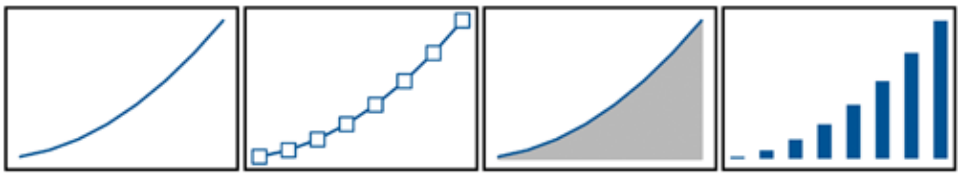
Data Style Inspector



Data Style Inspector

The *Data Style Inspector* controls the graphic attributes of each data buffer.

Lines, **Symbols**, **Fill**, **Bars**: Defines in which style a buffer should be drawn. All Styles can be combined.



Lines, Symbols, Fill, Bars

Fill Color: Defines the color for the fill style.

Color: Defines the color for the data buffer.

Linewidth: Defines the width of lines.

Line Pattern: Defines the dash pattern for the line style. 16 pattern are available.

Patternwidth: Allows to stretch the dash patterns.

Symbol: Defines the symbol which will be used for symbol style. 16 symbols are available.

Symbolsize: Defines the size off the selected symbol.

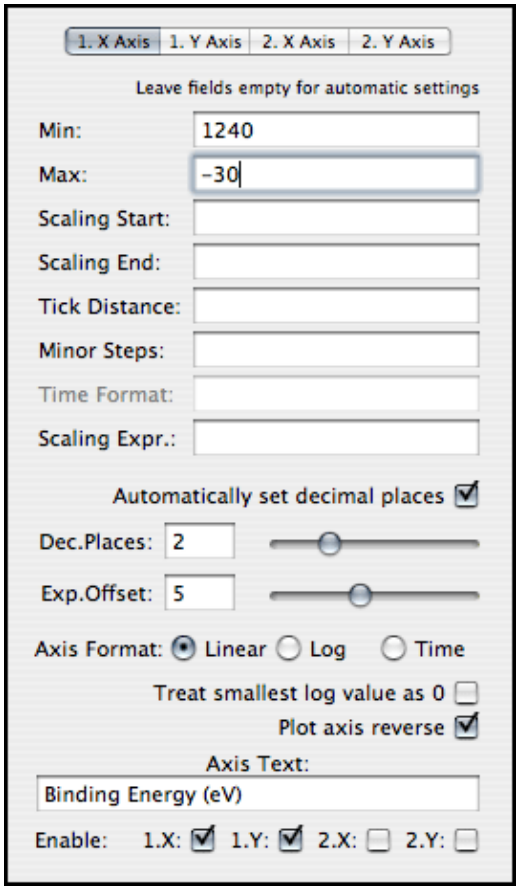
Apply Default Style: When clicked the default data style will be applied.

Apply changes to selected buffers: If checked changes will provided to all selected buffers and not only to the current working buffer (the buffer with the arrow in the first column of the *Data Inspector*).

Apply changes to all buffers: If checked changes will provided to every data buffer and not only to the current working buffer (the buffer with the arrow in the first column of the *Data Inspector*).

Automatically apply different styles: This is a comfortable way to assign different styles automatically to all buffers, available for symbols, dash pattern and colors.

Axis Inspector



Axis Inspector

The *Axis Inspector* allow settings depending to the 4 available axis. The button at the top of the inspector selects on which axis the attributes below apply to.

Min, **Max**: Controls the range of the axis. The range can also be changed with different mouse modes. Dependent on the number format you have to enter a number or a time value.

Scaling Start, **Scaling End**: Defines values where the scaling of the axis should start and stop. Dependent on the number format you have to enter a number or a time value.

Tick Distance: Defines the distance between two major ticks. If your axis is a time axis you have to enter *days:hours:minutes:seconds* or *w* (1 week) or *m* (1 month) or *y* (1 year).

Minor Steps: Defines the number of minor ticks between two major ticks.

Scaling Start, *Scaling End*, *Tick Width*, *Minor Steps* are optional values. If you leave the fields empty *Plot* calculates an optimal value automatically.

Time Format: Defines the format used for the displaying time values on time axis (time format tokens).

Scaling Expr.: This allows scaling of axis numbers without changing the data itself. For example to display seconds instead of milliseconds enter `v/1000` in this field. *v* is the variable which represents the axis number.

Automatically set decimal places: If checked the number of decimal places for axis numbers will be determind automatically.

Dec.Places: The number of decimal places for axis numbers.

Exp.Offset: Allows you to define the limit, above which numbers are plotted in exponential notation. The number you define with the slider is the exponent of the limit.

Axis Format: Here you can select between linear axis, logarithmic axis and time axis.

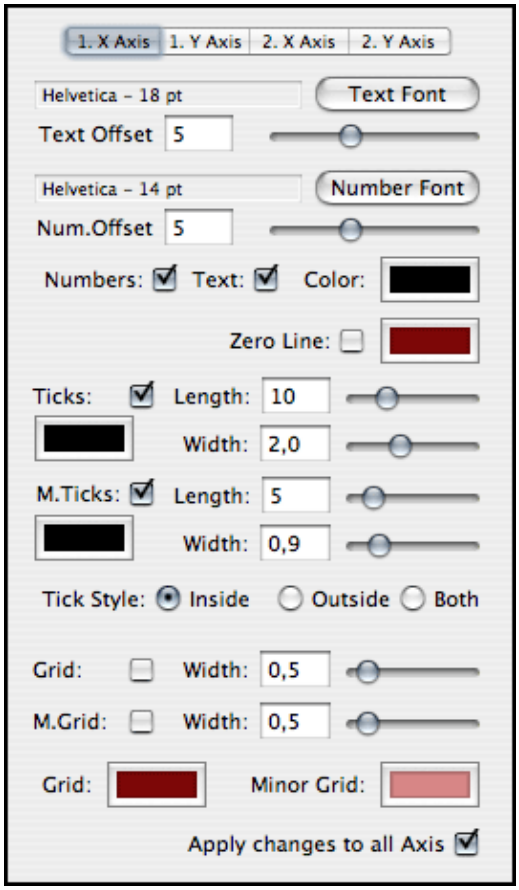
Treat smallest log value as 0: If check the smallest value on a logarithmic axis will be replaced with 0 (even if this is not correct).

Plot axis reverse: If check the axis will be plotted in reverse direction.

Axis Text: The major label for the axis.

Enable: Allows to enable or disable an axis completely.

Axis Format Inspector



Axis Format Inspector

The *Axis Format Inspector* controls the graphic attributes of the 4 available axis. The button at the top of the inspector selects on which axis the attributes below apply to.

If *Apply changes to all Buffer* is selected the changes will provided to all 4 axis.

Text Font: The font for the axis label.

Text Offset: The distance between text label and frame.

Number Font: The font for the axis numbers.

Text Offset: The distance between numbers and frame.

Text, **Numbers**: Enables or disables axis text and numbers. The color field defines the color for axis text and numbers.

Zero Line: If this option is check a line at the value zero in the given color will be drawn.

Ticks: If checked major ticks will be drawn. The color field defines the color of the major ticks.

Length: Defines the length of the axis major ticks.

Width: Defines the width of the axis major ticks.

M.Ticks: If checked minor ticks will be drawn. The color field defines the color of the minor ticks.

Length: Defines the length of the axis minor ticks.

Width: Defines the width of the axis minor ticks.

Tick Style: Allows to control on which side of the frame the ticks will be drawn.

Grid: If checked the major grid lines will be drawn.

Width: The width of the major grid lines.

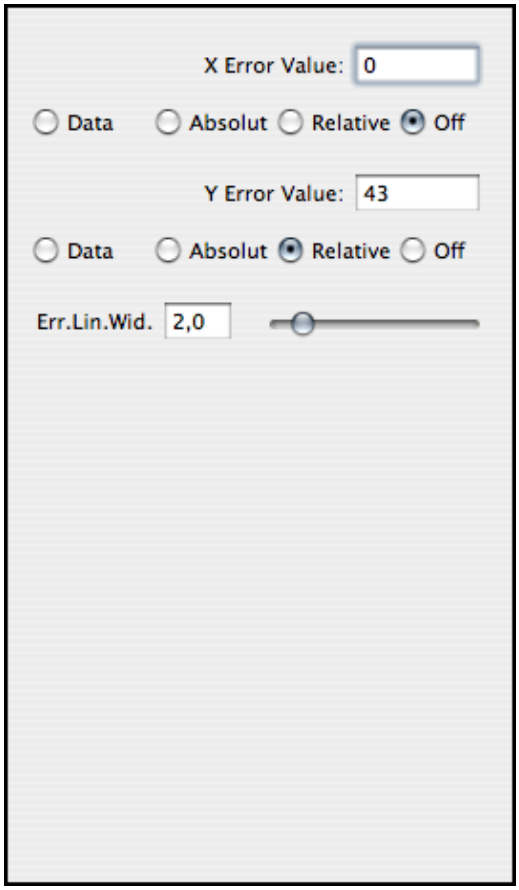
M.Grid: If checked the minor grid lines will be drawn.

Width: The width of the minor grid lines.

Grid: This color field defines the color of the minor grid lines.

Minor Grid: This color field defines the color of the minor grid lines.

Error Bars Inspector



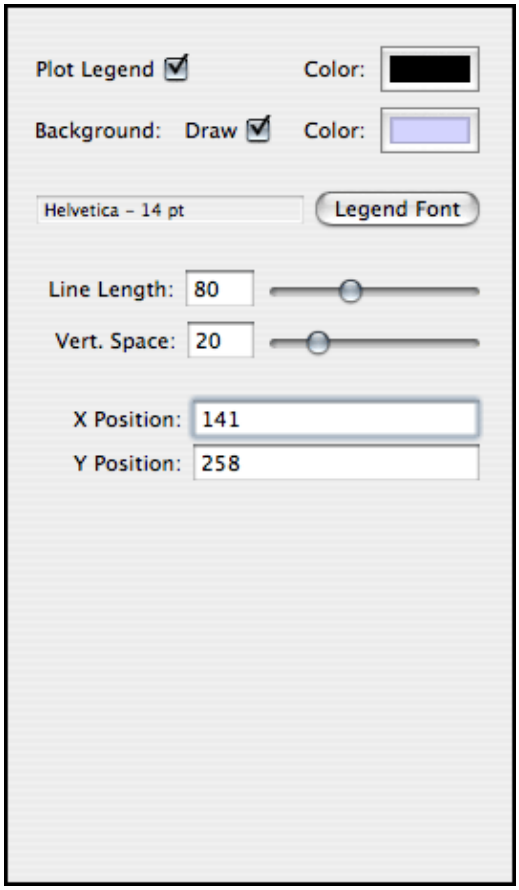
Error Bars Inspector

The *Error Bars Inspector* controls the error bars for your data points.

