



An Axiometrix Solutions Brand

# imc FAMOS 2022

What is new

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# imc FAMOS Update Info

This chapter lists all new features and changes implemented with this version.

## 1 imc FAMOS Update-Info (Version 2022)

### 1.1 General Notes

The new version imc FAMOS 2022 comes with numerous innovations and improvements. Along with new and optimized functions, imc FAMOS now also supports [distribution of sequence functions among multiple CPU-cores](#)<sup>4</sup>.

### 1.2 Multithreading

As of **edition Professional imc FAMOS** now supports the execution of sequence functions in separate threads. For this purpose the sequence functions (SQF) are encapsulated using the construct `BEGIN_PARALLEL / END_PARALLEL`. For a detailed description with examples, see the chapter Sequence functions\Multithreading of the user manual.

### 1.3 Functions

#### New functions:

- *New functions for groups:*
  - **GrPart()** : From a group passed as the parameter, this function returns a partial group defined by the index if its initial element and the element count.
  - **GrConcat()** : Generates a group from variables as the parameters. Any desired data types are allowed, including groups.
- *New functions for text arrays:*
  - **TxArrayPart()** : New function for copying a section from a text array.
- *New functions for text panels:*
  - **PnGetPageName()**: Returns the name of the page, along with indication of the page number
  - **PnGetPageIndex()**: Returns the page number, along with indication of the page name
- **ToInt()** : Using `ToInt()`, a FAMOS single value or data set can be converted to a 64-bit integer value.

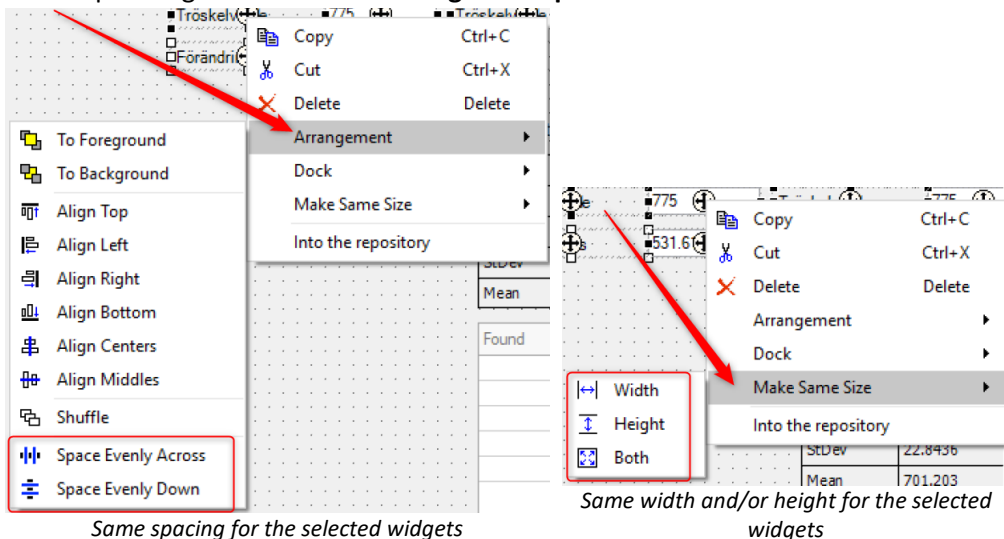
### Expansions of existing functions:

- **FFT(), Spec(), iFFT():** The maximum point count for FFT and iFFT has been increased to  $2^{27}$ .
- **FFT(), Spec():** Optional parameters for specifying window function and calculation mode.  
New calculation modes:
  - Automatic resampling of input data set to next power of 2.
  - Mixed-Radix method: In contrast to the previously implemented Radix-2 method (length of the data set must be a power of 2), data sets whose length is a product of powers of the numbers 2, 3 and 5 can also be processed here.  
The **mixed radix method** has the advantage that one obtains spectra with "round" frequency line spacings for data sets with technically usual sampling frequencies (e.g. 1kHz and multiples in 1/2/5 raster) and suitable choice of the input length. For example, a data set sampled at 1kHz returns a spectrum with 1Hz frequency line spacing for a length of 1000 samples ( $1000 = 2^3 * 5^3$ ), and a frequency line spacing of 50mHz for a length of 20000 samples ( $= 2^4 * 5^4$ ).
- **FileListNew()** : The function *FsFileListNew()* can now be called with a variety of file extensions.  
Example: `fid = FsFileListNew("C:\imc\dat\", "*.dat;*.txt", 0, 0, 0)`
- **GetSystemInfo()**: *GetSystem()* now also gets the count of logical processors in the system.
- **FsDlgSelectFiles()**: It is now possible to specify multiple file extensions with the function *FsDlgSelectFiles()*.
- The *DbClosePanel()* and *DbLoadPanel()* functions have been renamed to **PnClose()** and **PnLoad()**. Sequences using the old names still work correctly.

## 1.4 Panel

For **aligning multiple widgets** on the panel, the context menu has been extended.

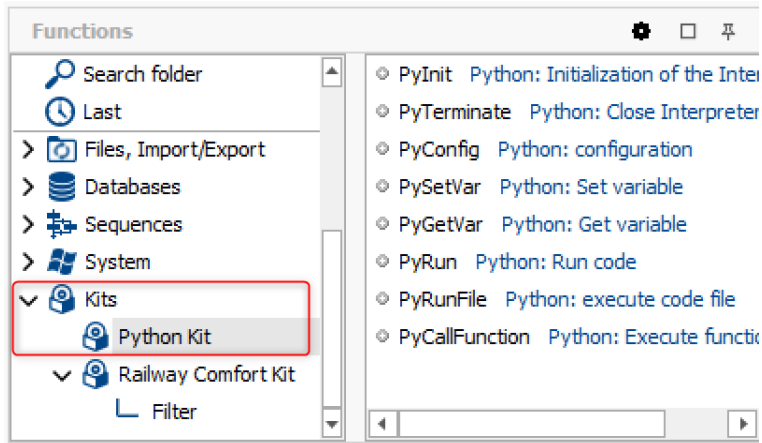
- Multiple selected widgets can be set to the same dimensions.
- Multiple widgets can now be **arranged at equal distances**.



## 1.5 Kits

### 1.5.1 Python

imc FAMOS is now able to create an embedded instance of the **Python** runtime environment that provides an interpreter for the **Python** program language.



Functions are available for reading and writing Python variables and for executing **Python** functions, lines of code or entire programs.

The kit is part of **imc FAMOS Edition Professional**.

## 1.6 Import/Export

### Import files in HDF5 format

Files which contain a superblock from the start of the file can now also be imported.

### Import of files in Vector CAN Bus Logging (\*.asc) format

The Vector import filter has been extended for CAN-FD data (max. 64-byte data length).

### Import files in imc Bus format

The imc Bus Filter has been extended to CAN-FD data.

### Import files in BLF format

The import filter for the BLF format has been extended to CAN-FD.

## 1.7 Miscellaneous changes

- The **default settings for projects** have been changed: Now all options are categorically activated except *"Reset FAMOS before loading project"*.
- The **imc SEARCH** interface is no longer supported.

## 2 Archive

### 2.1 imc FAMOS Update-Info (Version 2021)

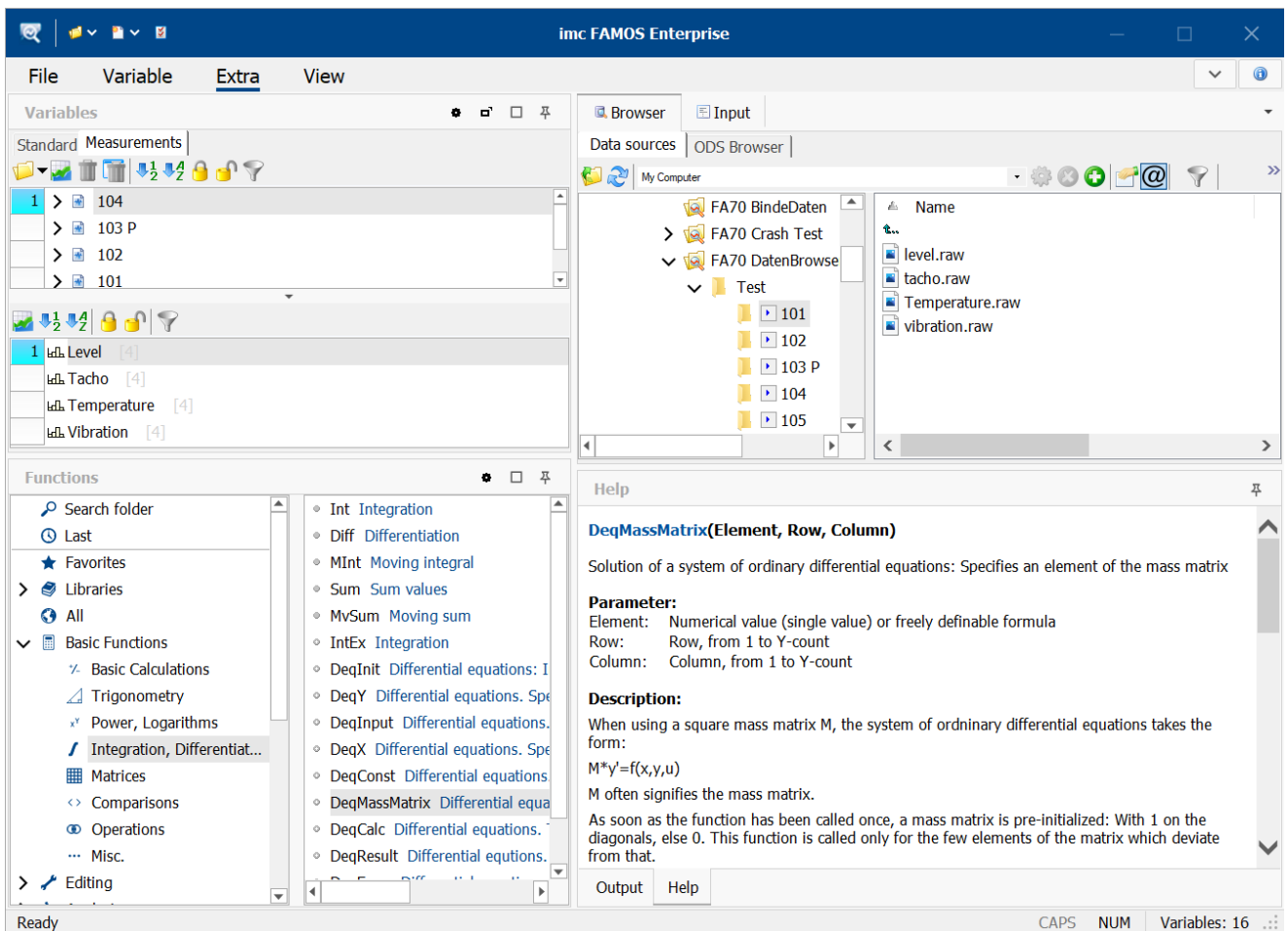
#### 2.1.1 General Notes

The new version, imc FAMOS 2021, comes with numerous innovations and improvements: New and optimized functions expand the range of analysis capabilities, while the Panel and curve window now offer new display and operating possibilities.

The **default setting for function names** and commands is now English, even on German-language operating systems. The German function names can be set in the *Options* under *Functions\Language*. However, how the sequences are executed does not depend on the language of the function's names.

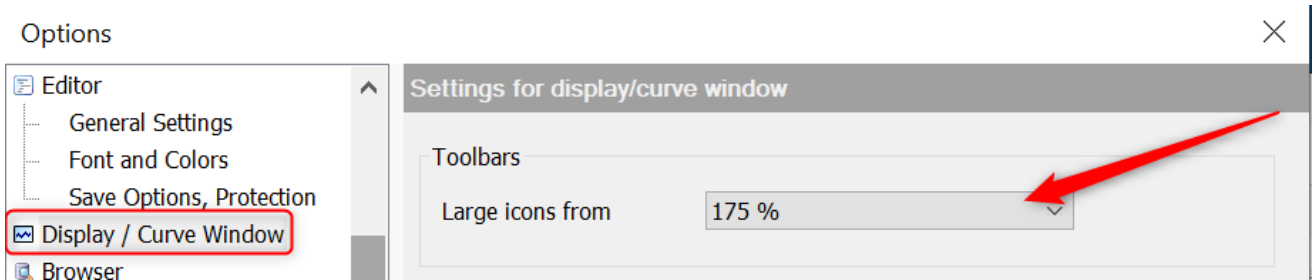
#### 2.1.1.1 Graphical user interface

- New design in imc-Look



Die Softwareoberfläche präsentiert sich in einem neuen aufgeräumten imc-Look.

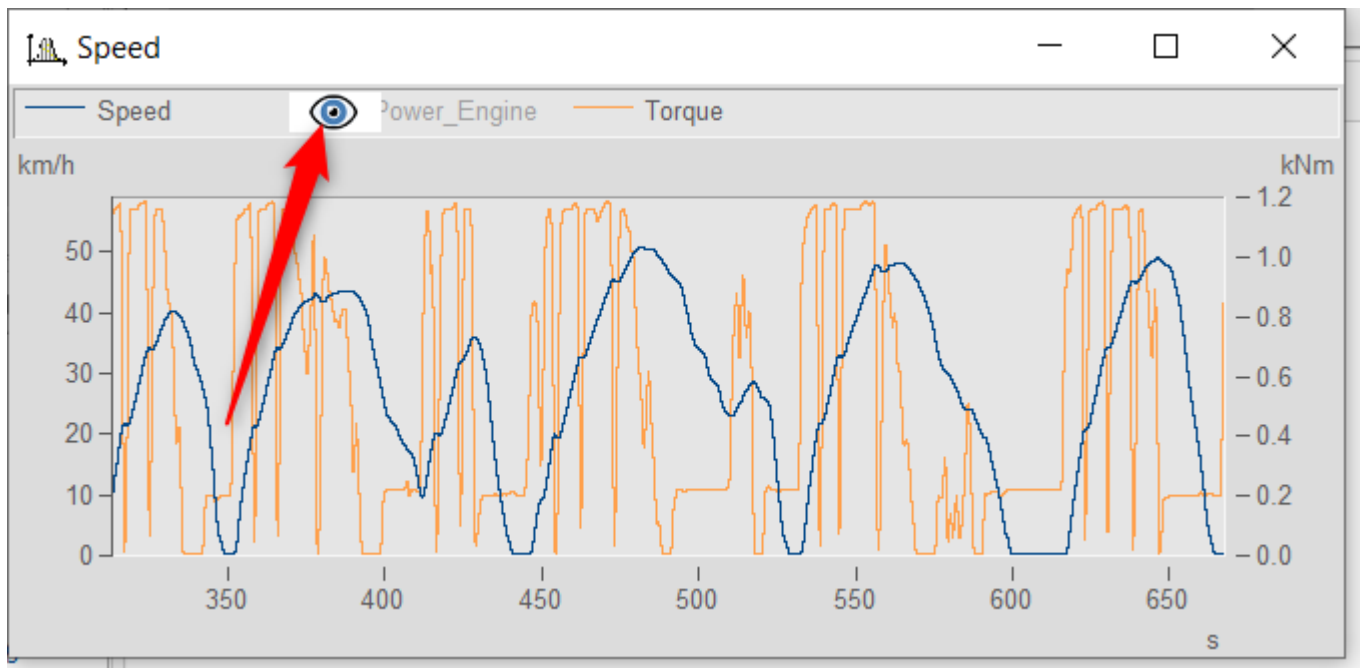
### Support of monitors having high resolution by large toolbars, conditional on the DPI-setting



Magnification factor for the monitor, on which large toolbars are used

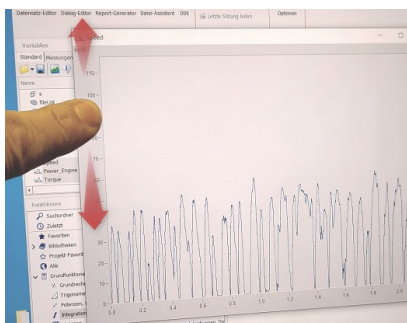
## 2.1.2 Curve window

### Showing/hiding channels at the click of the mouse



In the curve window, it is now possible to show or hide individual channels at the click of a mouse. To do this, the mouse pointer is moved over a channel name and then showed/hidden by clicking on the eye-icon. Alternatively, it is also possible to navigate to the curve window's upper left corner and use a pop-up menu there to configure which channels are displayed and which are hidden.

### Expanded touchscreen operation for the curve window



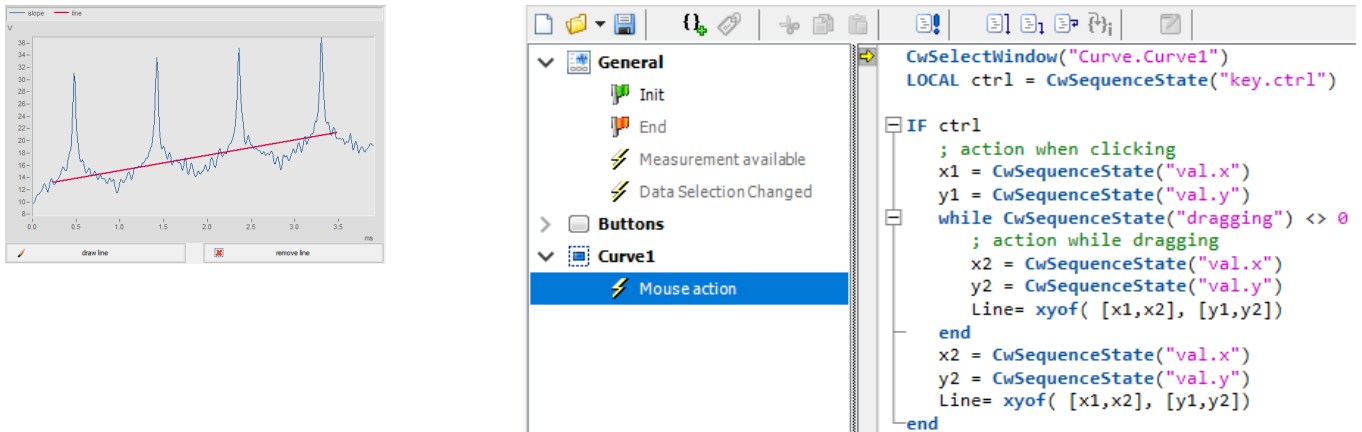
In order to further increase operability of the curve window by touchscreen techniques, certain regions of the curve window have been allocated for triggering certain actions. Thus for instance, in the top or bottom regions of the curve window, it is possible to move the curve in the Y-direction, and in the left or right margins of the curve, the curve can be moved in the X-direction.



## 2.1.3 Panel

### 2.1.3.1 Curve window with event

The curve widget now recognizes "mouse events" such as clicking and dragging, which in turn can be assigned to their own sequence actions. Thus for instance, clicking the mouse while pressing the CTRL-key sets a marker or circles an object graphically; similarly areas can be filled or regression lines drawn across a selected region.

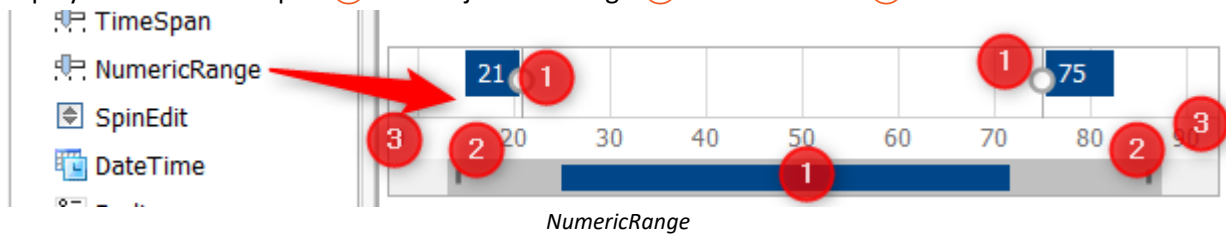


### 2.1.3.2 New widgets

#### 2.1.3.2.1 NumericRange, TimeSpan

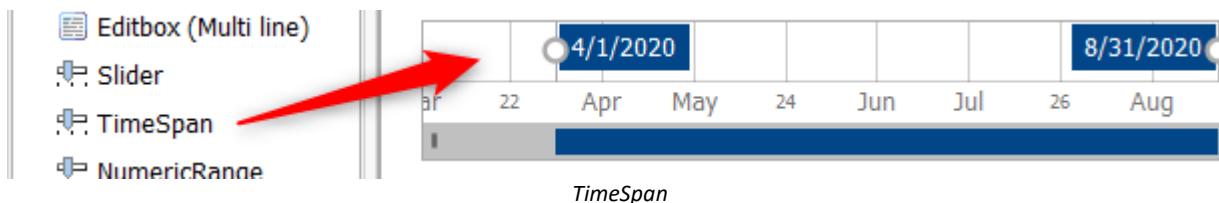
The new widget "Timespan" makes it possible to define time spans and the widget "NumericRange" to define numerical ranges by means of slider bars. Using these widgets, it would be possible, for example, to analyze measured data only within a certain time range, or only display events which fall within a defined numerical range.

- Display of a numerical span ① with adjustable range ③ and resolution ②.



The span ①, range ③ and resolution ② can be changed either graphically or by means of a function.

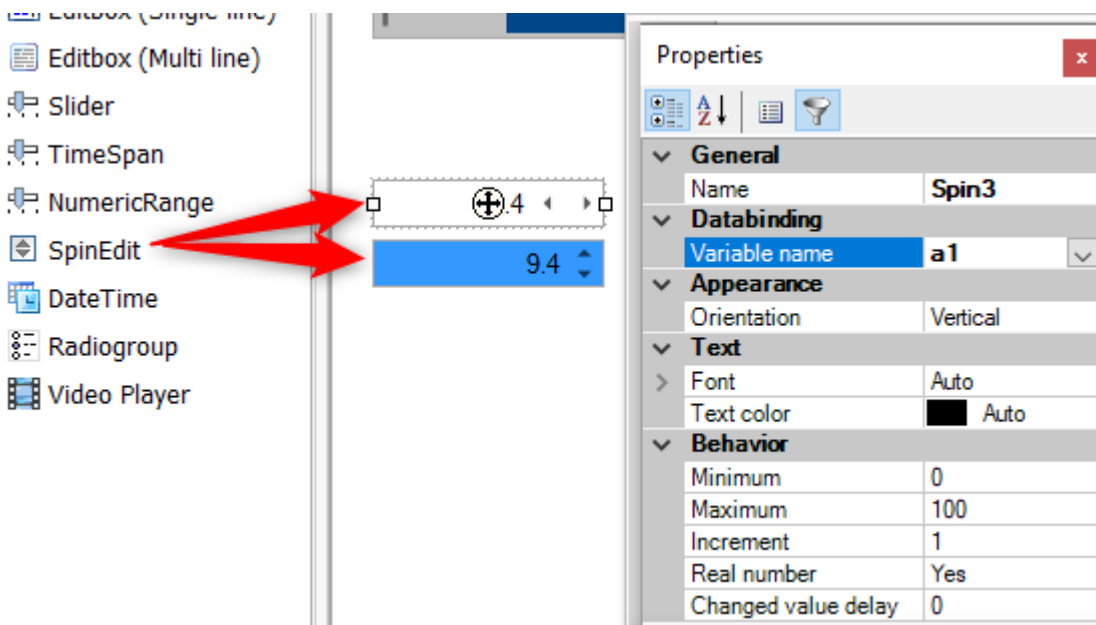
- A widget for defining a time span with a beginning and end of the time range as well as the minimum and maximum of the ruler.



All parameters can be set both graphically and by means of the function.

### 2.1.3.2.2 SpinEdit

The new [widget SpinEdit](#) makes it possible to increase or reduce numerical values using an "Up" and "Down"-button, respectively. Thus for example, series of measurements can be stepped through on the basis of their number, orders can be selected in an order analysis, boundary values can be increased incrementally, etc.



SpinEdit

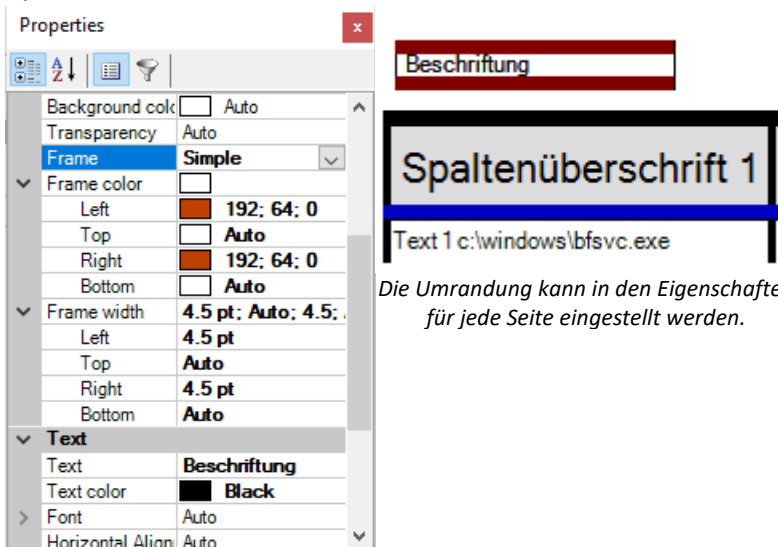
The increment arrows can be arranged either horizontally or vertically. It is possible to set or change the highest and lowest values, as well as the by means of a function. While the mouse button is held down, the values are incremented automatically, initially slowly, later quickly.

### 2.1.3.3 Tables and labels

#### 2.1.3.3.1 Formatting of text and frames

##### Frame width

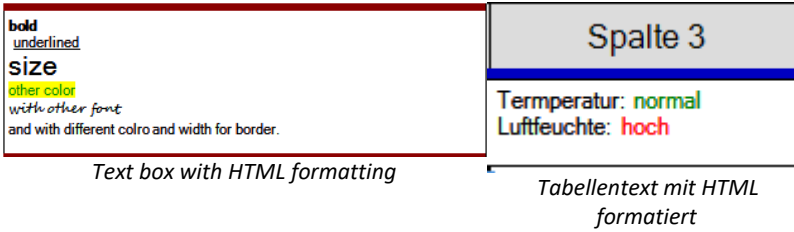
The frame width and color for tables and labels can now be set separately for each edge. Thus for instance the outer frame of the table can be formatted to be a solid thick red line, while the inner cells are separated by a dashed black line.