X Error Value, **Y Error Value**: Defines a value for errorbars. The radio button allows to switch between absolute, relative and individual data based error bars.

Err.Lin.Wid. Defines the linewidth for error bars.

Legend Inspector



Legend Inspector

The *Legend Inspector* sets the attributes for the automatically generated legend. Only buffers with a checked *L* column in the *Data Inspector* appears in the legend.

Plot Legend: Enables or disables the legend. The color field defines the color of the legend text.

Background: Enables or disables drawing of legend background. The color field defines the background color.

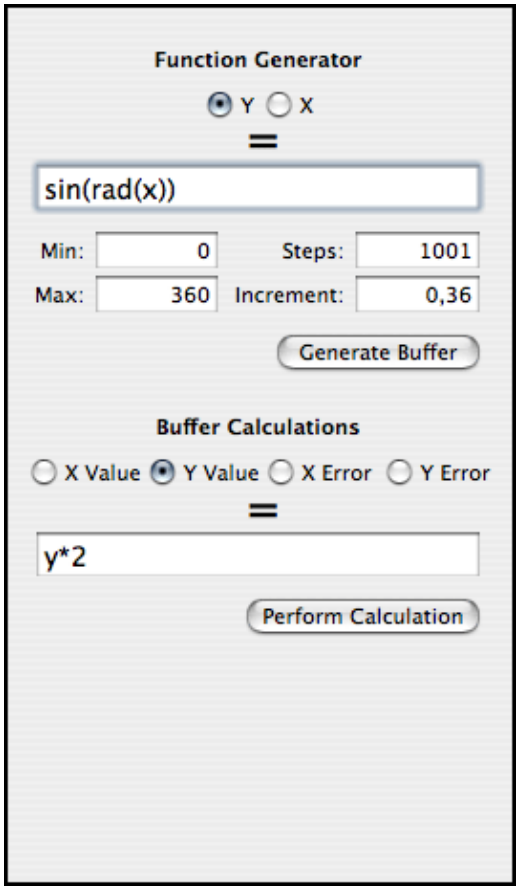
Legend Font: The font for the legend.

Line Length: The length of lines in the legend.

Vert. Space: The vertical space between two legend entries.

X Position, **Y Position**: The position of the legend. It is also possible to control the legend position with the mouse mode *Move Legend*.

Calculations Inspector



Calculations Inspector

This inspector contains the function generator and the calculator which allows buffer calculations.

Function Generator

As the name implies the *Function Generator* allows to generate function plots from arbitrary expressions.

X, **Y**: Select the target and enter the expression in the field below.

Min, **Max**: The range in which the expression should be calculated.

Steps, **Increment**: The number of steps which should be calculated. These two fields depends on each other; if you enter one the other one will be calculated automatically. The number of steps is limited to 1000000.

Generate Buffer: Runs the function generator and generate a new buffer.

Buffer Calculations

The *Buffer Calculation* function allows to perform an arbitrary calculation on all selected buffers.

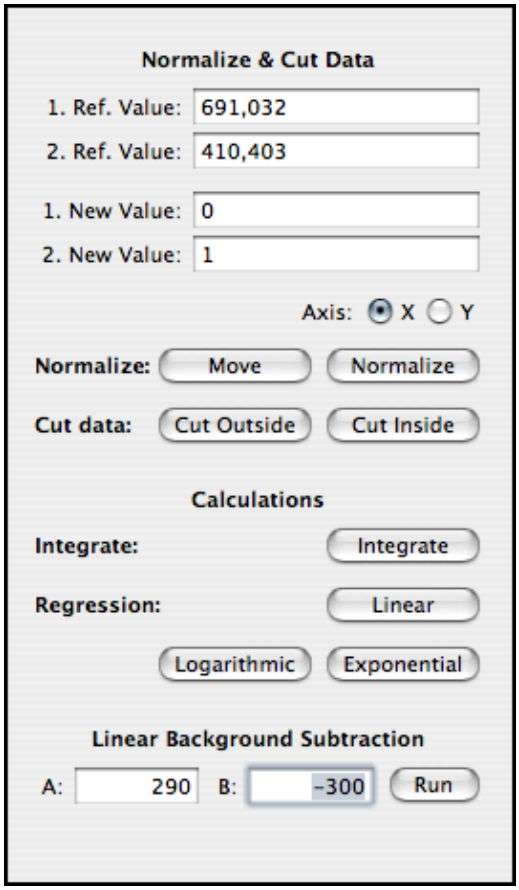
X Value, **Y Value**, **X Error**, **Y Error**: Select the target and enter the expression in the field below.

Perform Calculation: Execute the calculation.

Buffer Calculations allow the use of some special variables:

x	x value
y	y value
ex	x error value
ey	x error value
bn	buffer number
np	number of buffers
np	number of datapoints
dp	the current datapoint

Normalize Inspector



Normalize Inspector

With this inspector some manipulation of data like moving can be done.

Normalize Functions

1. Ref. Value, **2. Ref. Value**: Defines two values from either the x or the y axis. These values can also defined with the normalize mouse modes.

1. New Value, **2. New Value**: These values will only be used for the *Normalize* function.

Move: This function moves the selected buffers in the specified direction (selected with the *Axis* radio button) from the reference to the new value.

Normalize: This function manipulates the buffers by stretching or shrinking along the specified axis. The specified reference points in the data are changed in such a way that the first reference value becomes the first new value and the second reference value becomes the second new value.

Cut Outside: These function deletes all data points in all selected buffers which are not in the range between *1. Ref. Values* and 2. Ref. Value".

Cut Inside: These function deletes all data points in all selected buffers which are in the range between *1. Ref. Values* and 2. Ref. Value".

Calculations

Integrate: This function calculates the integral between X min (*1. Ref. Value*) and X max (*2. Ref Value*) and writes the result to the comment fields in the Data Inspector.

Regression: This function calculates the linear, logarithmic, or exponential regression between the X min (*1. Ref. Value*) and X max (*2. Ref. Value*) and generates a new buffer with the result. The following functions will be used:

Linear

$$A = \frac{\sum y - B * \sum x}{n}$$

$$B = \frac{n * \sum xy - \sum x - \sum y}{n * \sum x^2 - (\sum x)^2}$$

$$r = \frac{n * \sum xy - \sum x * \sum y}{\sqrt{\left(n * \sum x^2 - (\sum x)^2\right) * \left(n * \sum y^2 - (\sum y)^2\right)}}$$

$$y = A + Bx$$

Logarithmic

$$y = A + B * ln(x)$$

For A, B, and r replace x with ln(x) n the equations above.

Exponential

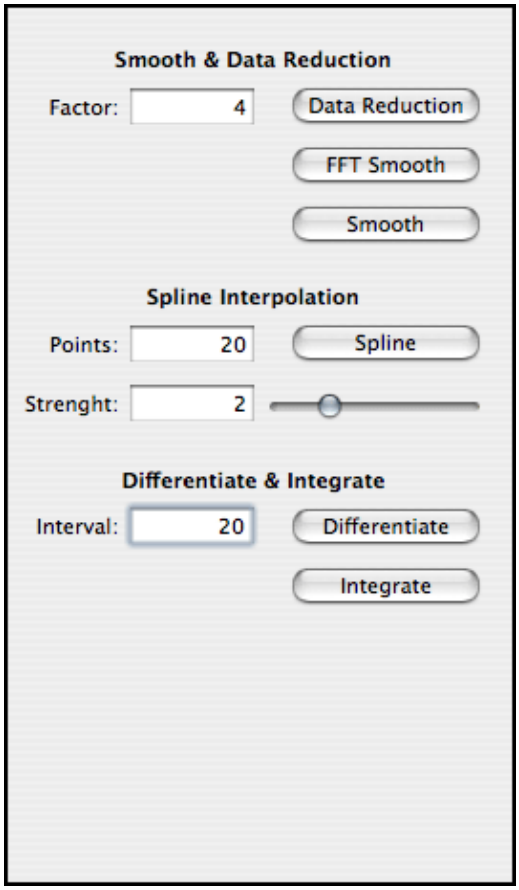
$$y = A * e^{Bx}$$

For A, B, and r replace y with ln(y) in the equations above.

Linear Background Subtraction

This function subtract a linear background from your data (y=y-a-bx). The reference values *a* and *b* can be set with the mouse mode *Linear Background*.

Fit Inspector



Fit Inspector

With this inspector some manipulation of data can be done.

Smooth & Datareduction

Data Reduction: Sometimes it is useful to reduce a large number of data points which consist mainly of noise to a more practical amount of points. This function takes *n* points (*n* is specified in the *Factor* field), builds the average, and replaces the *n* points with the new one.

FFT Smooth: This functions uses a effective smooth width the value from the *Factor* field and performs a FFT based smooth to reduce the noise on the buffer (see sources).

Smooth: This functions uses a effective smooth width the value from the *Factor* field and performs a least square smooth to reduce the noise on the buffer.

Spline Interpolation

This function calculates a nonparametric cubic spline interpolation (see sources) for all selected buffers.

Points: Defines the number of points which should be calculated for each interval.

Strength: Defines the *strength* of the interpolation. 2 is in most cases a god choice.

Differentiate & Integrate

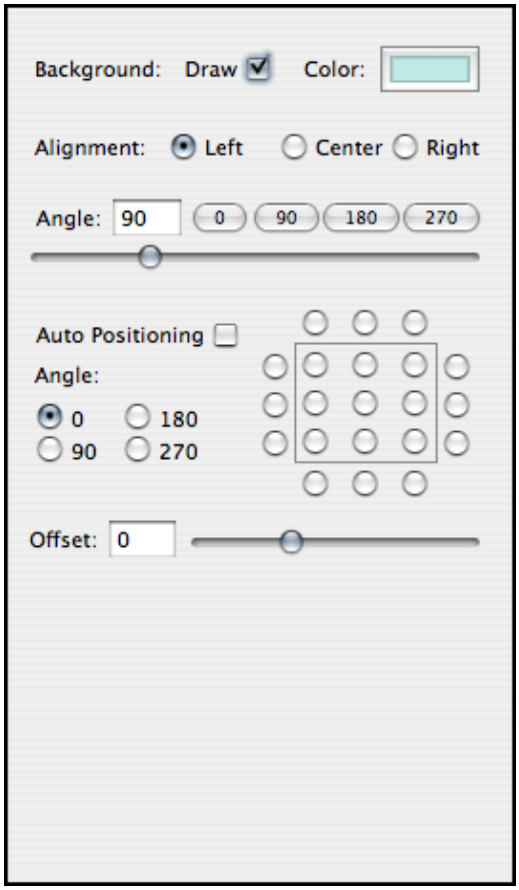
This function allow to differentiate and integrate buffers (see sources).