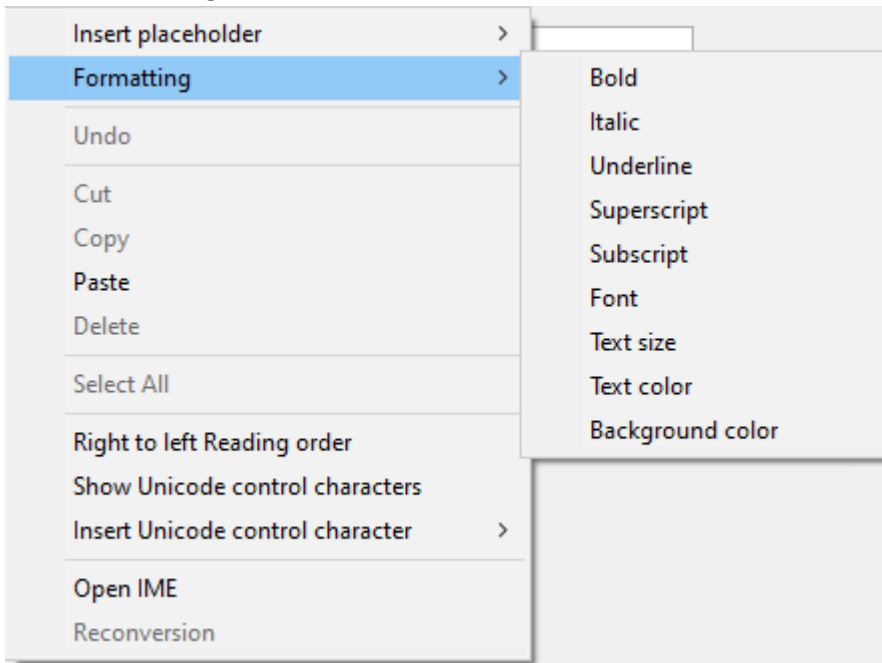
Die Umrandung kann in den Eigenschaften für jede Seite eingestellt werden.

### Text formatting

The texts in text boxes, labels and tables can now be formatted by HTML. Supported styles include <color> and <background>, <size>, bold <b>, italic <i> and many other tags.



The context menu now also includes formatting instructions. Highlight the text to be formatted and select the formatting:



#### 2.1.3.3.2 Table with input box

Tester	John Miller
Weather	rainy
No#	ABC545435

It is now possible to use table cells as input boxes. In this way it is not necessary to create many individual input boxes, but instead just one table. For this purpose, the table cells can be set to "editable" using the Properties window. It is then easy to access the contents of the table cells by means of a sequence.

#### 2.1.3.4 Support of text array variables

- **Linking text array variables with a textbox, input box, (cells of) tables:**

Text array variables can now be linked with labels, input boxes and tables. Each array element is outputted as a new line. It is possible to access each entry by its respective index.

- **Using Drag & Drop to place a text array variable at an empty location in the Panel:**

A menu is now available offering widget types (text box, (multi-line) input box, table, data grid) to create and link with the text array.

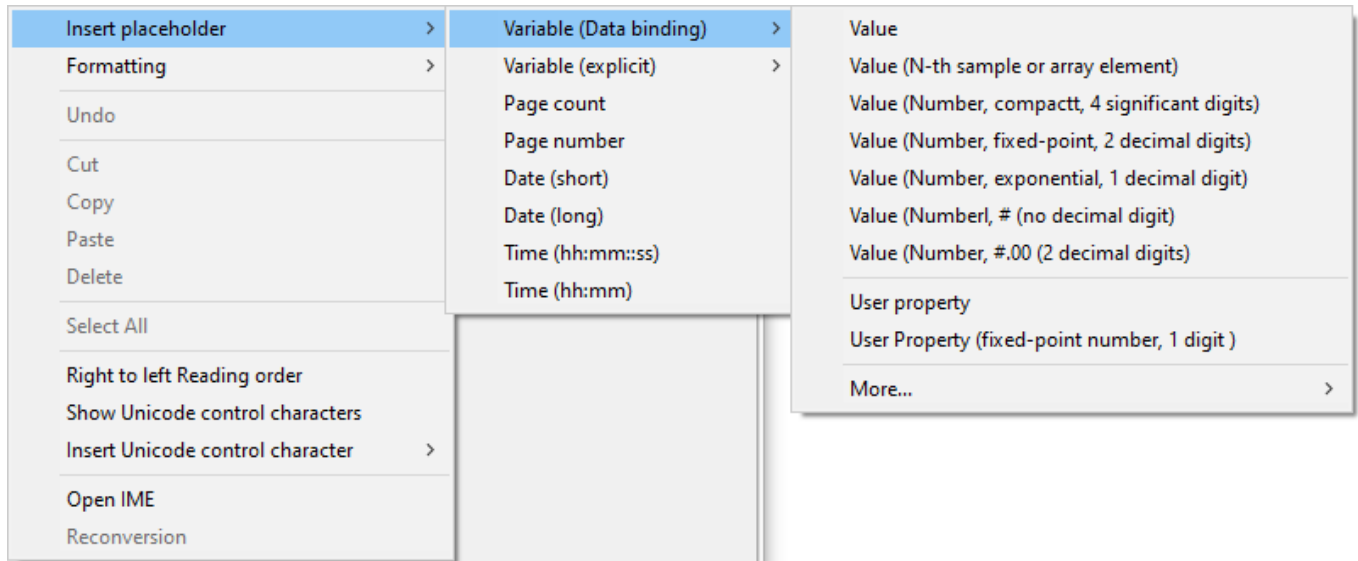
- **Taking a text array variable or data set to a table widget by Drag & Drop:**

When saving a simple, unstructured data set or a text array, a message box now appears in which the user is prompted to decide whether to expand the variable. If yes, the variable is distributed over the subsequent cells of the column.

### 2.1.3.5 Placeholders

For text arrays and tables, there are now new placeholders available. By using these, it is now possible use `<VAR.COMMENT>` and `<VAR.ORIGIN>` to embed the comment and the file origin into text arrays and tables, respectively, and to automatically update them by means of data binding. User-defined properties can be embedded using the command `<VAR.PROPS ("userpropname") >`.

Furthermore, the context menu for widgets with pre-defined placeholders has been expanded:



### 2.1.4 Editor

- Multiple lines can now be **commented out** as a **block** by means of (`* ... *`).
- In order to display **double quotation marks within text constants**, these can now be denoted by duplicating.  
Example:  
`Tx = "explorer.exe ""C:\Programme\Microsoft Office\MSAccess.EXE"""`
- In order to prevent long lines of code from being limited by the editor's end-of-line ("EOL"), it is now possible to achieve a code line wrap in the editor by means of SHIFT+ENTER.

```
42  ClsHandle = ClsOffRainflowInit1 ( _NumberClasses, _TypeOfUnit, ↵
                                     _UnitRow, _UnitColumn, ↵
                                     _UnitCount, _UnitRes, 0)
43  ClsOffRainflowInit2 ( ClsHandle, _Min, _Max, _Hysteresis, ↵
                         _Axis, _Type, _Border, _CalcOptions)
```

The "line break" symbol resulting from SHIFT+ENTER

## 2.1.5 Functions

### New functions:

- *New functions for text arrays:*
  - **TxArraySort()** : Sorts elements of a text array
  - **TxArrayClean()** : Deletes duplicates, empty entries and other entries according to pattern comparison/regular expressions in a text array.
  - **TxArrayCombine()** : Combines text arrays
  - **TxArrayToChannel()** : Conversion of a text array to a numerical data set
  - **TxToClipboard()**: Copy text field to clipboard
- **JoinEx()** : Improved *Join()*-function. Up to 15 parameters; the data format of the parameters is retained in the result wherever possible.
- **CwUpdateEnable()** : Replacement for *CvUpdate()*
- **Name?()**: Gets the variable's name
- **SoundIntensityThirds()**: Sound intensity for each third or total
- **Solving differential equations**: Under Basic Functions\Integration, Differentiation, there are now new functions *Deq\*()* for solving **differential equations**.

### Expansions of existing functions:

- The functions **Tleng()**, **TComp()**, **Tlike()** and the comparison operators "=" and "<>" can now also be applied to text arrays
- **Tleng()** now returns -1 whenever no text/text array is passed as the parameter. In older versions, this caused a runtime error
- **FileLineRead()** : Significantly accelerated, reading in text arrays now possible, return value for queries now optional.
- **FileLineWrite()**: Passing a text array now possible.
- **PnInsertItem()**: Passing a text array now also possible.
- **SetDatFormat()**: Min/Max parameters are now optional. When they are not specified in conjunction with Integer-formats, the system assumes Scaling factor = 1, Offset = 0.
- **TForm()**: New formatting options "x" and "b" (without specified number of digits) for optimal formatting of integers.
- **BitShift, BitGet, BitSet, BitAnd, BitOr, BitNot**: Enhancements for 64-bit
- **ClsoffRainflowInit3()**: New option for span calculations, HCM-algorithm

## 2.1.6 Sequence functions

The *Direction* column of the Declarations dialog now also offers "Reference" as a parameter. The local parameter name is interpreted as a reference to the variable passed, thus practically used as an alias name. The Formula Interpreter then uses the local alias name.

## 2.1.7 Import/Export

### Binary-Blob

With the new version of imc FAMOS, it is now possible to import and export files as an uninterpreted BLOB (Binary Large Object). Thus for instance, the original measured data can be saved as a BLOB.

### Import of text files with Unicode UTF-16 encoding

When importing files, text from files with character encoding UTF-8 or UTF-16 can now be read.

## 2.1.8 Miscellaneous changes

- imc FAMOS 2021 is available exclusively in a **64-Bit version**.
- Syntax of the **Initialization list** has been expanded  
With initialization lists, along with purely numerical values as well as texts, constants (e.g. PI), mathematical expressions, functions and variables are now possible, e.g.  
`ZeroOneZero = sin( [0, PI/2, PI] )`
- **Changes to the operation technique:**
  - Multi-line popup input windows (e.g. in Design mode, for the purpose of specifying the text in multi-line input boxes and text boxes, as well as of table cells) now use ENTER to Apply/Close and SHIFT+ENTER or CTRL+ENTER to place a line break. Previously: ENTER for new line, CTRL+ENTER for Apply/Close.
  - Multi-line popup editors now generally use TAB for Close/Apply and CTRL+TAB for placing a tabulator character. With most widgets, it had previously been the reverse.

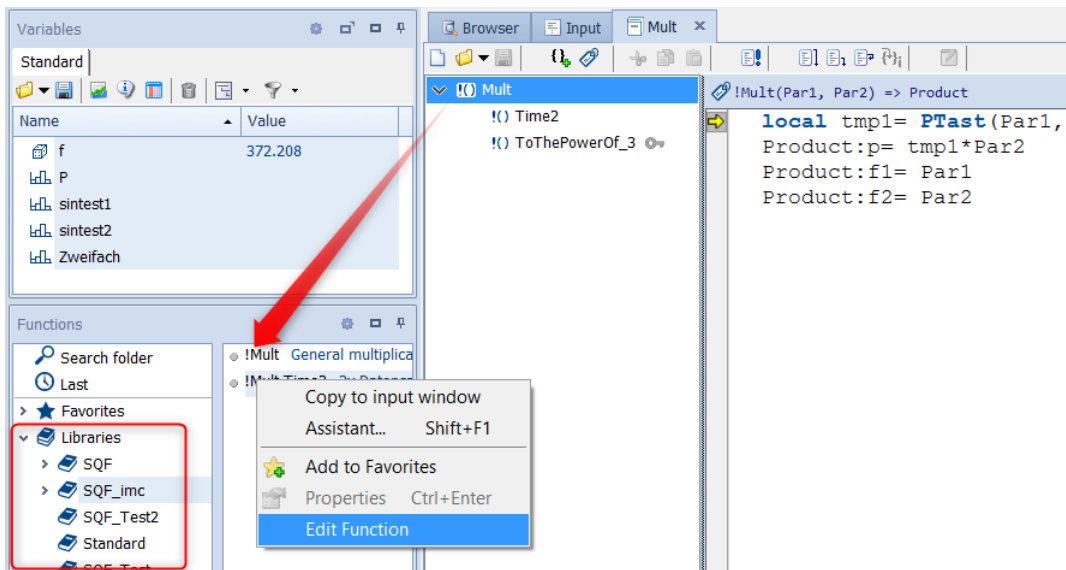
## 2.2 imc FAMOS Update-Info (Version 7.5)

### 2.2.1 Sequence functions

It is good practice to outsource recurring tasks or even complete analysis algorithms to encapsulated functions. This provides clearer structure to large-scale projects, making them easier to understand, expand and maintain. It also facilitates sharing of such know-how within work groups: all contributors and users benefit from centralized maintenance of function collections in order to work productively; no need to re-invent the wheel.

The new “**Sequence functions**” constitute such personally written sequences and offer the following advantages over simple subsequences:

- Clear separation of transferred (input/output) data from the internal, implicitly local variables. This helps avoid common mistakes such as accidentally changing an iteration index in the calling sequence...
- Use of arbitrary variable names in the calling sequence is achieved by **declaring** any desired count of input and output variables to be transferred, with definable types.
- **Description** of the function and its parameters, displays in the online help and support by the Functions Assistant are provided just as for standard FAMOS functions.
- Organization of the sequence functions in a **library** which can be subjected to centralized management (e.g. on a **company server**).
- A **password mechanism** can be used to provide protection for sensitive know-how.
- Simply **drag & drop** from the tree diagram into the target sequence.



Sequence functions are saved in a new file format and are denoted by the **file extension ".sqf"**. The ".seq"-file format for classic sequences is not compatible with it. Older FAMOS-versions are not able to interpret SQF sequences.