Differentiate: Differentiate all selected buffer and generate new buffers with the result data.

Interval: This the effective interval which will be used to calculate the differentiation.

Integrate: Integrates all selected buffer and generate new buffers with the result data. The integrate function does not need the interval.

Text Inspector



Text Inspector

This inspector controls the graphical attributes of text objects.

Background: Enables or disables background drawing for text objects.

Color: The color the the text backgrounds.

Alignment: Defines the text alignment of a text label.

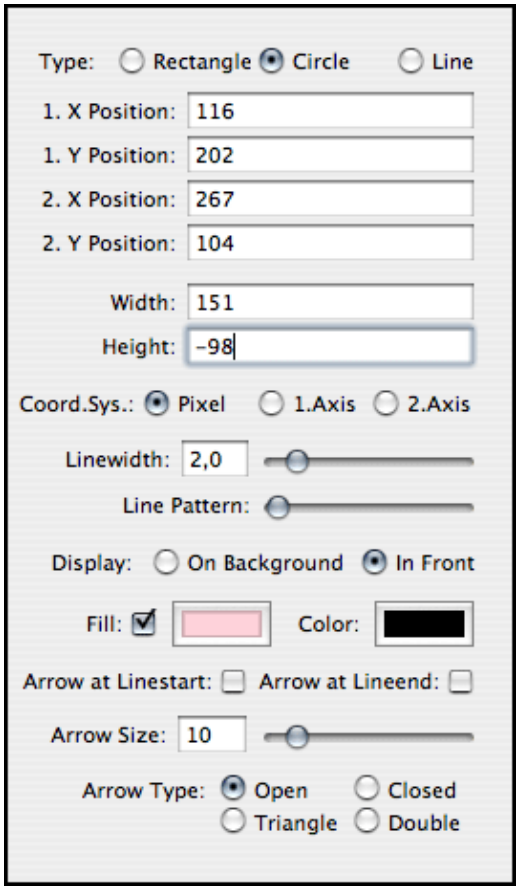
Angle: The angle of text objects. The four buttons allow easy selection of the usual angles.

Auto Positioning: This option allow to give a text a fixed position inside your plot. The button matrix on the right selects the position relative to the plot frame.

Auto Positioning Angle: The angle of auto positioning text objects.

Auto Positioning Offset: The offset between plot frame and auto positioning text.

Graphic Inspector



Graphic Inspector

This inspector controls the graphical attributes of graphic objects. Currently lines, arrows, rectangle, and circles are supported.

Type: Selects the graphic type.

Background: Enables or disables background drawing for rectangles and circles.

1. X, **1. Y**, **2. X**, **2. Y**: Position of the graphic object.

Width, **Height**: Size of the graphic object.

Pixel, 1.Axis, 2.Axis: Defines the coordinate system to which the graphic object belongs. This allows graphics with a fixed position in the window and also graphics which floats with the data.

Linewidth: Defines the width of lines.

Line Pattern: Defines the dash pattern for the line style. 16 pattern are available.

Display: Display the graphic object on the background or in front.

Fill: Enables filling of rectangles and circles. The color field defines the fill color.

Color: The line color of the graphic object.

Arrow at linestart, **Arrow at lineend**: Switch arrows on or off.

Arrow Size: The size of arrows.

Arrow Type: The style of the arrows.

Mouse Modes

The lower part of the *Inspector* allows to select different mouse modes. Mouse modes defines the behaviour of the mouse in your document.

Measure

The crosshair allow to measure points and the distance between two points. The result will be shown in the middle part of the *Inspector*. The values will be displayed for both axis and depending on the axis mode as time value or as number.
Keyboard shortcut: `m`

Zoom

Zooming, the plot will be rescaled to the selected rectangle.
Keyboard shortcut: `z`

Normalize X

With this mouse mode two reference values on the X axis can be selected. The values will be used by the Calculations Inspector.
Keyboard shortcut: `n`

Normalize Y

With this mouse mode two reference values on the Y axis can be selected. The values will be used by the Calculations Inspector.
Keyboard shortcut: `b`

Downscale

If you click with this mouse mode inside your plot the clicked point will be centered and the range of the plot will be increased.
Keyboard shortcut: `d`

Upscale

If you click with this mouse mode inside your plot the clicked point will be centered and the range of the plot will be lowered.
Keyboard shortcut: `u`

Range

This is for easy navigating through your data. Clicking and moving in the plot changes the range accordingly. If you have a mouse wheel you can also zoom in and out. If your hold the option keys while zooming only the X axis changes. Holding the command key does the same for the Y axis. Keyboard shortcut: `r`

Select Tool

This mouse mode allows different manipulations on your plot. You can resize the frame of your plot; move and edit texts; select data points which will then highlighted in the data view; change the current working buffer; and select axis. After selection the appropriate inspector appears.
Keyboard shortcut: `s`

Move Y

This mouse mode allows moving of data from all selected buffers in Y direction. This operation changes the data itself and not just the range of the plot.
Keyboard shortcut: `y`

Move X

This mouse mode allows moving of data from all selected buffers in X direction. This operation changes the data itself and not just the range of the plot.
Keyboard shortcut: `x`

Move XY

This mouse mode allows moving of data from all selected buffers in X and Y direction. This operation

changes the data itself and not just the range of the plot.
Keyboard shortcut: q

Move Points

With this mouse mode you can select and move a single data point. This operation changes the data itself and not just the range of the plot.
Keyboard shortcut: p

Linear Background

Allows to define the reference values for linear background subtraction with the mouse.
Keyboard shortcut: w

Legend Moving

With this mouse mode the automatically generated legend can be moved.
Keyboard shortcut: l

Graphic

With this mouse mode graphic objects can be created, sized and moved.
Keyboard shortcut: g

Text

This mouse mode allows to add and edit texts in your plot.
Keyboard shortcut: t

Subview

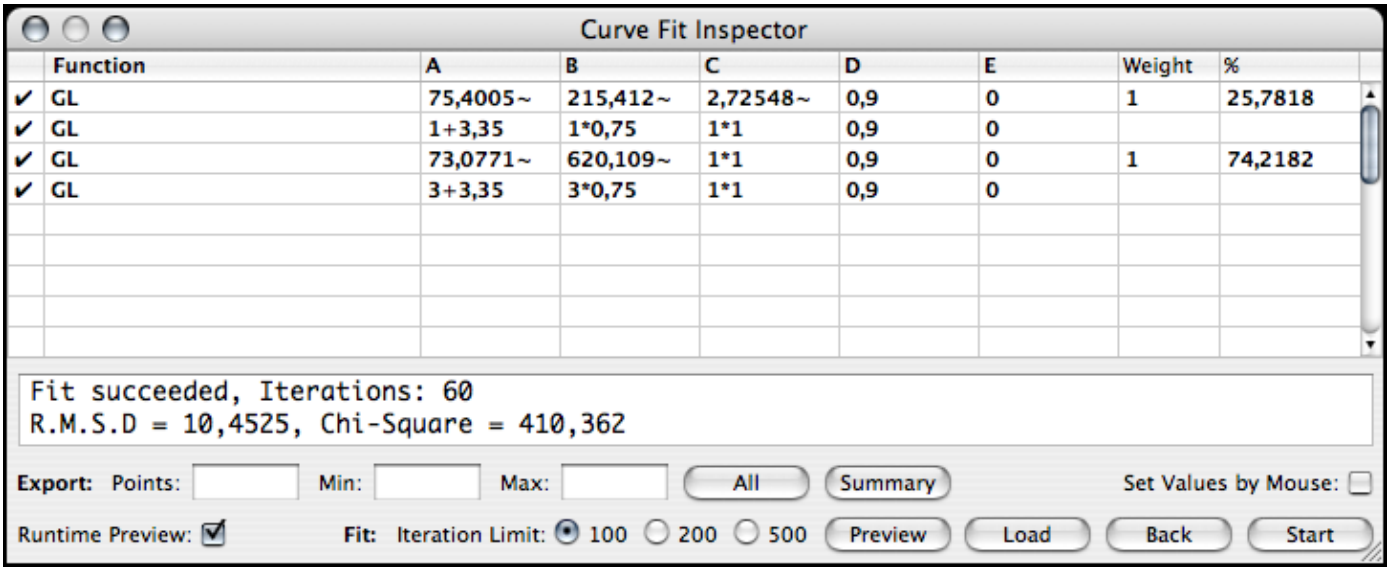
With this mouse mode new empty subview can be generated.
Keyboard shortcut: h

Change Subview

This mouse mode allow to change the size and position of a subview.
Keyboard shortcut: `j`

Curve Fit Inspector

This function allows you to fit data with some predefined functions or free defined functions. Fits are possible with up to 24 functions each with up to 5 free parameters (see sources).



Curve Fit Inspector

The Function Fit Inspector consists of a few controls and a table for the function and fit parameter definition.

Active functions are displayed with a check mark in the first column. Double clicking the first column lets you select / unselect the functions.

Function: In this column you have to define the function you want to fit (see below).

A, **B**, **C**, **D**, **E**: This are the free parameters for the fit function.

Weight: The weight of a function for the integration routine (only needed/used for the special functions).

%: The result of the integration will be displayed in this column (only calculated for the special functions).

Start: Starts the fit for the current working buffer.

Preview: Displays all the fit functions and the summary curve in the current document.

Back: Every time you start a fit the state will be saved in a history buffer. With this button you can go back trough the fit steps.

Load: Loads fit data from another document.

All: Exports all the fit functions and the summary curve as new buffer to your document.

Summary: Exports the summary curve as new buffer to your document.

Points, **Min**, **Max**: Defines the range and the number of points for curve export. If this fields are empty for each point in the current working buffer a new value will be calculated.

Iteration Limit: Defines a cycle limit after which it is possible to stop the fit.

Runtime Preview: If this button is checked a preview will be displayed after each fit cycle.

Set Values by Mouse: If this button is checked the values from the mouse mode *Measure* will be sent to the currently selected line in the parameter table (A = X position and B = Y position). After this the next line in the parameter table will selected automatically.

Fit result

The text field in the middle of the inspector show the status and the result of the fit. The first line displays the fit state and the second the fit result:

R.M.S.D: Root Mean Square Deviation of the last cycle:

$$R.M.S.D = \sqrt{\frac{\sum_{i=1}^{n} \left[y_i - y(x_i)\right]^2}{n}}$$

Chi-Square:

$$\chi^2 = \sum_{i=1}^{n} \left(\frac{y_i - y(x_i)}{\sigma_i} \right)$$

 is the error of your data. If your data set doesn't contain error values *Plot* makes a statistically approximation of the standard deviation.

Function definition

In the *Function* column you can enter normal mathematical expression as functions for fit (There are some special functions, see below).

Available variables:

x	x value
A	A parameter
B	B parameter
C	C parameter
D	D parameter
E	E parameter

Example: (x+A)^2+B

For the 5 fit parameter (A,B,C,D,E) the following syntax is possible

<value>	a fixed value
<value>~	a value which should be fitted

<value>~<dvalue>	a value which should be fitted in the range from *value-dvalue* to *value+dvalue*
<row>[+,-,*,/]<rel>	Sets value to the entry of same column in a previous row, plus/minus/times/divided by rel.

Examples: 284 1234~ 10.7~0.2 1-2.3 5*0.12

Special Functions

The fit function supports some special functions. These functions are easy to use and a little bit faster than free defined functions. The special functions can not be used together with other expressions in one row.

GL (Gauss-Lorentz mix curve)

$$l = \frac{l_0 * y^2}{y^2 + 4(1-M)(x-x_0)} * e^{-4\frac{M(x-x_0)^2}{y^2}}$$

A = position (X0)
B = height (I0)
C = width (, FWHM)
D = Gauss-Lorentz ratio (M ,1.0=pure Gauss, 0.0 = pure Lorentz)
E = unused

DS (Doniach-Sunjic curve)

$$l = \frac{l_0(1-n\alpha) * \Gamma(1-\alpha)}{\left(\left(\frac{2(x-x_0)}{y} + k * cot(\frac{\pi}{2-\alpha})\right)^2 + 1\right)^{\frac{1-\alpha}{2}}} * cos(\chi)$$

$$\chi = \frac{\pi\alpha}{2} + (1-\alpha)atan\left(\frac{2k}{\gamma}(x-x_0) + cot\left(\frac{\pi}{2-\alpha}\right)\right)$$

n=0.588468, k=1 (right skew) or -1 (left skew)

A = position (X0)
B = height (I0)
C = width (, Lorentzian FWHM)
D = Anderson's exponent (, -0.5 ... 0.5)
E = unused

ET (Gauss-Lorentz mix curve with exponential Tail)

$$l_e = l + (l_0 - l)e^{\frac{0.1|x-x_0|}{\alpha}}$$

A = position (X0)
B = height (I0)
C = width (, Lorentzian FWHM)
D = Gauss-Lorentz ratio (M ,1.0=pure Gauss, 0.0 = pure Lorentz)

E = tail exponent factor (, -infinity - +infinity)

The numerical Gauss convolution of the following two functions (Lorentz and Doniach-Sunjic, F(x,Y0, x0, ? [,?])) in the interval x1 to xn in steps of dx is performed with the following formula:

$$i = 1...integer\left(\frac{x_N - x_1}{d_x} + 1\right)$$

$$l_i = Q_{y_0} d_x \sum_{j=-m}^{m} \left(F(x_1 + \Delta_{x_0} + d_x(i+j))e^{-\frac{j^2 d_x^2}{G^2}}\right)$$

$$m = integer\left(\frac{2G}{d_x}\right)$$

G is the FWHM of the convoluting Gauss function; Y0, x0,? [,?] are the parameters of the function to be convoluted, as in the earlier expressions for Lorentz and Doniach-Sunjic functions. The normalizing factor QY0 and shift dx0 are defined as QY0=y0 / y'0 and dx0=x'0 - x0, where y'0 and x'0 are the amplitude and position of the maximum of the not normalized convoluted function.

GL* (Gauss convoluted Lorentz curve)

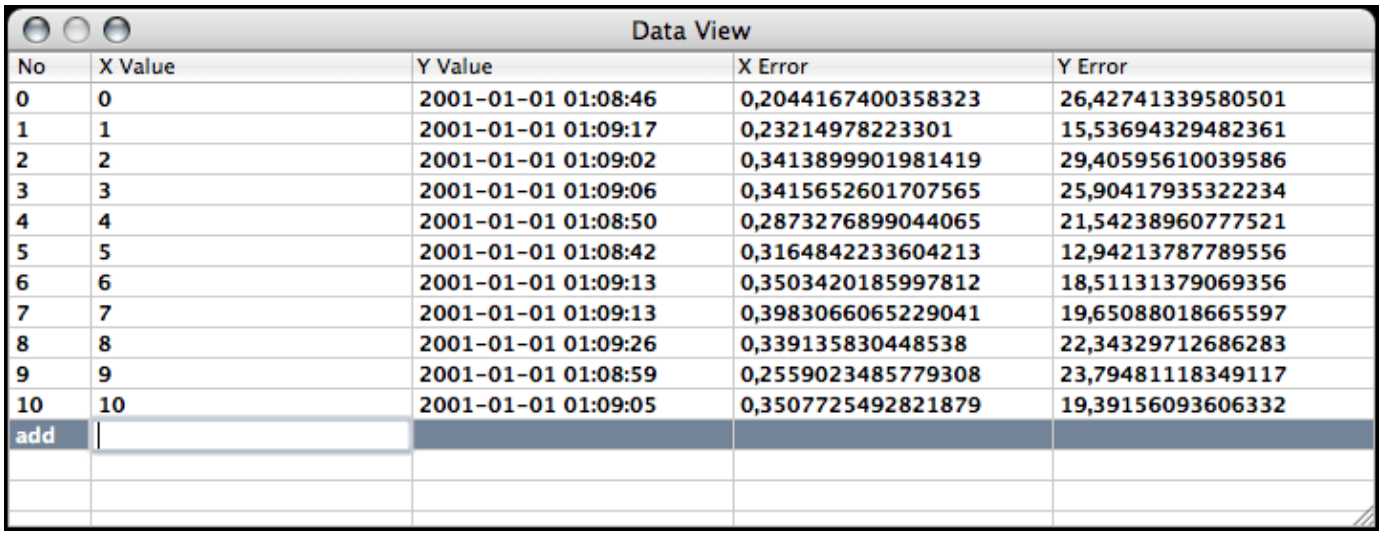
A = position
B = height
C = width (FWHM)
D = Gauss-Lorentz ratio (must be set to 0.0)
E = Gauss FWHM (0 - +infinity)

DS* (Gauss convoluted Doniach-Sunjic curve)

A = position
B = height
C = width (Lorentzian FWHM)
D = Anderson's exponent (-0.5 ... 0.5)
E = Gauss FWHM (0 - +infinity)

DataView

The *Data View* is a spreadsheet like editor for your data. It show the data of the working buffer.



No	X Value	Y Value	X Error	Y Error
0	0	2001-01-01 01:08:46	0,2044167400358323	26,42741339580501
1	1	2001-01-01 01:09:17	0,23214978223301	15,53694329482361
2	2	2001-01-01 01:09:02	0,3413899901981419	29,40595610039586
3	3	2001-01-01 01:09:06	0,3415652601707565	25,90417935322234
4	4	2001-01-01 01:08:50	0,2873276899044065	21,54238960777521
5	5	2001-01-01 01:08:42	0,3164842233604213	12,94213787789556
6	6	2001-01-01 01:09:13	0,3503420185997812	18,51131379069356
7	7	2001-01-01 01:09:13	0,3983066065229041	19,65088018665597
8	8	2001-01-01 01:09:26	0,339135830448538	22,34329712686283
9	9	2001-01-01 01:08:59	0,2559023485779308	23,79481118349117
10	10	2001-01-01 01:09:05	0,3507725492821879	19,39156093606332
add				

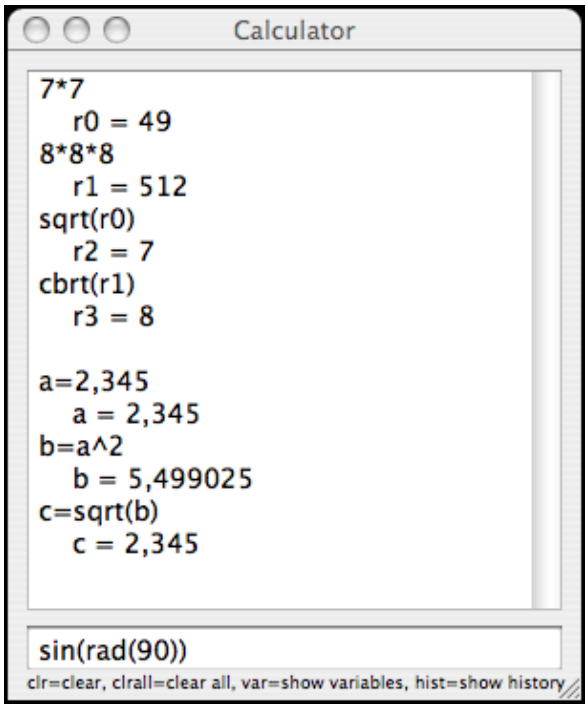
Data View

Double clicking on the *X Value* or *Y Value* column header switches the display format between number and time values.

The *X Error* and *Y Error* column stores individual error values for each data point.

If you select points in the *Data View* the points will be highlighted in your document.

Calculator



Calculator

This is a simple builtin calculator for instant calculations. The *Calculator* supports the common math expressions of *Plot*. Just enter your calculation in the lower text field and hit return to get the result in the upper textfield. The result of every calculation is stored in a variable (*r0* ... *r<n>*). These variables can be used in later calculation and also in all other functions where *Plot* allow expressions (e.g. in the function generator).

There are three special commands in the calculator:

clr	reset the calculator and deletes all variables and the history.
clrall	reset the calculator and deletes all variables, user variables and the history.
vars	show a list of available variables
hist	show the calculator history

It is also possible to define user specific variables. Just enter:

<name>=<value>

User variables can also be used in all other functions where *Plot* allow expressions.

Expressions

Plot functions which allow entering of mathematical expressions supports the following functions:

+, -, *, /	arithmetic operations
%, mod	modulo
( )	grouping
^, **	power
rad(x), deg(x)	conversion between radians and degrees
sin(x),cos(x),tan(x)	trigonometric functions
asin(x),acos(x),atan(x)	inverse trigonometric functions
sinh(x),cosh(x),tanh(x)	hyperbolic functions
rnd(h)	random number (h = height)
ln(x),log(x)	natural and logarithm to base 10
sqrt(x)	square root
cbrt(x)	cubic root
frac(x)	returns the fraction of x
int(x)	returns the integer of x
round(x;n)	round up and down to the nth place on the right of the decimal point
gau(x;x0;a;w)	Gauss (x0 = position, a = amplitude, w = width)
lor(x;x0;a;w)	Lorentz (x0 = position, a = amplitude, w = width)
galo(x;x0;a;w;r)	Gauss-Lorentz (x0 = position, a = amplitude, w = width, r =Gauss-Lorentz ratio (1.0=pure Gauss,0.0 = pure Lorentz))
tail(x;x0;a;w;r;t)	Gauss-Lorentz with exponential Tail (x0 = position, a = amplitude, w = width, r = Gauss-Lorentz ratio(1.0=pure Gauss,0.0 = pure Lorentz)), t = tail exponent factor
j0(x), j1(x), jn(x,n)	bessel functions
y0(x), y1(x), yn(x,n)	bessel functions
pi	3.14159265359
e	2.71828182846
xval(b;i)	x value of point *i* in buffer *b*
yval(b;i)	y value of point *i* in buffer *b*
xerr(b;i)	x error value of point *i* in buffer *b*
yerr(b;i)	y error value of point *i* in buffer *b*
xmin(b)	minimum x value in buffer *b*
xmax(b)	maximum x value in buffer *b*
ymin(b)	minimum y value in buffer *b*
ymax(b)	maximum y value in buffer *b*
points(b)	number of points in buffer *b*
xpoint(v;a)	x screen coordinate of v (a can be 1 for the first or 2 for the second axis).
xvalue(v;a)	x value of the screen coordinate v (a can be 1 for the first or 2 for the second axis).
ypoint(v;a)	y screen coordinate of v (a can be 1 for the first or 2 for the second axis).
yvalue(v;a)	y value of the screen coordinate v (a can be 1 for the first or 2 for the second axis).
findx(v;b)	x value which depends to y in buffer b. If there are more than one it returns the first it found.

findy(v;b)	y value which depends to x in buffer b. If there are more than one it returns the first it found.