## 2.2.2 Import and export of imc FAMOS configurations

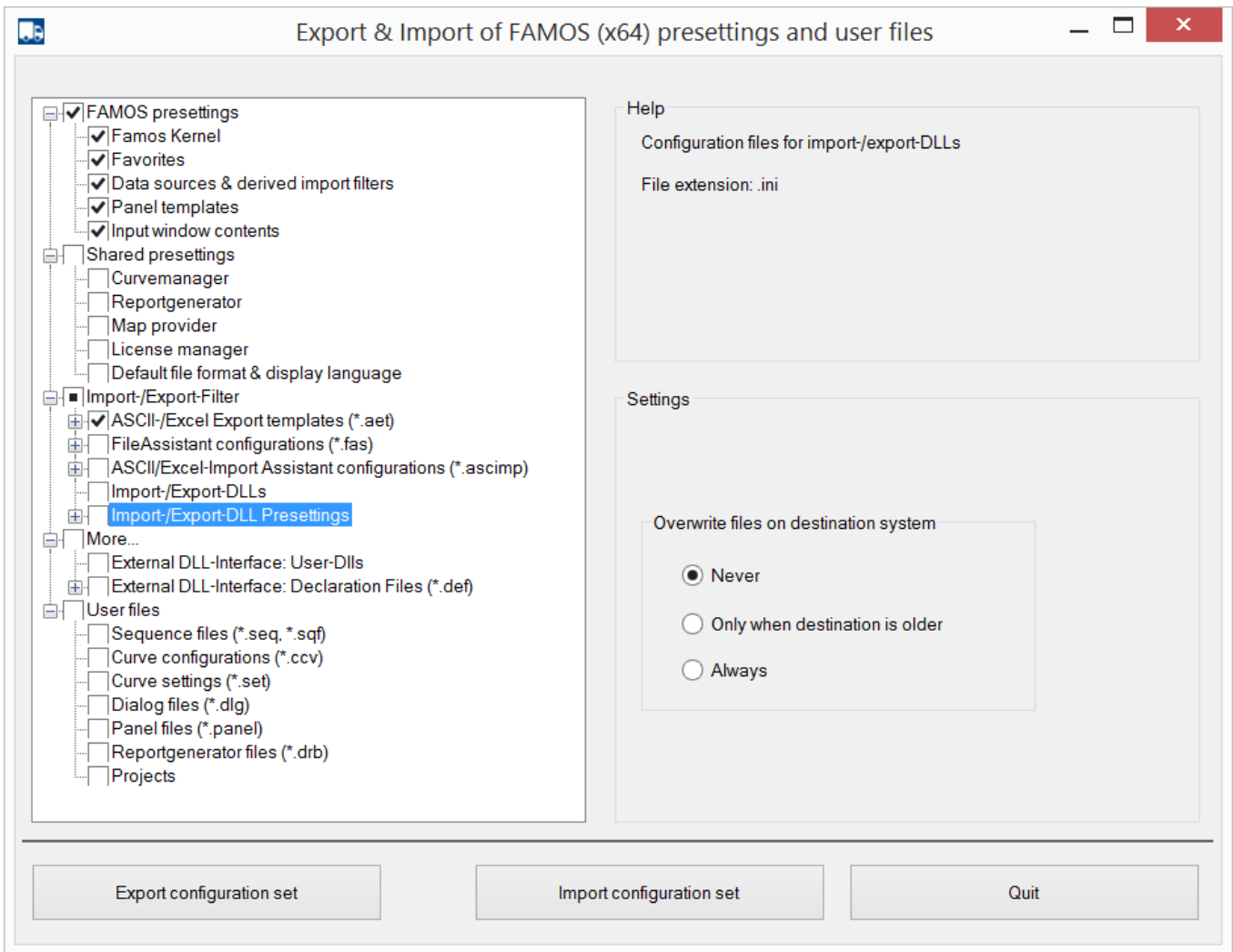
Both small work groups and the administrators of large organizations, not to mention anyone changing their PC, will often face the same challenge: how to restore customized work environments identically as they were before:

Installation of imc FAMOS needs to be performed at multiple worksites in a simple and automated manner, while applying custom compositions of settings and other supplemental files and components. The new tool *"imc FAMOS Configuration Im & Export"* enables this to be achieved reliably and conveniently with a just a few mouse clicks:

- imc FAMOS global options, menu layouts
- Favorites, data sources and Panel-templates
- Data filters, pre-defined sequences and libraries
- All kinds of templates for projects, curve configurations, sequences, reports, logos etc.
- Import to or installation on the target system can even be executed via console command line ("xconfig -i PathToFamosCfgZip")

This makes customized but yet efficient system rollout a simple matter. The time saved and troubles avoided for the user can be enormous. Content once prepared is then immediately available for anyone, to the great increase of productivity. Even uniform style guides can be easily implemented in this way, improving communication and quality.

***imc FAMOS configuration im- & export*** (filename:xconfig2.exe) is exclusively for installation of the 64-bit version of imc FAMOS. The user interface is only available in **English**.



imc FAMOS Configuration Im,- & Export user interface



## 2.2.3 Functions

### New functions

- **Video functions:** Video-reports represent a new multimedia format supplementing or replacing reports in pdf-format. Using just a set of functions, a sequence can automatically extract pictures of Panels and curve windows and compile these to a video film. By specifying appropriate pause intervals, one can easily create an attractive and intuitively understandable presentation in the style of a “stop-motion” animation. This opens new horizons for illustrating complex results and relationships in a well-controlled and logically organized order. As well, external pictures, graphics and photos can be included. The complete “animation” can be rendered as a standard video file (mp4) to be replayed back even beyond the imc FAMOS environment on any desired platform.
  - *VFOpen()*: A video file is opened and prepared for subsequent appending of individual images.
  - *VFAppendPanelSnapshot()*: A page of the active Panels is exported as a bitmap and it is appended to a video file previously opened with *VFOpen()*.
  - *VFAppendCwSnapshot()*: The content of the currently selected curve window is exported to a bitmap which is then appended to a video file previously opened by *VFOpen()*.
  - *VFAppendFrame()*: A bitmap is loaded from an image file and appended to a video file previously opened with *VFOpen()*.
  - *VFAppendRGBData()*: An RGB-data set is converted to a bitmap or a series of bitmaps, and this is appended to a video file previously opened with *VFOpen()*.
  - *VFClose()*: A video file is closed and the content is written to the data carrier.
- **Video player:** New function *VpGetImages()*: Modern data acquisition software such as imc STUDIO allows recording of video data in synchronization with conventional analog measurement data, as well as with vehicle or fieldbusses, in order to comprehensively assess a complex testing process. The analysis procedure must integrate such different perspectives, and subject these to thorough evaluation. This might require to address a specific point in time within a video stream and to extract individual frames. The new video grabber-function “*VpGetImages()*” provides this capability. In conjunction with the new formats for pixel and bitmaps this allows for numerical analysis of image data.
- In group "**Variable/Properties**":
  - *VerifyVar()*: Checks whether a variable meets specified conditions.
- **Exceptions and error handling**

The handling of errors and exceptions while executing the sequence can now be governed in detail by means of commands in new group "**Sequences/Error handling**":

  - *OnError()*: This function determines how FAMOS is to respond to an error occurring during execution of a sequence.
  - *ThrowError()*: Generates an error
  - *LogSetup()*: Configure log output
  - *LogTrace()*: Outputs a text to the output window or a file.
  - *GetLastError()*: Gets last error.

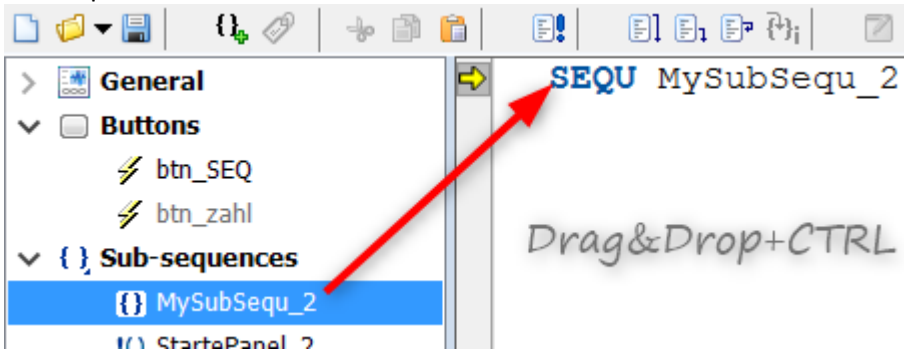
### The following functions have been expanded

- With functions for controlling **Panel-widgets**, a list of all available widget titles is now offered as the first parameter.
- Extended choice of reduction with standard statistics:

Statistic functions „**Mv\*(I)**“ with moving averaging or evaluation window, such as *MvMean()*, *MvRMS()* etc. will now extend the allowed ratio of window width to reduction factor from 1:10 to 1:1000. Large averaging intervals will thus no longer enforce equally drastic reduction.

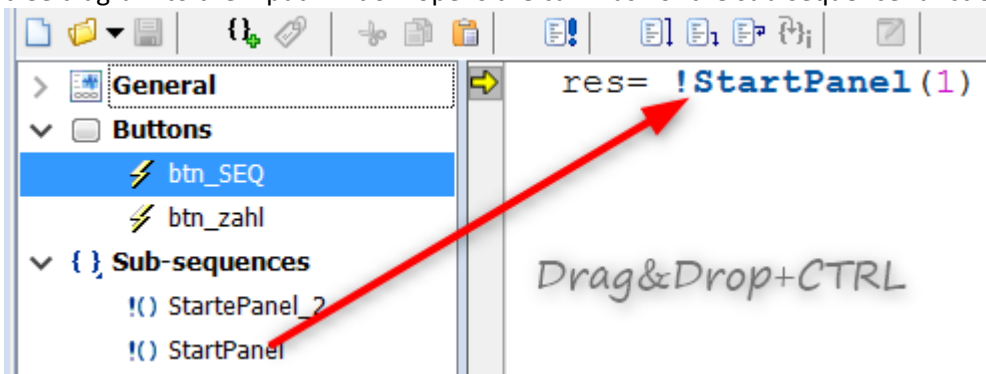
### 2.2.4 Operating the editor

- While holding down the CTRL-key, you can use Drag&Drop on a sub-sequence to move it from the Sequences tree diagram to "SEQU name" in the input window; with classic sequences, this saves the effort of typing the sub-sequence's name.



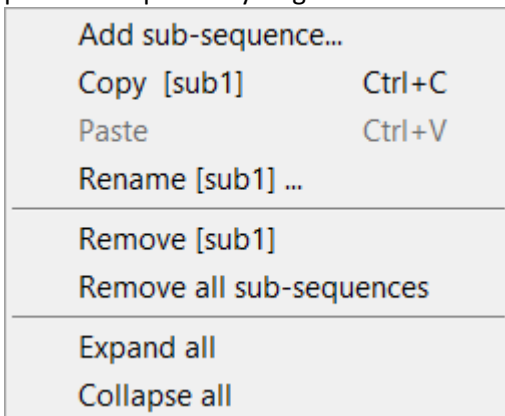
*D&D of a classic sequence*

- While holding down the CTRL-key, you can use Drag&Drop on a sub-sequence to move it from the Sequences tree diagram to the input window opens the call mask of the sub-sequence functions.

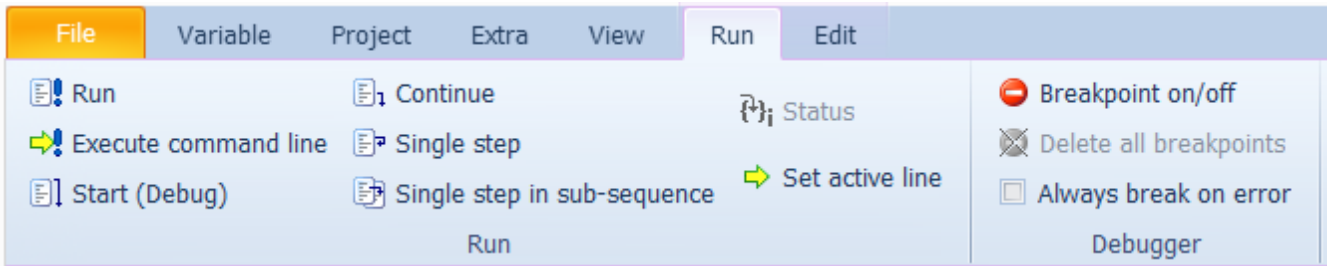


*D&D of a sequence function*

- Copy/Paste for sub-sequences/sequence functions (in the context menu of the sequence tree diagram): This provides a quick way to generate variants of sub-sequences.



- Supplemental Debugger option: "*Always break on error*". This allows the preset for `OnError`<sup>17</sup>() to be overwritten.



Direct declaration of text boxes now possible, for example:

```
MyTextbox = ["cold", "normal", "warm", "hot"]
```

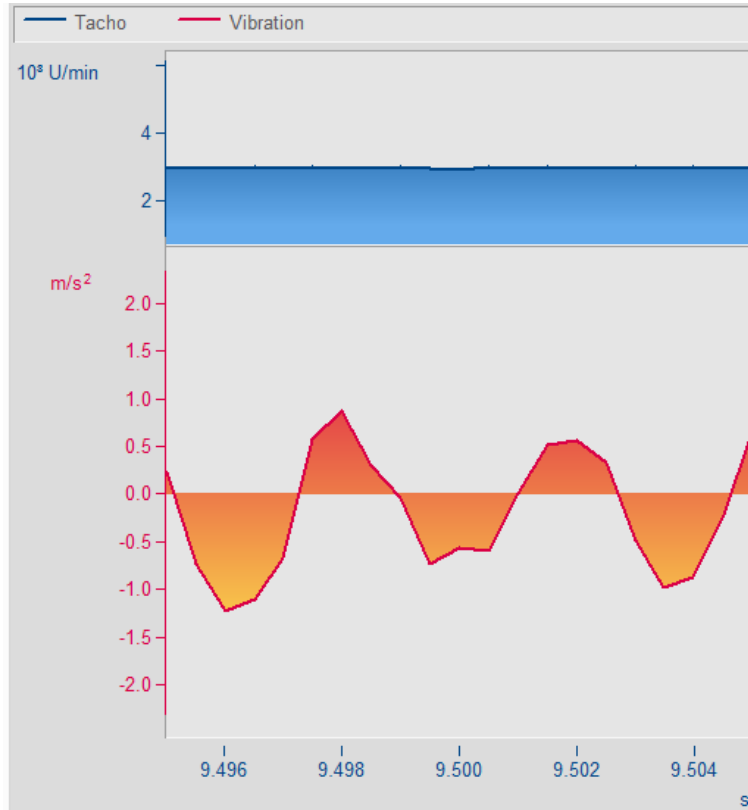
## 2.2.5 Curve window

### 2.2.5.1 Fill area

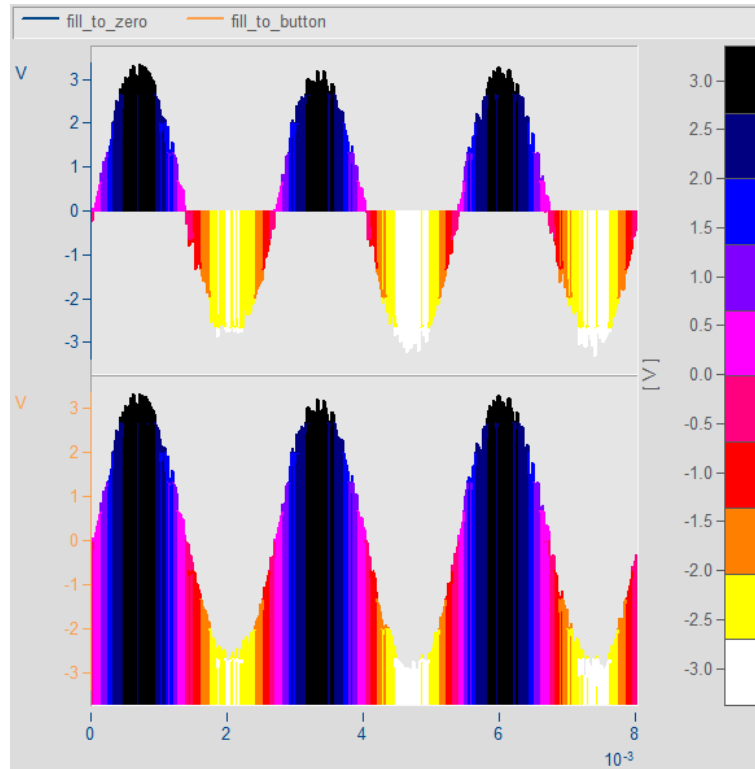
Fills the area below a line in a graph.

In the curve window menu *Configuration*\Lines the area under a line can now be filled with different color options.

Fill area:    
Area color gradient:    
Color gradient to:




With color palette and Fill area to zero and Fill area to bottom.

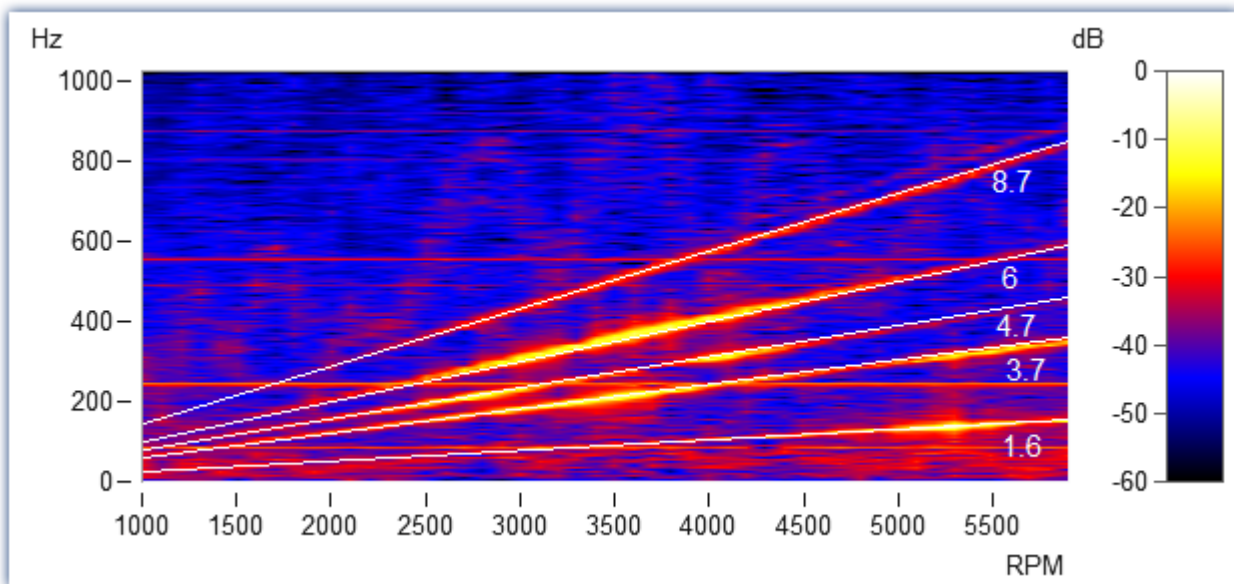


Fill area with color palette and fill area to zero and fill area to bottom.

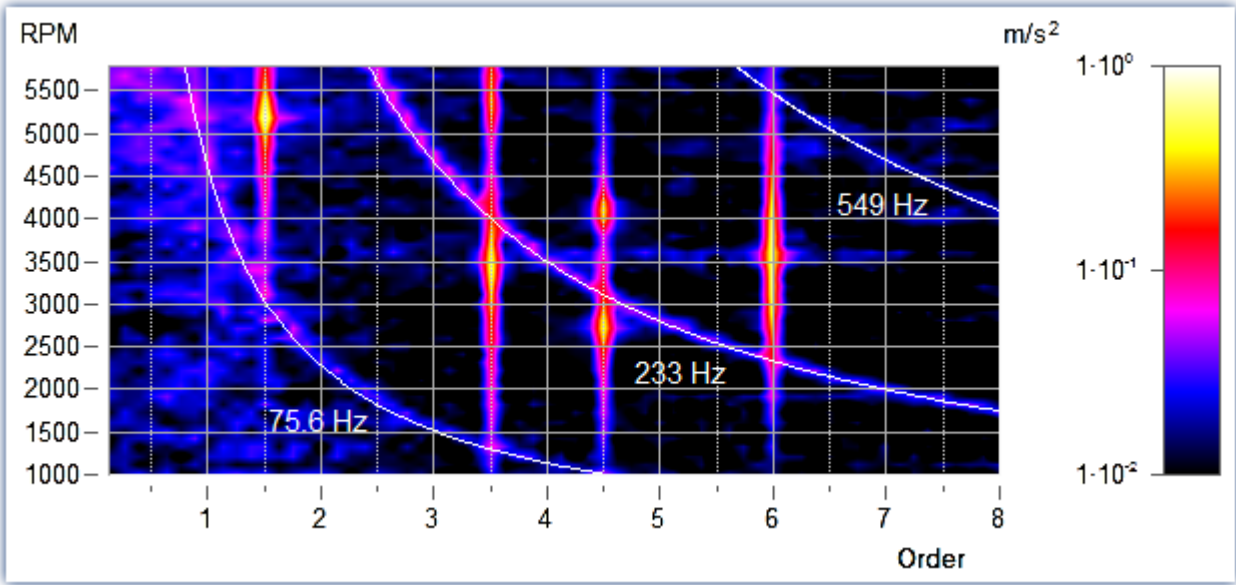
### 2.2.5.2 Marker-Order line

The curve window is now able to display order lines and hyperbola functions.

For this purpose, the Marker-menu has been supplemented with the item  Order line.



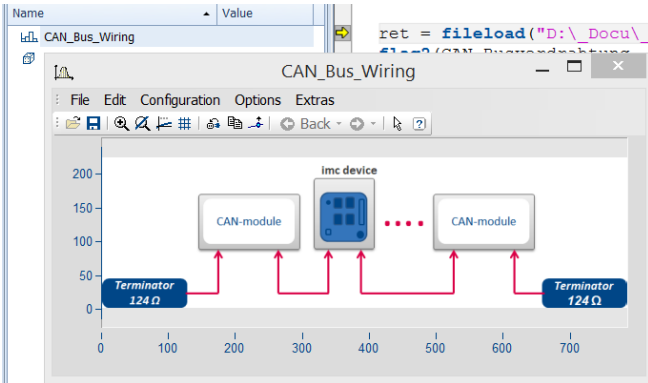
Amplitude spectrum with frequency over RPMs



RPM and order

### 2.2.5.3 Picture as a variable

The data format has been supplemented with a "Colors-flag<sup>25</sup>". This enables the mathematics functions in FAMOS to interpret values as RGB values (for 4-Byte unsigned Integers) or grayscale (for 1-Byte unsigned Integer values).

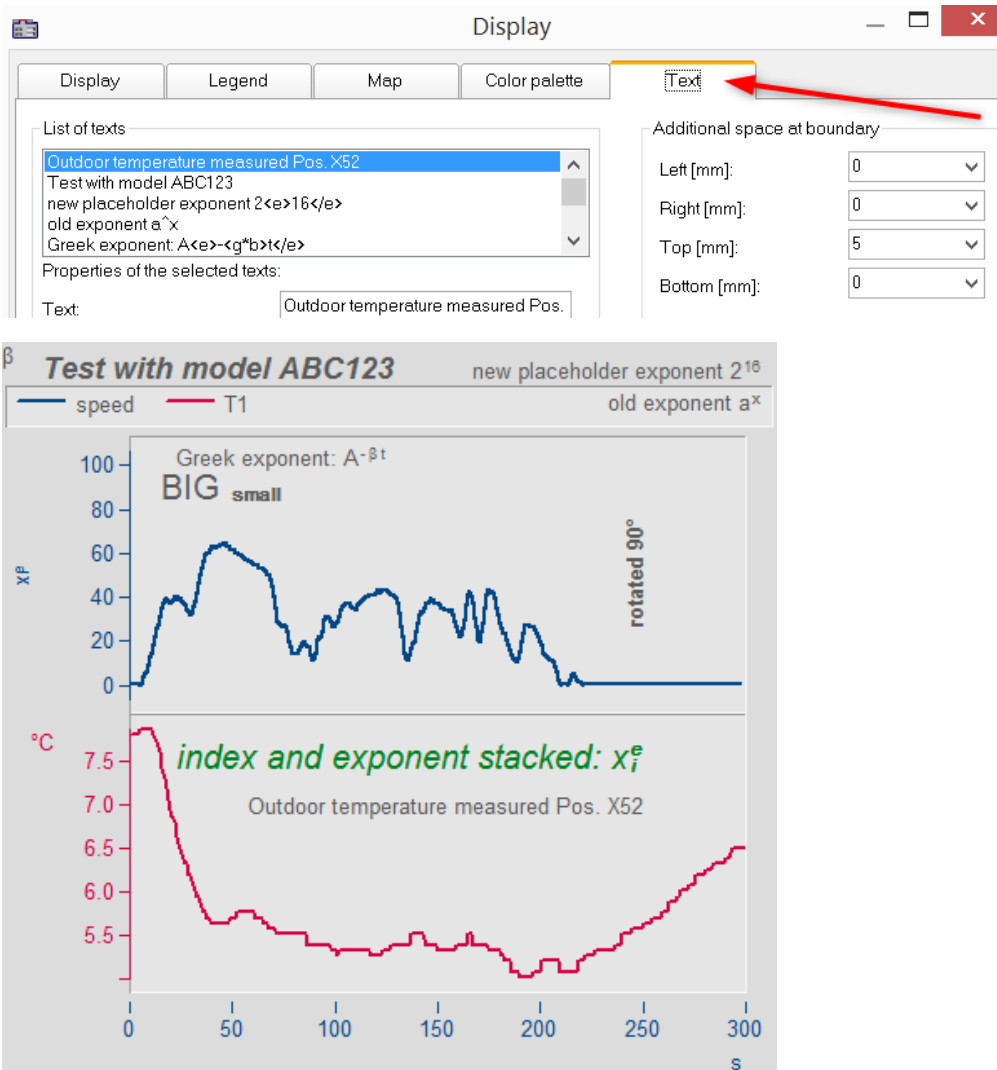


If the data are additionally segmented, the curve window displays the data set as an image.

The Colors-flag is set automatically, for example, when an image is loaded using the **FileLoad()** command and the format specification "Picture Format". Otherwise, the property in the curve window can be set using the menu item *Configuration\Lines\Extras: Effect*.

## 2.2.5.4 Freely defined texts

The page "Text" of the Display dialog provides the ability to position any desired texts, e.g. for captions, headers and footers, or general comments.



For this purpose, the functions in the curve window kit have been supplemented.

### Example

```
CwDisplaySet("header.count", 5 )
CwSelectByIndex( "header", 1 )
CwDisplaySet("header.text", "TEXTMITTE" )
CwDisplaySet("header.position", 8 )
CwDisplaySet("header.text.color", 255 )
```

The additional space at the edge is adjusted using the "legend.x" functions.

```
CwDisplaySet("legend.space.left", 10.4 )
CwDisplaySet("legend.space.right", 4.7 )
CwDisplaySet("legend.space.top", 10 )
CwDisplaySet("legend.space.bottom", 10 )
```



## 2.2.6 ASCII/EXCEL Import Assistant

Using a period as the separator for the thousands' digit is now supported. Previously, a period was only interpreted as the marker of the decimal position.