Time Format

Plot stores time data as the number of seconds relative to an absolute reference time: the first instant of 1 January, 2001, Greenwich Mean Time (GMT). Dates before then are stored as negative numbers; dates after then are stored as positive numbers.

To convert a UNIX time to a *Plot* time simply subtract 978307200.0 from the UNIX time.

Time format tokes

%a Abbreviated weekday name

%A Full weekday name

%b Abbreviated month name

%B Full month name

%c Shorthand for x", the locale format for date and time

%d Day of the month as a decimal number (01-31)

%e Same as %d but does not print the leading 0 for days 1 through 9 (unlike strftime(), does not print a leading space)

%F Milliseconds as a decimal number (000-999)

%H Hour based on a 24-hour clock as a decimal number (00-23)

%I Hour based on a 12-hour clock as a decimal number (01-12)

%j Day of the year as a decimal number (001-366)

%m Month as a decimal number (01-12)

%M Minute as a decimal number (00-59)

%p AM/PM designation for the locale

%S Second as a decimal number (00-59)

%w Weekday as a decimal number (0-6), where Sunday is 0

%x Date using the date representation for the locale, including the time zone (produces different results from strftime())

%X Time using the time representation for the locale (produces different results from strftime())

%y Year without century (00-99)

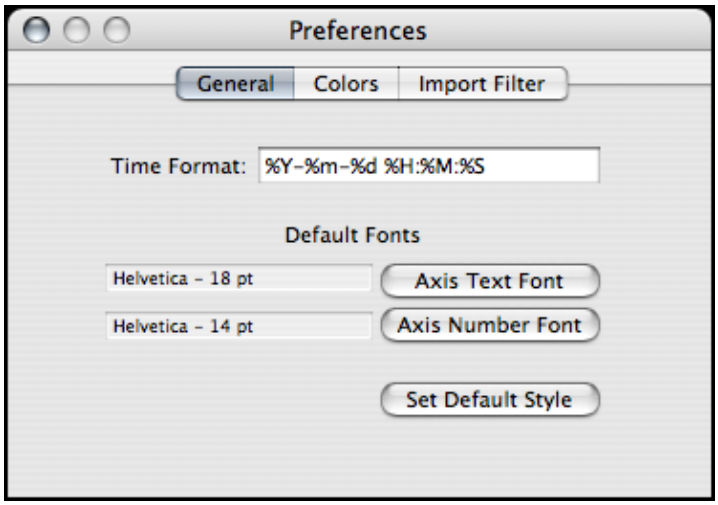
%Y Year with century (such as 1990)

%Z Time zone name (such as Pacific Daylight Time; produces different results from strftime())

%z Time zone offset in hours and minutes from GMT (HHMM)

Preferences

The *Preferences Panel* allow to change some global setting in *Plot*



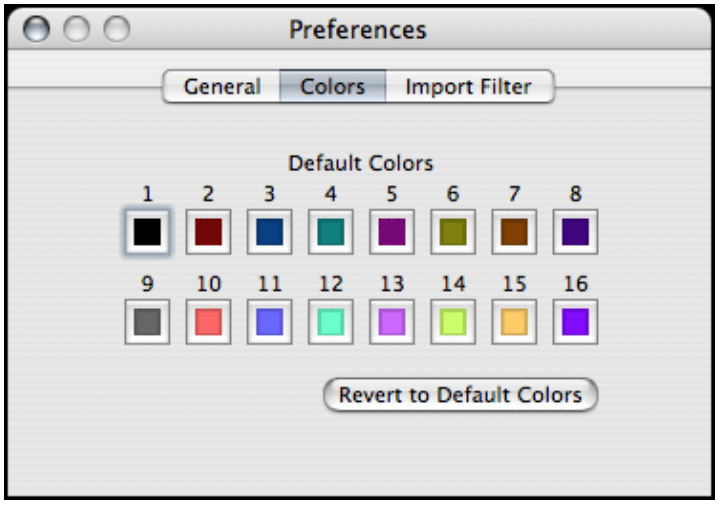
General

General

Time Format: Defines the format for time values used in *Plot*.

Default Font: Allow to define default fonts for axis labels and axis numbers.

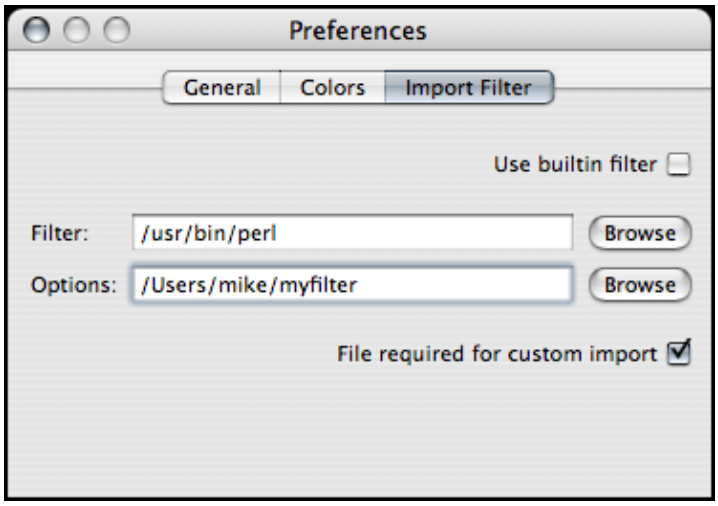
Set Default Style: If clicked the style of the current working buffer in the current document will be the default style for newly generated data buffers.



Colors

Colors

Here you can define the default colors used by *Plot*. It is also possible to restore the default colors.



Import Filter

Import Filter

Besides the builtin import filter for ASCII data you can use your own custom filter to import data.

Use builtin filter: Enables or disables the builtin import filter.

Filter: Defines the custom filter. This has to be an executable file.

Options: Defines additional option for the import filter.

File required for custom import filter: If enabled you will be asked for a file to import. If disabled your filter needs to know by itself where to find the data.

Information how to make an import filter can be found in the import filter section.

Menu Item

Apart from the usual Apple menu items *Plot* has some more which will be described here:

File Import
Using this item brings up a open panel in which you can select a file for ASCII import.

File Binary Import
Using this item brings up a open panel in which you can select a file for binary import.

File MySQL Import
This items brings up the *MySQl Import* dialog which allows direct data import from a MySQL database.

File MySQL Import
This items brings up the *MySQl Import* dialog which allows direct data import from a MySQL database.

File SciPlot Import
Allow to import data from old SciPlot files.

File New Empty Buffer
Generates a new empty buffer in the current document. You can fill it with data by using the *Data View*.

File Delete Subview
Deletes the currently selected subview.

File Load Layout
File Load Data
File Load Range
File Load Colors
File Load Fonts
These item allow partial load of *Plot* files. This is handy to give different documents the same graphical attributes.

File Save As PDF
File Save As EPS
File Save As PNG
File Save As JPG
Saves your document in one of the given formats as graphic file.

File Export ASCII
This exports all selected buffers of the current document as ASCII data. A new file for every buffer will be generated with the given name and the appended buffer number.

View Inspector
Brings up the Inspector

View Data View
Brings up the Data View

View Data Inspector
Brings up the Data Inspector

View Curve Fit Inspector
Brings up the Curve Fit Inspector

View Macro Inspector
Brings up the Macro Inspector

View Calculator
Brings up the Calculator

Import Filter

Import

General the import filter accepts file with UNIX, Mac and Windows line end characters. Each line should contain at least one number. Numbers in the line will be separated by any character which could not be part of a number.

The import dialog allows to select between two modes of importing ASCII data.

Multicolumn: The builtin import filter expects an ASCII file with one or more columns.
If your file has only one column the values will be treated as Y values, the X value will be generated as sequence number.
If you have more than one column the first will be treated as X value and every other column as Y value.

Error Values: This mode expects up to 4 columns of data. The 1. and 2. will be treated as X and Y values. The 3. and 4. as X error values and Y error values. If only three column are available the 3. will used as Y error values.

Custom Import Filter

For using a custom filter you need to know what *Plot* expects from the filter. Right now this is really easy to implement.

Plot calls the filter with some arguments where the last is always the filename.