## 2.2.7 Data format

### Colors-flag

Pictures, colors, pixel values etc. are supported in the new imc3 data format by the Colors-flag. This interprets amplitude values as either RGB-color values (4 Byte) or grayscale (1 Byte).

A complete picture (bitmap) is then represented by a segmented data set, where the format (height/width) corresponds to the number of segments and samples/samples.

The curve window goes to "[Image mode](#)" when the flag is set and the data set is segmented. In order to achieve a useful result, mathematics functions or functions for video analysis may need to evaluate this flag (e.g. interpolation functions). This also applies when, for example, one line of the whole data set is extracted and passed to a function.

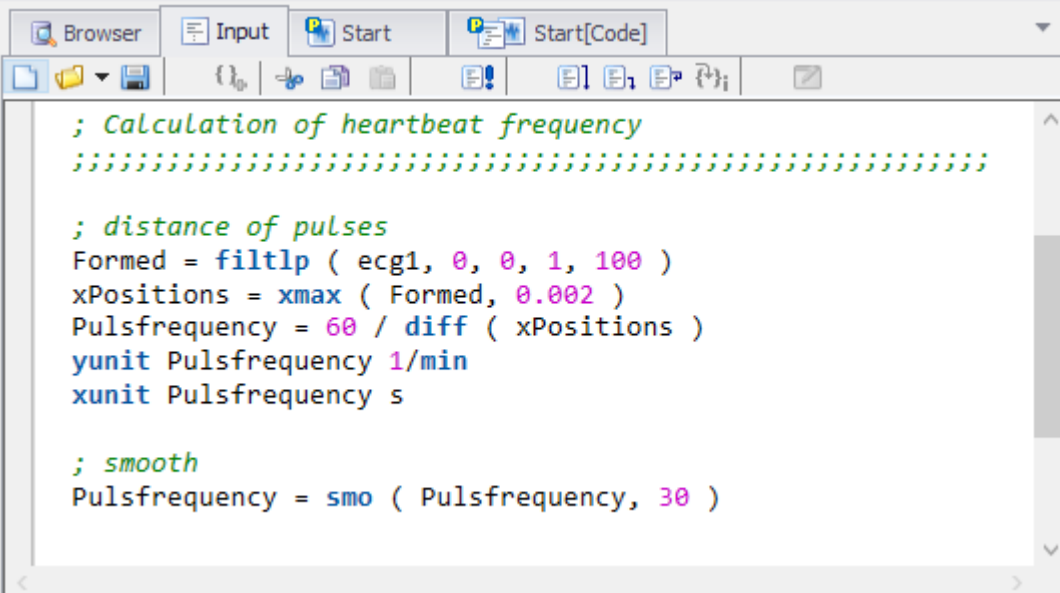
### HDF5 and Matlab 7.3

The data format HDF5 ("Hierarchical Data Format") is prevalent in scientific fields, where it serves to handle very large volumes of numerical data. It is supported by many platforms such as Java, Python, R or Mathematica. Matlab uses it as its default format (e.g. in Matlab R2018b). imc FAMOS 7.5 provides an importer for this rather complex format. It thus builds a firm bridge to numerous data pools, allowing the user to choose the best and most appropriate tool for the respective task to accomplish.

## 2.3 imc FAMOS Update-Info (Version 7.4)

### 2.3.1 Sequence-Editor

The Sequence-Editor has been completely revised.



```
; Calculation of heartbeat frequency
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

; distance of pulses
Formed = firlp ( ecg1, 0, 0, 1, 100 )
xPositions = xmax ( Formed, 0.002 )
Pulsfrequency = 60 / diff ( xPositions )
yunit Pulsfrequency 1/min
xunit Pulsfrequency s

; smooth
Pulsfrequency = smo ( Pulsfrequency, 30 )
```

The following improvements, among others, have been implemented:

- Code folding of code-blocks: The system recognizes the blocks by keywords for program flow control (e.g. WHILE, FOR, IF, END). Furthermore, any lines of comment beginning with "<<" or ">>" are recognized as the beginning, or respectively ending of possible code folding.

- Improved saving options for syntax coloring (bold, cursive, underlines). The style of the program flow control keywords can be set separately.
- Improved Search function: Searches for regular expressions, marking of all search term locations found in the text, list of most recent patterns for search/replacement
- Moving of breakpoints and bookmarks by means of mouse
- Rectangle zone selection of Editor content.
- Copying in HTML-format for any desired regions (previously, only whole lines)
- The use of keyboard shortcuts has been completely revised.

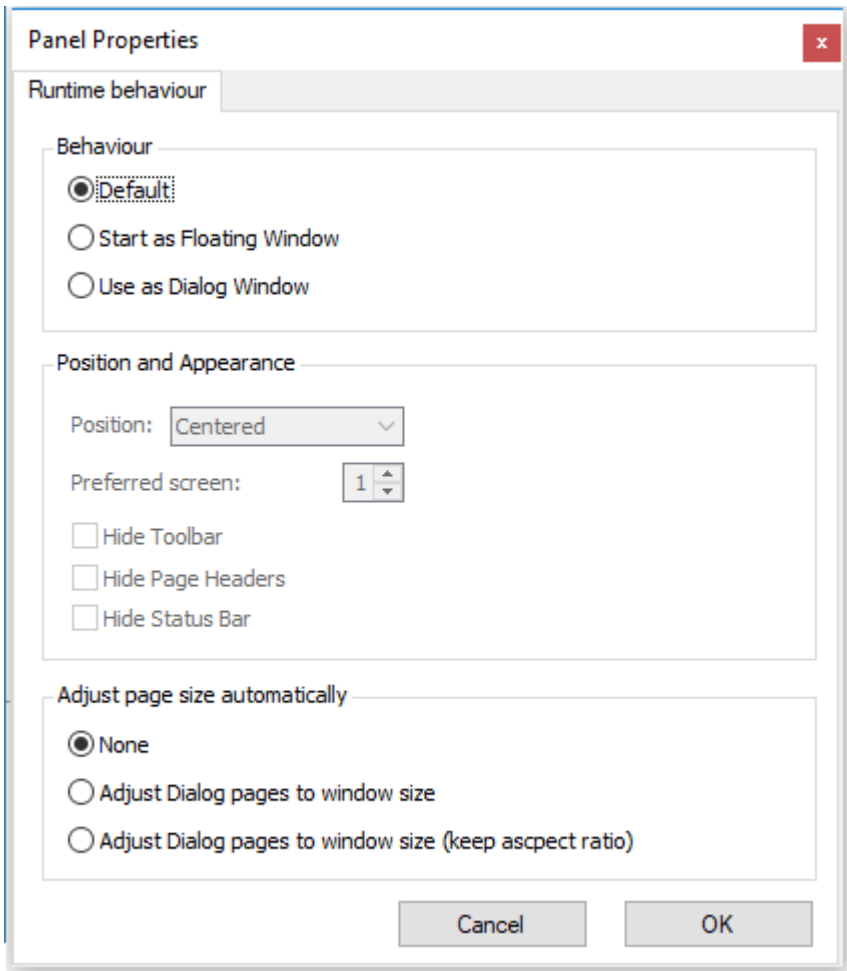
## 2.3.2 Panel

### 2.3.2.1 Password protection

Panels can now be protected by a password. This protects the underlying programming from third parties.

### 2.3.2.2 Panel-dialog

Panels can now be used as dialogs. This means that they can be run modally, like user-defined dialogs. For this purpose, additional options have been implemented in the Panel-settings.



### 2.3.3 User-defined dialogs

- New element: Radiogroup

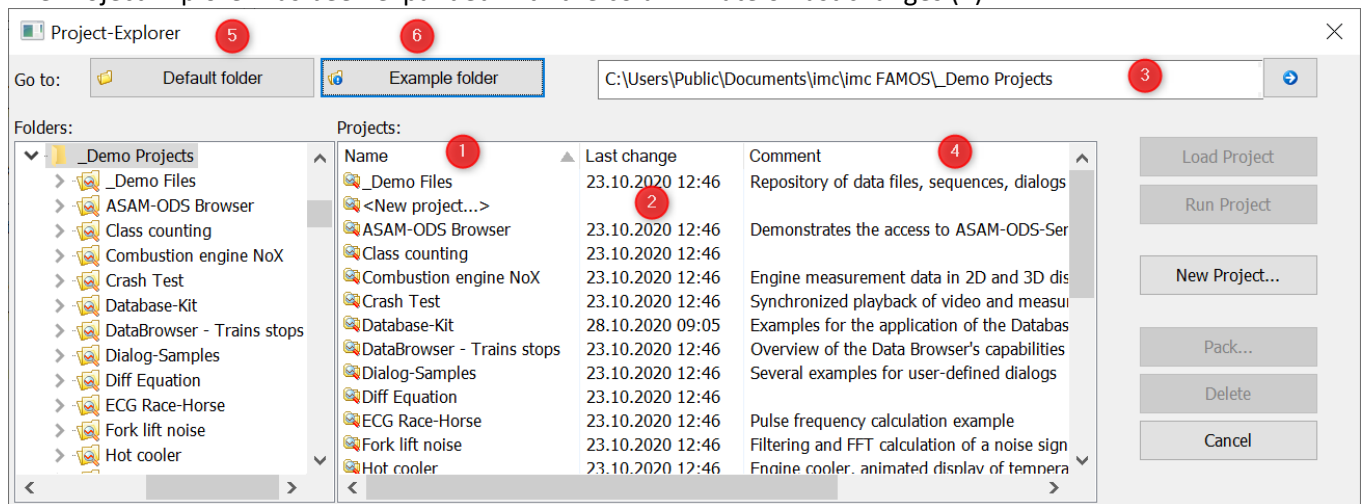
An associated group of radio buttons, which select mutually exclusive alternative options.

- Support of the Tab-key for alternating the focus among the elements

### 2.3.4 Projekte

#### 2.3.4.1 Project-Explorer

The Project-Explorer has been expanded with the column Date of last changes (2).



#### 2.3.4.2 Project properties and configurations

It is now possible to specify various configurations as additional features of the project:

1. ASCII/EXCEL-import-configurations (\*.ascimp) created with the ASCII/EXCEL-Import Assistant
2. ASCII/EXCEL-export templates (\*.aet)
3. File Assistant import filters (\*.fas)
4. DLL-declaration files for the external DLL-interface (\*.def)
5. Definitions for data sources
6. Definitions for derivative import filters

These are saved along with the project and no longer require extra transferal when a project is transferred.

### 2.3.5 File-Browser

The new option "*Simplified display for folder tree diagram*" **accelerates** the construction of the folder hierarchy structure.

This option is found under "*Options*" / "*Browser*" / "*Data sources*".

In particular when there are network drives and folder structures with many subfolders, this makes the process of setting up the tree diagram much faster.

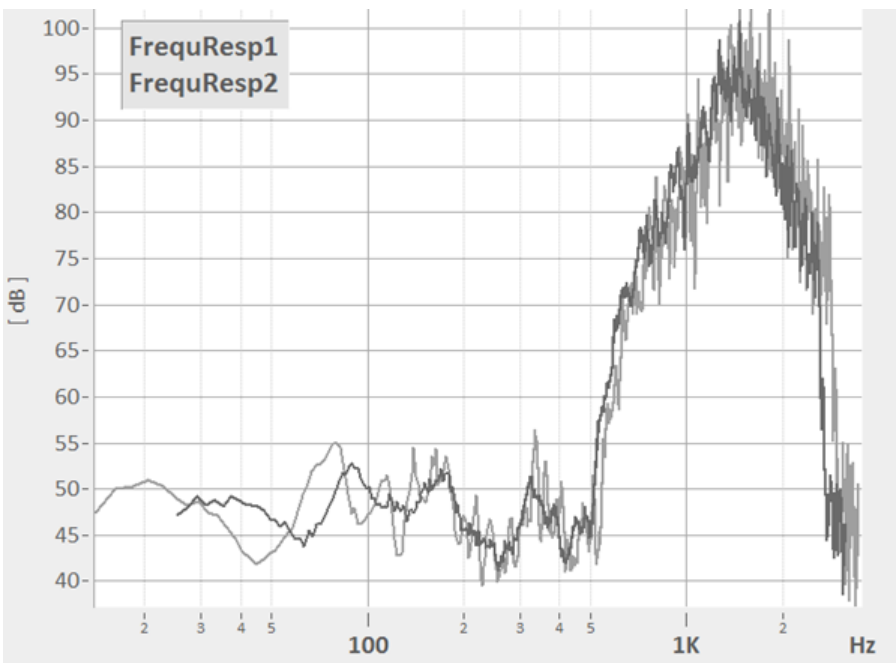
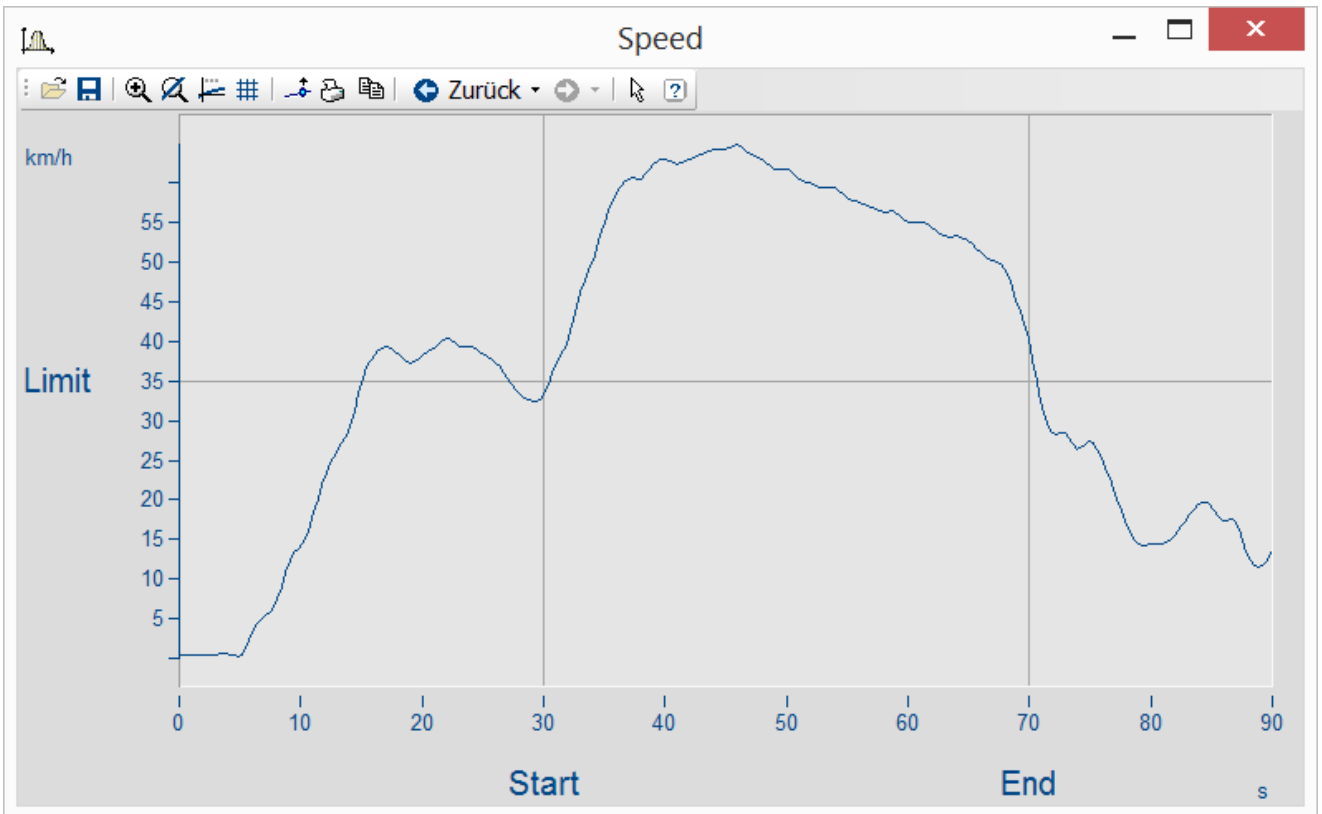
### 2.3.6 Data-Format