If you want to use a perl script to import some data your have to set the *Filter* field in the preferences panel with `/usr/bin/perl` and in the *Options* field with the path to your script (e.g. `/Users/mike/myscript`)). *Plot* will now run the following command line to call the filter:

```
/usr/bin/perl /Users/mike/myscript <file>
```

Now your script has to parse the file and write to standard output a stream the *Plot* understands. The stream *Plot* expects is just a sequence of numbers seperated by colons (**:**). The first number in the sequence must be the number of columns in your data set.

e.g. if you want to import this date:

```
1 1
2 4
3 9
4 16
```

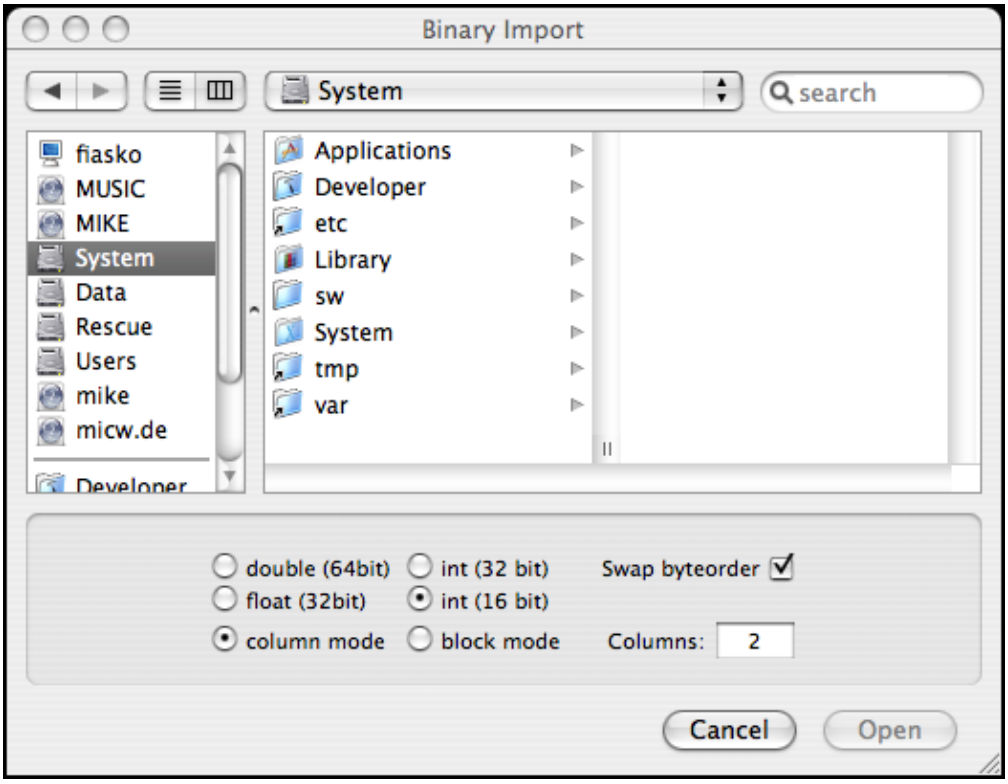
your script have to write this data stream:

```
2:1:1:2:4:3:9:4:16
```

You have to provide at least 2 columns of data.

Binary Import Filter

Plot allows importing of binary data. This can be done by selecting *Binary Import* from the *File* menu. In the open panel you have to select your binary file and to provide some extra informations.



Binary Import Panel

Data type: Specifies the type of date in your file. Valid type are double (64 bit), float (32 bit), integer (23 bit) or integer (16 bit).

Import mode: Defines how the data are ordered in you file. *Column mode* expects data ordered in columns and *Block mode* expects a block for each column.

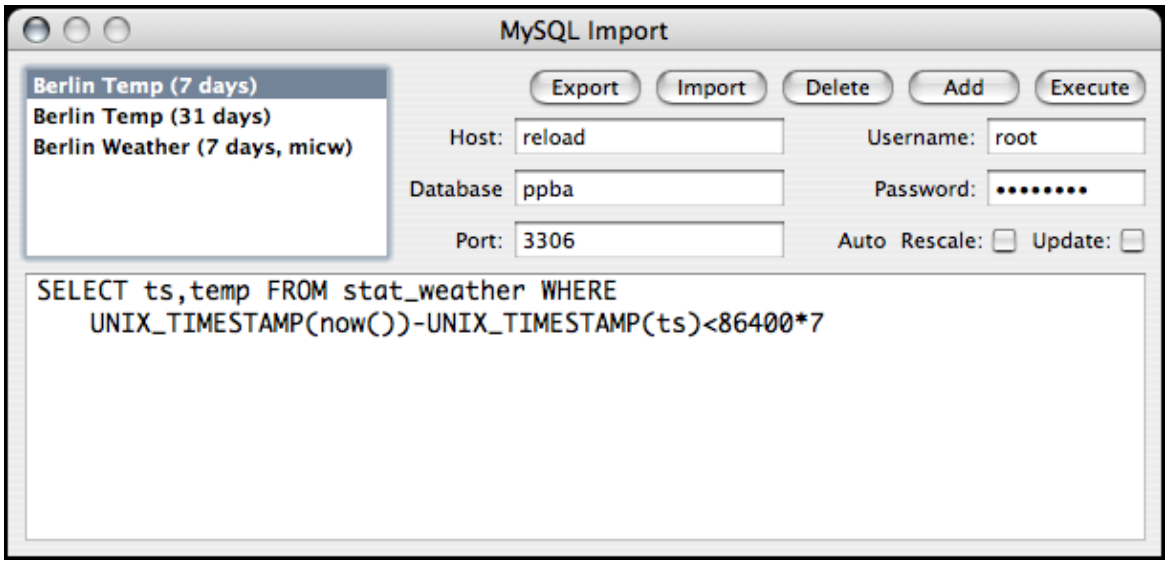
Swap byteorder: Allows to swap data which are generated on a platform with different byte order.

Columns: The number of columns in your file (has to be at least 1). If your file has only one column the values will be treated as Y values, the X value will be generated as sequence number. If you have more than one column the first will be treated as X value and every other column as Y value.

MySQL Import

This function allow directly to import data from your MySQL database. In the upper field of the panel you have to define the database parameters. The list on the left contains a list of all your MySQL queries. In the lower part you can enter an SQL query; typically in the form:

```
SELECT <x column>,<y column> FROM <table> WHERE ...
```



MySQL Import Panel

Import, **Export**: Allows to import or export the whole query set and store it in a file for later use.

Delete: Delete the selected MySQL query.

Add: Add a new empty MySQL query.

Execute: Performs the MySQL query a generate buffers as needed.

Host: The host where your database resides.

Database: The database name.

Port: The TCP port of your database (usually 3306).

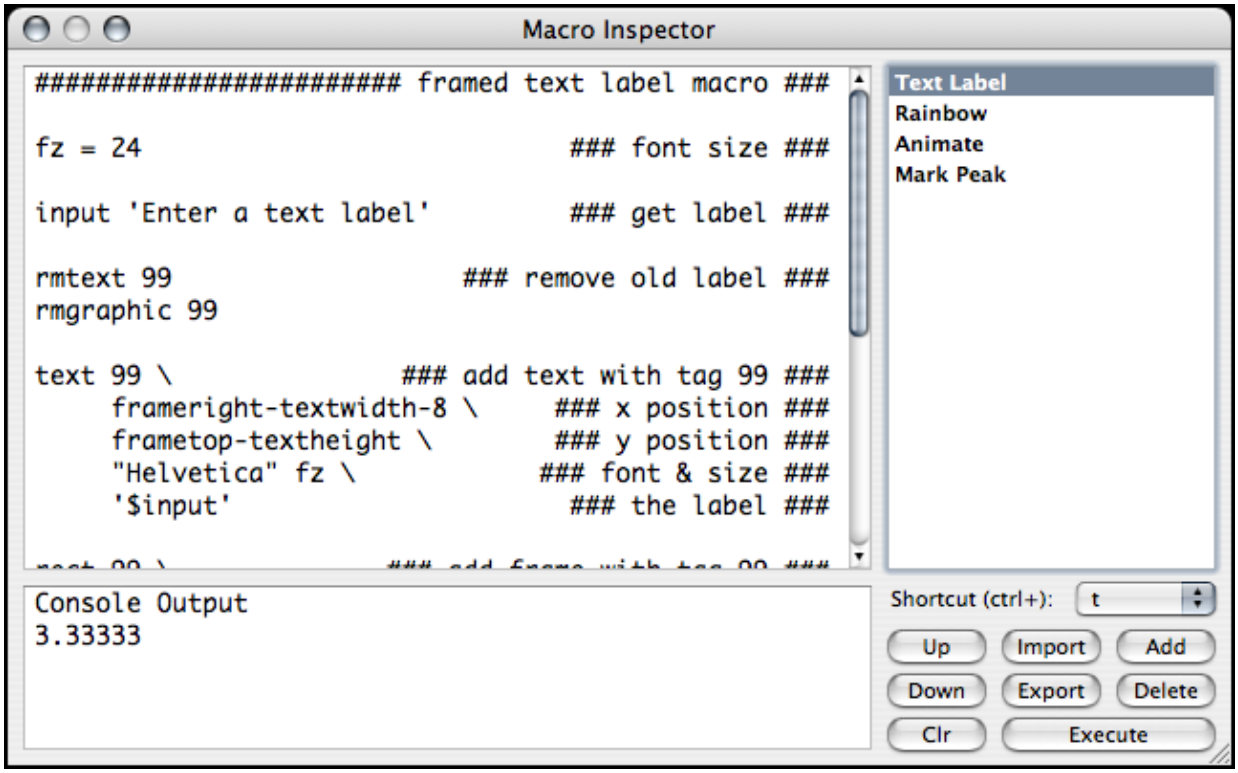
Username, **Password**: MySQL login informations.

Auto Update: If checked the data will automatically updated e.g. if you open the document.

Auto Rescale: If checked your document will be rescaled after an data update.

Macro Inspector

Plot has a build in macro language which allows to automate complex task which can be called with a single shortcut in your document.



Macro Inspector

The big text field contain the macro itself. The small text field is the output console where messages or debug info can be printed. The list on the right contains a list of all your macros. You can create an unlimited number of macros but only 26 keyboard shortcuts for macros.

Up, **Down**: Moves the selected macro in the list up or down.

Import, **Export**: Allows to import or export the whole macro set and store it in a file for later use.

Add: Create a new empty macro.

Delete: Delete the currently selected macro.

Clr: This clears the console output.

Execute: Executes the macro on the current document.

Macro Language

Introduction

There are ~ 140 commands available in the *Plot* macro language. Most of the commands needs one or more argument. Simply enter the command followed by the arguments separated by spaces. If an argument contains spaces you have to quote the argument with `'` or `"`. Comment can be escaped with `#`. For example a command may look like this:

```
atext 1 'Axis Text'
```

This commnads set tha axis text for axis `1` (the first X axis).

Command Reference

Variables

During macro execution several variables will be available. String variable starts with a `$`.

`$date`	the current date
`$document`	the filename of the current document
`dx1`	the distance between the last two measures with the mouse (1. X axis)
`dx2`	the distance between the last two measures with the mouse (2. X axis)
`dy1`	the distance between the last two measures with the mouse (1. Y axis)
`dy2`	the distance between the last two measures with the mouse (2. Y axis)
`$file`	the filename from the `browse` command
`framebottom`	the position of bottom frame line
`frameleft`	the position of left frame line
`frameright`	the position of right frame line
`frametop`	the position of top frame line
`framewidth`	the width of the frame
`$home`	the users home directory
`input`	the result of the last input command
`$input`	the result of the last input command as string
`l`	the run variable for loops

`lastbuffer`	the number of the last buffer generated with one of the calculation commands
`marginbottom`	the bottom margin
`marginleft`	the left margin
`marginright`	the right margin
`margintop`	the top marginb
`nb`	number of data buffer in the document
`option`	the result of the `askoption` command
`ref1`	the 1. reference value
`ref2`	the 2. reference value
`linbga`, `linbgb`	the reference values for linear background subtraction
`rega`, `regb`, `regr`	the result of the last regresion
`textheight`	the height of the last added text
`textwidth`	the width of the last added text
`$time`	the current time
`$user`	the users name
`windowheight`	the window height
`windowwidth`	the window width
`xpos1`	the last result of the measure with the mouse (1. X axis)
`xpos2`	the last result of the measure with the mouse (2. X axis)
`ypos1`	the last result of the measure with the mouse (1. Y axis)
`ypos2`	the last result of the measure with the mouse (2. Y axis)
`xmin1`	min value of the first (bottom)X axis
`xmax1`	max value of the first (bottom) X axis
`ymin1`	min value of the first (left) Y axis
`ymax1`	max value of the first (left) Y axis
`xmin2`	min value of the second (top) X axis
`xmax2`	max value of the second (top) X axis
`ymin2`	min value of the second (right) Y axis
`ymax2`	max value of the second (right) Y axis

Arguments

In the command descriptions on the following pages optional argument are written with surrounded square brackets (`[argument]`) and required arguments with angle brackets (`<argument>`).