The new imc3 data format has been implemented.

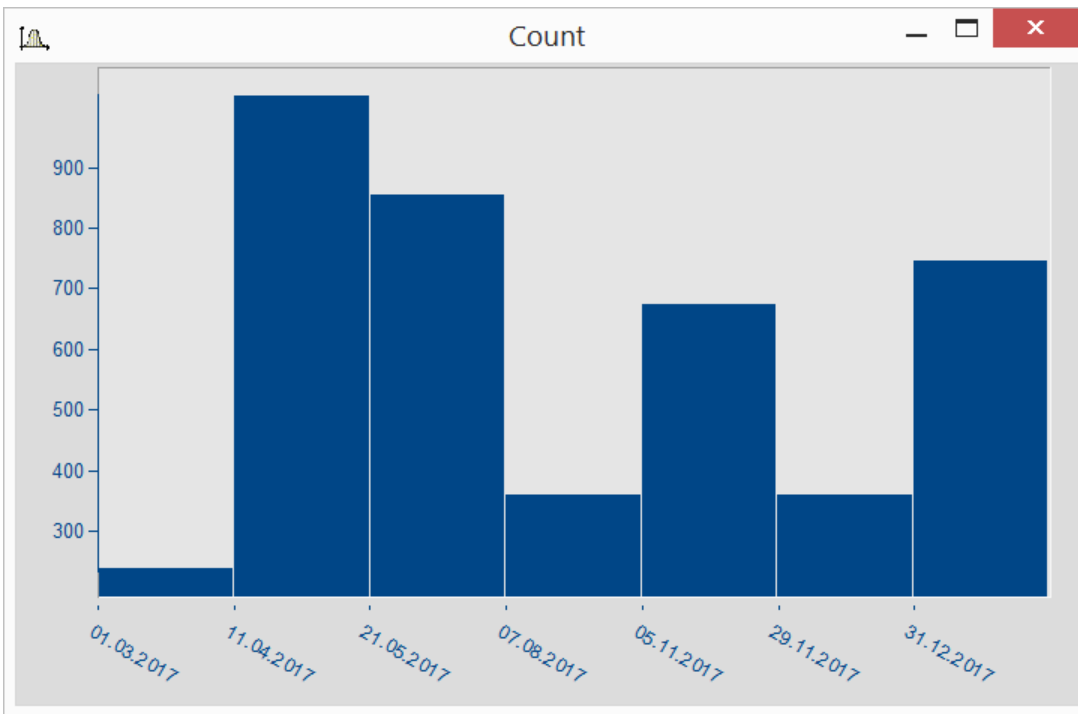
- Faster display of large files in particular when using 64-bit

### 2.3.7 Curve window

#### User Ticks



Beliebige Formatierung z.B. bei log. Darstellung



Datumsangaben unabhängig von x-Delta

The axis settings have been supplemented with the tab "User Ticks". This allows extra ticks with labels to be inserted. The font size, -style, -color, and text angle and position can be freely specified.

In this context, the Axis Arrangement page has been supplemented with the parameter "Axis width". Additionally, the units can be hidden.

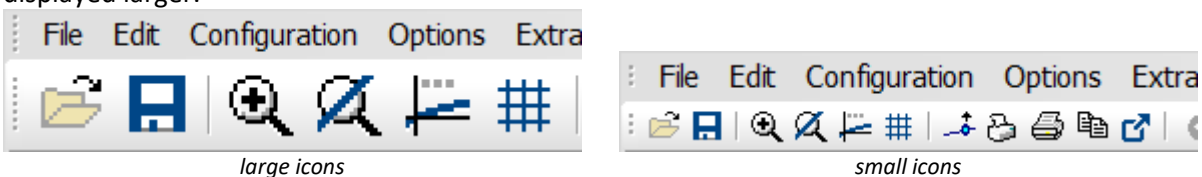
### Legend

The font size for the legend is now adjustable.

### Toolbars

The size of the icons in the toolbars can be adjusted under *Extras\Menu and Toolbar\Adapt* on the page *Options -> Large Icons*.

For the purpose of clearer display at high resolutions e.g. on 4K monitors, the icons can now additionally be displayed larger.



### Accelerated display

The display of very large data volumes has been accelerated.

## 2.3.8 Functions

### New functions

- *Panel:*
  - *PnShowPage():* Controls visibility and operability of a Panel page
  - *PnRemovePage():* Deletion of a Panel page.
- *CutDt():* Function for making excerpts from data sets. The parameters are the starting point in time and the length of the excerpted region. The length may even extend beyond the end of the data set.

- *GrExpand()*: Expands a data group
- Expanding of groups via menu command: It is also possible to expand groups having a measurement-based association (expanded channels are associated with the same measurement)
- *RenameMeasurement()*: A measurement's name can now be altered.
- New and enhanced **Excel-functions**
  - *XIWbOpen()* wit additional parameters (password)
  - *XIWbGetCount()*: Gets the count of currently open workbooks.
  - *XIWbGetName()*: Gets the name of an open workbook.
  - *XIWbExist()*: Checks whether a workbook of the specified name is currently open.
  - *XISheetGetCount()*: Gets the count of sheets in the active workbook.
  - *XISheetGetTitle()*: Gets the title of a sheet in the active workbook.
  - *XISheetExist()*: Checks whether the active workbook contains a sheet having the specified title.
  - *XISheetInsertCopy()*: Inserts the copy of a sheet into the active workbook.
  - *XISheetMove()*: Changes the position of a sheet in the active workbook or moves a sheet from another workbook to the active workbook.
  - *XISheetRename()*: Renames a sheet in the active workbook.
  - *XISelectRange()*: Selects a cell or a cell region.
  - *XIGetSelectedRange()*: Excel: Gets region selected.
  - *XIPaste()*: Inserts the content of the Clipboard into the active sheet.
  - *XIFind()*: Searches for text in the current sheet.
  - *XISheetSetOption()*: Sets display and print options for the current sheet.
- New and enhanced **Spectral Kit-functions**
  - *SDOF\_Response()*: The SDOF (single degree of freedom system) is agitated according to the acceleration plot provided. The Response is determined.
  - *Sharpness()*: The sharpness [*acum*] is determined from the specific loudness [*sone/Bark*].
  - *ShockResponseSpectrum()*: Supplemented with new models, e.g. *pseudo velocity (PVSS)*
  - *LoudnessSpectrum()*, *LoudnessLevel()*: Updated in conformity to ISO 532-1:2017
- New in the **Order Analysis package**:
  - *OtrTimeOrderSpectrum()*: The order spectrum is determined from the plots of the vibration and the tacho-signal in over time.
- *SpeakText()*: Voice output of the specified text via the default audio output device.

#### The following functions have been enhanced

- *GetSystemInfo("Famos.IsKitAvailable", ...)*: Queries whether a particular expansion Kit is present.
- *SetOption("DLLImport.DefinitionFile", ...)*: Activation of definitions file for external DLL-functions via sequence
- *GetOption("Dir.DefinitionFiles")*: Returns the folder containing definitions files.
- *FileLoad()*: It is now also possible to use import filters which are currently deactivated.
- *Dialog()*: It is now also possible to specify a [Panel-file](#)<sup>26</sup> which is run "modally".
- *FileOpenDSF()*, *FileSave()*, *FileLoad()* support the new imc3 format.
- *FileOpenFAS()* can now also use the "*imc/Text*" and "*imc/Video*"– formats when loading.

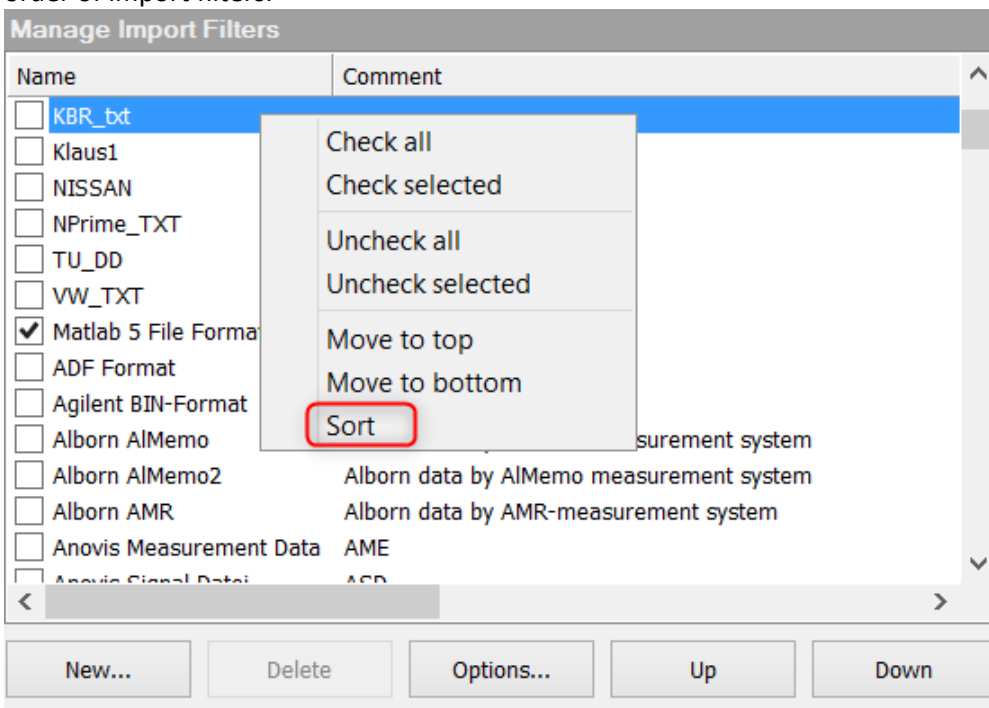
- The functions library of the Curve-Kit has been supplemented with the following parameters in accordance with the new [parameters](#) <sup>28</sup>.

*CwDisplaySet*  
 legend.font.size  
 legend.font.style

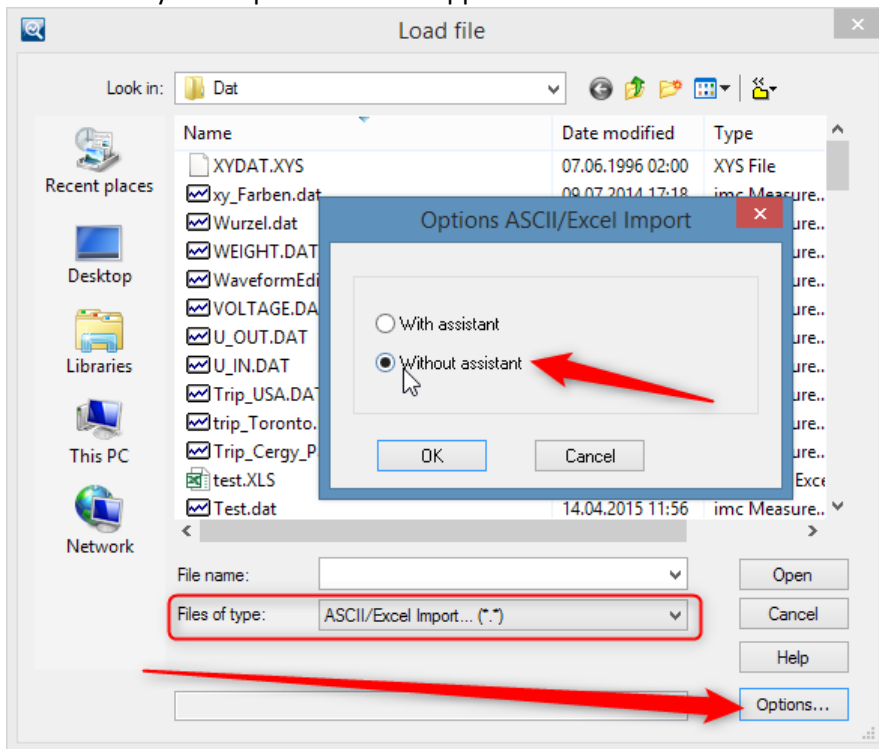
*CwAxisSet*  
 count.userticks  
 userticks  
 userticks.\*  
 unit.visible  
 width

### 2.3.9 Miscellaneous

- **Dialog "Mange import filters"** : New command in the context menu: "Sort" – restores the default sequential order of import filters.