There are also some special arguments:

`<BUFFER>`

a list of one or more data buffers. Possible values are:

`all`	all buffers in the document
`selected`	selected buffers in the document
`unselected`	unselected buffers in the document

`visible`	visible buffers in the document
`hidden`	hidden buffers in the document
`none`	no buffer
`b1,b2,b3,...,bn`	a list of buffers where the arguments may be math expressions.
`bs..be`	buffers from *bs* to *be*

`<AXIS>`

a definition for the four axis. Possible values are:

`all`	all four axis
`x`	both X axis
`y`	both Y axis
`1`	first X axis
`2`	first Y axis
`3`	second X axis
`4`	second Y axis

`<AXISGROUP>`

the coordinate system:

`0`	both axis
`1`	first axis (left and bottom)
`2`	second axis (right and top)

`<COOR>`

the coordinate system:

`0`	screen coordinates
`1`	first axis (left and bottom)
`2`	second axis (right and top)

`<RANGE>`

a list of numbers (e.g. used for the `loop` command):

`n`	defines a range from 0 to *n*
`from:to:step`	defines a range where the arguments may be math expressions.
`b1,b2,b3,...,bn`	a list of numbers where the arguments may be math expressions.
`bs..be`	numbers from *bs* to *be*

Macro Language: Range Commands

`range <AXIS> <min> <max>`

Sets the axis min and max.

`rescale [AXISGROUP]`

Rescales the plot so that every datapoint is just visible.

`upscale <AXISGROUP> [factor]`

Lowers the range of the plot by the given factor (default=10).

`downscale < AXISGROUP > [factor]`

Increase the range of the plot by the given factor (default=10).

Macro Language: Buffer Commands

`select <BUFFER>`

Select buffers in the Data Inspector.

`invertselections`

Inverts the selection in the Data Inspector.

`hide <BUFFER>`

Hide buffers.

`show <BUFFER>`

Show buffers.

`delete <BUFFER>`

Delete buffers.

`duplicate <BUFFER>`

Duplicate buffers.

`setcomment <BUFFER> <text>`

set comment field of buffers.

`setsource <BUFFER> <text>`

set source field of buffers.

`setcomment <BUFFER> <text>`

add text to the comment field of buffers.

`addsource <BUFFER> <text>`

add text to the source field of buffers.

`belongx <BUFFER> <axis>`

defines if the buffers belongs to the first (bottom) or the second (top) X axis (possible values: 1, 2).

`belongy <BUFFER> <axis>`

defines if the buffers belongs to the first (left) or the second (right) Y axis (possible values: 1, 2).

Macro Language: Control Commands

```
if <expr> <operator> <expr>
else
endif
```

Executes the commands between `if ...` and `else` if the condition is true. If the condition is false it executes the commands between `else` and `endif`. Possible operators are ==, !=, >, <, >=, <= for numerical comparison and `eq`, `ne` for string comparison. It is not possible to define if,else,endif statements inside another if,else,endif statements.

```
loop <RANGE>
```

Starts a loop for the given range. The running variable for the loop command is `l`. It is not possible to define loop inside another loop.

```
bufferloop <BUFFER>
```

Starts a loop for the given buffer numbers. The running variable for the loop command is `l`. It is not possible to define loop inside another loop.

```
endloop
```

The endpoint of a `loop` or `bufferloop`.

Macro Language: Interactive Commands

`ask <text>`

This command stops the macro, shows an alert box, displays the `text`, and let you choose to stop or continue the macro.

`askoption <text> <button1> <button0>`

This command stops the macro, shows an alert box, displays the `text`, and provide two buttons. The result will be stored in the variable `option` (1=`button1` clicked, 0=`button0` clicked)

`browse`

Opens a panel for file selection. The selected file will be stored in `$file`

`input`

This command brings up an input panel an let you enter a value. The value will be stored in variables `input` and `$input`.

`plot`

Normally your document will be updated at the end of the macro execution. This command allow updates the document when called.

`print <argument> ...`

Print messages to the console window. Argument will be treated as expression or string.

`sleep <seconds>`

Stops the macro execution for the given time in seconds.

Macro Language: Calculation Commands

`fg <axis> <min> <max> <steps> <expr>`

Generate a function with the given parameters.

`<axis>`: The target axis (1=X axis, 2=Y axis)

`<min>`, `<max>`: The range for the new generated function.

`<steps>`: Number of steps for the the function.

`<expr>`: Expression which defines the function.

`calc <data> <expr> <BUFFER>`

Performs a calculation on the data in data buffers.

`<data>`: The target axis (1=X values, 2=Y values, 3=X error, 4=Y error)

`<expr>`: Expression which defines the calculation.

`normx <ref1> <ref2> <new1> <new2> <BUFFER>`

This function manipulates the buffers by stretching or shrinking along the X axis. The specified reference points in the data are changed in such a way that the first reference value becomes the first new value and the second reference value becomes the second new value.

`normy <ref1> <ref2> <new1> <new2> <BUFFER>`

This function manipulates the buffers by stretching or shrinking along the Y axis. The specified reference points in the data are changed in such a way that the first reference value becomes the first new value and the second reference value becomes the second new value.

`movex <from> <to> <BUFFER>`

This function moves the buffers on the X axis.

`movey <from> <to> <BUFFER>`

This function moves the buffers on the Y axis.

`cutoutsidex <min> <max> <BUFFER>`

These function deletes all data points in the buffers which are not in the X range between `min` and `max`

`cutinsidex <min> <max> <BUFFER>`

These function deletes all data points in the buffers which are in the X range between `min` and `max`

`calcint <min> <max> <BUFFER>`

Integrates the buffers and add the result to the comment field. The result of the last integration is stored in the variable `integral`.

`linreg <min> <max> <BUFFER>`

Perform a linear regression between `min` and `max`. The result of the last regression will be stored in the variables `rega`, `regb` and `regr`.

`logreg <min> <max> <BUFFER>`

Perform a logarithmic regression between `min` and `max`. The result of the last regression will be stored in the variables `rega`, `regb` and `regr`.

`expreg <min> <max> <BUFFER>`

Perform a exponential regression between `min` and `max`. The result of the last regression will be stored in the variables `rega`, `regb` and `regr`.

`linbg <a> <b> <BUFFER>`

Perform a linear background subtraction (y=y+a+bx)

`smooth <factor> <BUFFER>`

This functions uses the effective smooth width `factor` and performs a least square smooth to reduce the noise on the buffer.

`fftsmooth <factor> <BUFFER>`

This functions uses the effective smooth width `factor` and performs a FFT based smooth to reduce the noise on the buffer (see sources).

`datareduction <n> <BUFFER>`

Sometimes it is useful to reduce a large number of data points which consist mainly of noise to a more practical amount of points. This function takes `n` points, builds the average, and replaces the `n` points with the new one.

`spline <points> <strength> <BUFFER>`

This function calculates a nonparametric cubic spline interpolation (see sources).

`points`: Defines the number of points which should be calculated for each interval.

`strength`: Defines the strength of the interpolation. 2 is in most cases a god choice.

`diff <interval> <BUFFER>`

Differentiate the buffers and generate new buffers with the result data (see sources).

`integrate <BUFFER>`

Integrates buffers and generate new buffers with the result data.

Macro Language: Style Commands

`margins <left> <right> <bottom> <top>`

Defines the margins between window and frame.

`windowsize <width> <height>`

Defines the window size.

`bgcolor <c> <c> <c>`

Defines the background color. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`margincolor <c> <c> <c>`

Defines the margin color. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`framecolor <c> <c> <c>`

Defines the frame color. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`framewidth <width>`

Defines the frame width.

`framestyle <style>`

Defines the frame style. (0=full frame, 1=line at X and Y axis, 2=draw a cross at 0).

`forceframe <bool>`

If enabled a full frame will always be drawn (possible values: yes/no).

`framearrows <bool>`

If enabled arrow will be drawn for frame style 1 and 2.

Macro Language: Data Style Commands

`bstyle <lines> <symblos> <fill> <bars>`

Enable or disable styles for data buffers. All styles can be combined (possible values: yes/no).

`bcolor <c> <c> <c> <BUFFER>`

Defines the color for buffers. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`bfillcolor <c> <c> <c> <BUFFER>`

Defines the color for the fill style. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`blinewidth <linewidth> <BUFFER>`

Defines the line width for buffers.

`blinepattern <pattern> <BUFFER>`

Defines the dash pattern for buffers (0-15).

`bpatternwidth <patternwidth> <BUFFER>`

Defines the width of dash pattern.

`bsymbol <symbol> <BUFFER>`

Defines the symbols for buffers (0-15).

`bsymbolsize <symbolsize> <BUFFER>`

defines the symbol size for buffers.

`bxerrorval <error> <BUFFER>`

Defines the value for X error bars.

`bxerror <type> <BUFFER>`

Defines the X error bar type (0=off, 1=absolute, 2=relative, 3=form data).

`byerrorval <error> <BUFFER>`

Defines the value for Y error bars.

`byerror <type> <BUFFER>`

Defines the Y error bar type (0=off, 1=absolute, 2=relative, 3=form data).

`berrorlinewidth <linewidth> <BUFFER>`

Defines the line width for error bars.

Macro Language: Axis Style Commands

`setaxis <x axis 1> <y axis 1> <x axis 2> <y axis 2>`

Enable or disable axis drawing (possible values: yes/no)

`axisscalstart <AXIS> <start>`

Defines where axis scaling should start.

`ascalend <AXIS> <end>`

Defines where axis scaling should end.

`atickdist <AXIS> <dist>`

Defines the distance between two major ticks. If your axis is a time axis you have to enter days:hours:minutes:seconds or w (1 week) or m (1 month) or y (1 year).

`aminsteps <AXIS> <steps>`

Defines the number of minor ticks between two major ticks.

`atimeformat <AXIS> <format>`

Defines the format used for the displaying time values on time axis (time format tokens).

`ascalexpr <AXIS> <expr>`

This allows scaling of axis numbers without changing the data itself. For example to display seconds instead of milliseconds enter `v/1000` in this field. *v* is the variable which represents the axis number.

`aexpoffset <AXIS> <offset>`

Allows you to define the limit, above which numbers are plotted in exponential notation. The number you define with the slider is the exponent of the limit.

`adecplaces <AXIS> <n>`

Defines the number of decimal places for axis numbers.

`adecplaces <AXIS> <bool>`

If enabled the number of decimal places for axis numbers will be determined automatically

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`aformat <AXIS> <format>`

Defines the axis format (0=linear, 1=logarithmic, 2=time).

`asetsmalllogzero <AXIS> <bool>`

If enabled the smallest value on a logarithmic axis will be replaced with 0 (even if this is not correct) (possible values: yes/no).

`atext <AXIS> <text>`

Defines the axis text label.

`anumfont <AXIS> <font> <size>`

Defines the font for axis numbers.

`anumoffset <AXIS> <offset>`

The distance between numbers and frame.

`atextfont <AXIS> <font> <size>`

Defines the font for axis text labels.

`atextoffset <AXIS> <offset>`

The distance between text label and frame.

`asetnum <AXIS> <bool>`

Enable or disable axis numbers (possible values: yes/no).

`asettext <AXIS> <bool>`

Enable or disable axis text labels (possible values: yes/no).

`atextcolor <AXIS> <c> <c> <c>`

Defines the color for axis numbers and text. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`asetzeroline <AXIS> <bool>`

Enable or disable a line at the value zero (possible values: yes/no).

`azerolinecolor <AXIS> <c> <c> <c>`

Defines the color for zero lines. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`aticklength <AXIS> <length>`

Defines the tick length.

`aminticklength <AXIS> <length>`

Defines the minor tick length.

`atickwidth <AXIS> <width>`

Defines the tick width.

`amintickwidth <AXIS> <width>`

Defines the minor tick width.

`asetticks <AXIS> <bool>`

Enable or disable axis ticks (possible values: yes/no).

`asetminticks <AXIS> <bool>`

Enable or disable axis minor ticks (possible values: yes/no).

`atickcolor <AXIS> <c> <c> <c>`

Defines the tick color. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`amintickcolor <AXIS> <c> <c> <c>`

Defines the minor tick color. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`atickstyle <AXIS> <style>`

Defines the tick style (0=inside, 1=outside, 2=both)

`asetgrid <AXIS> <bool>`

Enable or disable the grid (possible values: yes/no).

`asetmingrid <AXIS> <bool>`

Enable or disable the minor grid (possible values: yes/no).

`agridcolor <AXIS> <c> <c> <c>`

Defines the grid color. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`amingridcolor <AXIS> <c> <c> <c>`

Defines the minor grid color. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`agridwidth <AXIS> <width>`

Defines the grid width.

`amingridwidth <AXIS> <width>`

Defines the minor grid width.

Macro Language: Legend Commands

`setlegend <bool>`

Enable or disable the legend (possible values: yes/no).

`legendpos <x> <y>`

Defines the legend position.

`setlegendbg <bool>`

Enable or disable legend background (possible values: yes/no).

`legendlength <length>`

Defines the length for legend lines.

`legendspace <space>`

Defines the vertical space between two legend entries.

`legendcolor <c> <c> <c>`

Defines the color for legend text. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

`legendbgcolor <c> <c> <c>`

Defines the legend background color. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

Macro Language: Text & Graphic Commands

`text <tag> <x> <y> <font> <font size> <text> [c] [c] [c] [angle] [align] [pos] [offset] [cb] [cb] [cb]`

Adds a text label to the document.

`<tag>`: The `tag` argument should be an integer value which can be used later to address a graphic or text object. Interactively created text or graphic objects always have the tag 0.

`<x>`, `<y>`: the position in screen coordinates of the text.

`<font>`: The font for the text (e.g. *Helvetica-Bold*)

`<font size>`: The font size of the text.

`[c] [c] [c]`: The color of the text. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command `colormode` (0=RGB, 1=HSB).

`[angle]`: The text angle.

`[align]`: The text alignment (0=left, 1=center, 2=right).

`[pos]`: The position for automatically positioned text label (0=off, 1-22 fixed text positions).

`[offset]`: Offset for automatically positioned text label.

`[cb] [cb] [cb]`: The color of the text background. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command `colormode` (0=RGB, 1=HSB).

`rect <tag> <COOR> <x> <y> <w> <h> [linewidth] [dash] [c] [c] [c]`

Draw a rectangle with the given attributes.

`<tag>`: The `tag` argument should be an integer value which can be used later to address a graphic or text object. Interactively created text or graphic objects always have the tag 0.

`<COOR>`: The coordinate system to which the rectangle belongs.

`<x>`, `<y>`: The position of the rectangle in the defined coordinates system.

`<w>`, `<h>`: The size of the rectangle in the defined coordinates system.

`[linewidth]`: The rectangles line width.

`[dash]`: The dash pattern for the rectangle (0-15).

`[c] [c] [c]`: The color of the rectangle. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command `colormode` (0=RGB, 1=HSB).

`frect <tag> <COOR> <x> <y> <w> <h> [linewidth] [dash] [cf] [cf] [cf]`

Draw a filled rectangle with the given attributes.

`<tag>`: The `tag` argument should be an integer value which can be used later to address a graphic or text object. Interactively created text or graphic objects always have the tag 0.

`<COOR>`: The coordinate system to which the rectangle belongs.

`<x>`, `<y>`: The position of the rectangle in the defined coordinates system.

`<w>`, `<h>`: The size of the rectangle in the defined coordinates system.

`[linewidth]`: The rectangles line width.

`[dash]`: The dash pattern for the rectangle (0-15).

`[c] [c] [c]`: The color of the rectangle. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command `colormode` (0=RGB, 1=HSB).

`[cf] [cf] [cf]`: The fill color of the rectangle. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command `colormode` (0=RGB, 1=HSB).

`circle <tag> <COOR> <x> <y> <w> <h> [linewidth] [dash] [c] [c] [c]`

Draw a circle with the given attributes.

`<tag>`: The `tag` argument should be an integer value which can be used later to address a graphic or text object. Interactively created text or graphic objects always have the tag 0.

`<COOR>`: The coordinate system to which the circle belongs.

`<x>`, `<y>`: The position of the circle in the defined coordinates system.

`<w>`, `<h>`: The size of the circle in the defined coordinates system.

`[linewidth]`: The circles line width.

`[dash]`: The dash pattern for the circle (0-15).

`[c] [c] [c]`: The color of the circle. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command `colormode` (0=RGB, 1=HSB).

`fcircle <tag> <COOR> <x> <y> <w> <h> [linewidth] [dash] [cf] [cf] [cf]`

Draw a filled circle with the given attributes.

`<tag>`: The `tag` argument should be an integer value which can be used later to address a graphic or text object. Interactively created text or graphic objects always have the tag 0.

<COOR>: The coordinate system to which the circle belongs.

<x>, <y>: The position of the circle in the defined coordinates system.

<w>, <h>: The size of the circle in the defined coordinates system.

[linewidth]: The circles line width.

[dash]: The dash pattern for the circle (0-15).

[c] [c] [c]: The color of the circle. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

[cf] [cf] [cf]: The fill color of the circle. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

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arrow <tag> <COOR> <x1> <y1> <x2> <y2> <a1> <a2> <at> <as> [linewidth] [dash] [c] [c] [c]

Draw an arrow with the given attributes.

<tag>: The tag argument should be an integer value which can be used later to address a graphic or text object. Interactively created text or graphic objects always have the tag 0.

<COOR>: The coordinate system to which the arrow belongs.

<x1>, <y1>, <x2>, <y2>: The start and end position of the arrow in the defined coordinates system.

<a1>, <a2>: Draw arrow at line start and/or end (possible values: yes/no)

<at>: The arrow type (0-3).

<as>: The arrow size.

[linewidth]: The arrow line width.

[dash]: The dash pattern for the arrow (0-15).

[c] [c] [c]: The color of the arrow. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command colormode (0=RGB, 1=HSB).

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line <tag> <COOR> <x1> <y1> <x2> <y2> [linewidth] [dash] [c] [c] [c]

Draw a line with the given attributes.

<tag>: The tag argument should be an integer value which can be used later to address a graphic or text object. Interactively created text or graphic objects always have the tag 0.

<COOR>: The coordinate system to which the line belongs.

`<x1>`, `<y1>`, `<x2>`, `<y2>`: The start and end position of the line in the defined coordinates system.

`[linewidth]`: The line width.

`[dash]`: The dash pattern for the line (0-15).

`[c] [c] [c]`: The color of the line. Dependent on the colormode the three values are RGB or HSB values from 0.0 to 1.0. The colormode can be set with the command `colormode` (0=RGB, 1=HSB).

`rmtext <tag>`

Remove text object with the tag `tag`.

`rmgraphic <tag>`

Remove graphic object with the tag `tag`.

Macro Language: Document Commands

`new`

Opens a new document.

`open <filename>`

Opens the document with the given filename.

`save`

Save the current document.

`printdoc`

Print the current document.

`import <filename> <mode> [comment]`

Import an ASCII file

`<mode>`: import mode (0=multicolumn, 1=error values).

`binaryimport <filename> <type> <mode> <swap> <columns> [comment]`

Performs a binary import of data.

`<type>`: Defines the data type (0=double (64bit), 1=float (32bit), 2=integer (32 bit), 3=integer (16 bit).

`<mode>`: Defines the import mode (0=column mode, 1=block mode).

`<swap>`: Enables or disables byte order swapping.

`<columns>`: The number of columns to import.

`mysqlimport <host> <db> <user> <password> <port> <sql>`

Import data from mysql database.

`export <file> <BUFFER>`

Export buffers as ASCII.

Macro Language: Miscellaneous Commands

`colormode <mode>`

With this command you can define if colors will be defined as RGB or HSB (0=RGB, 1=HSB).

`clr`

Clears the console output.

`setvar <var> <expr>`
`<var>=<expr>`

Defines a variable.

`setstring <var> <value>`
`$<var>=<expr>`

Defines a string variable.

`eval <name> <expr>`

Evaluates the expression and defines the result as string variable.

About Plot

History

A long time ago in the last millennium I wrote a program called SciPlot for the fantastic NeXT computers (the older ones of you maybe remember).

After the NeXT period I had the idea to make a similar program for windows computers. After some work on this I did not find any fun in programming for Windows computers and so I stopped the development of SciPlot for Windows.

Now we have Mac OS X and I started the Plot project which takes some of the ideas of SciPlot but is a completely rewritten program with a different focus than SciPlot (and right now with less features).

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About the author

Nothing to say about me but you are invited to send email and also to visit also my pets page.