- **ASCII/EXCEL Import Assistant:** Optionally, the data can now be loaded without opening the Assistant. The automatically found presets will be applied in this context.



*Use of the ASCII/Excel imports with default settings, without the Assistant*

- **Command line parameter "/I":** The command line parameter for ignoring Kits has been supplemented with the following abbreviations:
  - "RKT" (R-Kit)
  - "RWY" (Railway-Kit)
- **Indexing of variables:** Using the indexer [\*], data can now be replaced, without changing the properties Comment, User-defined properties, Filename/source, display-color and display Y-scaling.
- **Kits Registration:** Kits are now no longer de-selectable; instead all existing and licensed Kits are always loaded.



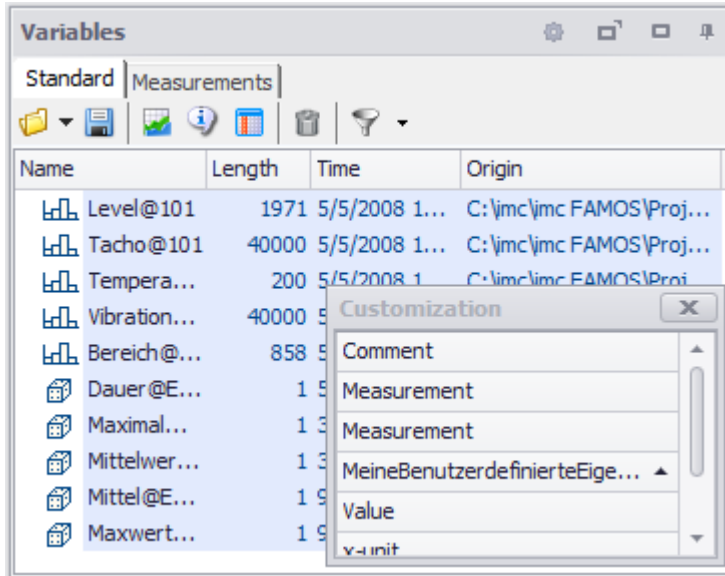
## 2.4 imc FAMOS Update-Info (Version 7.3)

### 2.4.1 Variables list

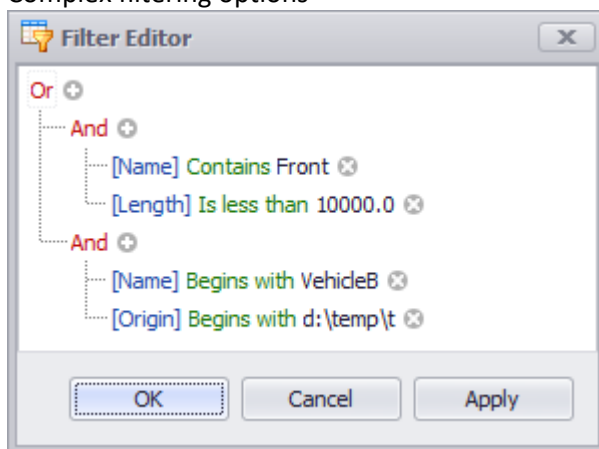
#### 2.4.1.1 Standard

The Standard Variables list has been completely revised.

- Configurable columns for display of data set properties



- The variables can be sorted depending on the displayed columns
- Complex filtering options



Filter conditions

- Hierarchical display

Name	Len...	Ori
▼ Test A		
▼ VehideA		
▼ Front		
xxx.brake_pressure	67767	D:!
xxx.Temp_oil_BV	6778	D:!
▼ Test B		
▼ VehideB		
▼ Front		
xxx.Temp_oil_mot	6778	D:!
▼ Rear		
xxx.Temp_output_turbo	6778	D:!

Variables list

### 2.4.1.2 Measurements

Double-clicking copies names into the active script window (analogous to the behavior of the Standard Variables list).

- Channel list: => Channel name
- Measurement list/Measurement node: => Measurement name
- Measurement list/Channel entry: => ChannelName@MeasurementName

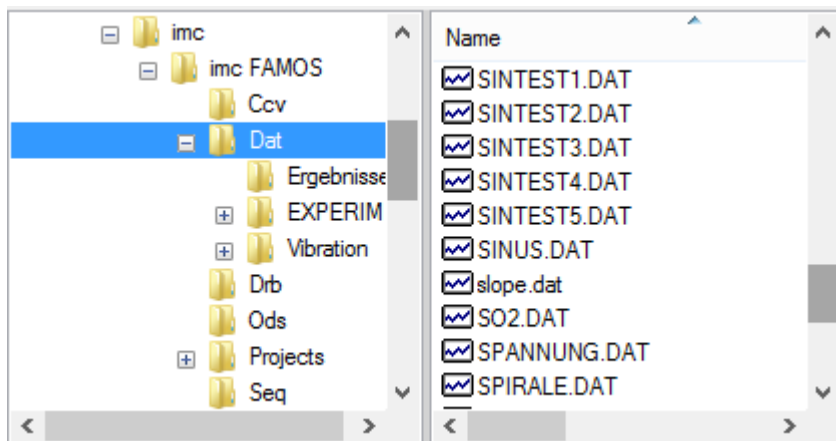
### 2.4.2 System prerequisites

WINDOWS XP and Vista are officially no longer supported.

### 2.4.3 Panel

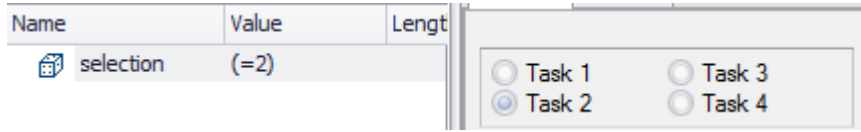
#### 2.4.3.1 Widget: "FileExplorer"

This widget emulates the functionality of the Windows Explorers.



### 2.4.3.2 Widget: "Radio group"

A group of related functional options offered for exclusive selection via radio buttons .



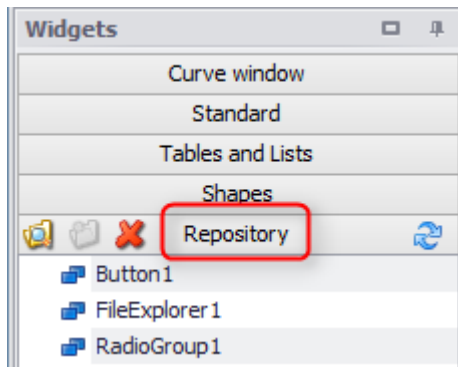
### 2.4.3.3 Widget: "Pushbutton"

The "Simple button" is allocated the new property "Fill color".



### 2.4.3.4 Widget-Repository

A new group "Repository" has been introduced. It is thus possible to use the CTRL-key to drag configured widgets into the repository. There, these copied widgets remain independent of the Panel and project, and can thus be used in other Panels.



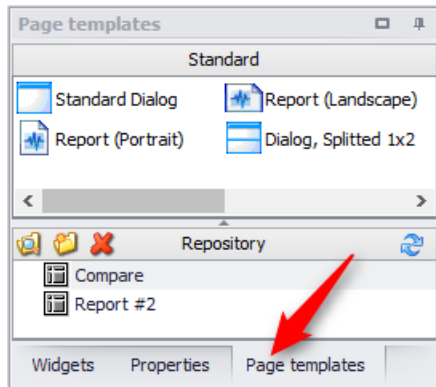
### 2.4.3.5 Widgets: miscellaneous

Alignment: In Design mode, the cursor buttons can now be used to move the widgets.

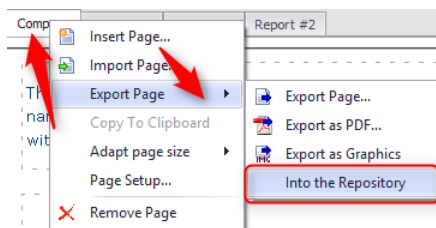
Shortcut: Using CTRL+A, it is possible to select all widgets on the page.

### 2.4.3.6 Page templates and repository

A new tab "[Page templates](#)" has been added. New pages can now be inserted from here with a template. In a further repository, you can store created pages for future projects.



In Design mode, there is a tab for *Page templates*. Along with standard templates for dialogs and reports, you can also re-use panel pages which you had created yourself and which had been copied to the repository.



Pages are copied to the repository via the page context menu.

## 2.4.4 New functions

### 2.4.4.1 Matrix calculation

- **MatrixEigen:** Eigenvalues, Eigenvectors
- **MatrixInit:** Create a defined new matrix
- **MatrixPart:** Partial matrix
- **MatrixMerge:** Integration of partial matrix
- **MatrixChangeDim:** Adding/deleting rows
- **MatrixAdd:** Also for transpose, +, -
- **MatrixIpol:** 2 dim interpolation
- **MatrixGet:** Read value sequence from (interpolated) matrix
- **MatrixSet:** Enter value sequence into matrix

### 2.4.4.2 Kit: "R-Kit"



imc FAMOS has been equipped with a bridge to the (open source) statistics package "R". Along with installation of imc FAMOS, a current version of "R" Version is now also installed.

This means that any desired "R"-functions and scripts can be called from a sequence.

This Kit is a component of imc FAMOS in the edition Professional and higher.

### 2.4.4.3 Kit: "PowerPoint-Kit"

The **PowerPoint-Kit** enables remote controlling of PowerPoint presentations by means of sequences, Panels and dialogs.

This Kit is a component of imc FAMOS in the edition Professional and higher.

### 2.4.4.4 Miscellaneous

- **AppendLoop**: Quick appending of samples in loops. The function is optimized for calling within a loop, in which small data volumes are repeatedly appended.
- **CodeRange**: A list of numerical values (codes) is assigned to and returned for a list of ranges of Y-values of the input signal.
- **corrcoeff**: Correlation coefficient, also moving
- **FlipFlop**: RS, JK
- **GetScale**: Requests the scaling
- **GetSystemInfo()**: New parameter
  - Determine IP address
  - Query whether x86 or x64 version of the operating system is used
  - Query of number of monitors and their size
- **Monoflop**: Prolong pulse, to left/right
- **NorthCorrection**: Correction of angle reading within a window, in order to allow sensible averaging of compass readings or angles/phases.
- **PhaseMod**: Wind directions, angles, or phases are transformed into a customary value range, e.g. 0 .. 360 degrees
- **PolynomRoots**: Zeroes/roots of a polynomial
- **PulseDuration**: Duration/width, or even the frequency of pulses, determined in relation to time.
- **RangeSet**: Input data values which lie within a specific value range of the controlling channel are set to a different value.
- **RedEx**: Sampling with user-specified reduction factor and start
- **Rosette**: With rosettes, the principal strain and the principal stress are calculated from the strains measured.
- **SamplesGate**: Includes all values in the result which are selected by a controlling data set.
- **Signum**: The function returns 1 when  $x > 0$ ; returns -1 when  $x < 0$ ; returns 0 when  $x = 0$ .

### 2.4.5 Sequence Editor

- New option: **Display line number**
- New command "**Go to line**" (context menu in Editor box and "Editor"-ribbon ). CTRL+G as Shortcut, thus "Selected variable" now CTRL+T
- Option "**Ident automatically**" supplemented: After entering a block opening command such as IF, WHILE etc., the next line is automatically indented by 1 tab stop more. After entering END, the current indent is reduced by 1 tab stop.
- Font larger/smaller with **mouse wheel + CTRL-key**

## 2.4.6 GUI: miscellaneous

### 2.4.6.1 Functions Assistant

The parameter boxes can now be filled either using Drag&Drop to move an entry from the Variable list or by highlighting in the Sequence Editor.

### 2.4.6.2 Projects

**Project Properties dialog:** The option "*Variables window: Display filter*" has been renamed to "*Variable window: Layout*".

Previously, only the display filters and, partially, the sorting of the Standard Variables list and the Measurement list were elements of the project.

Now, all settings of the Standard Variables list (e.g. column configuration, tree diagram, filters, sorting) also belong with the project.

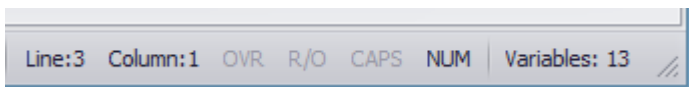
### 2.4.6.3 Layout

Previously, the settings for the Variables list (Standard + Measurements, such as sorting, filters, display of component etc.) belonged with "Famos.config".

Now, these are saved as parts of the \*.layout file. This means that when performing "*Load/Save layout*" or "*Save current session/Load last session*", these settings are also included.

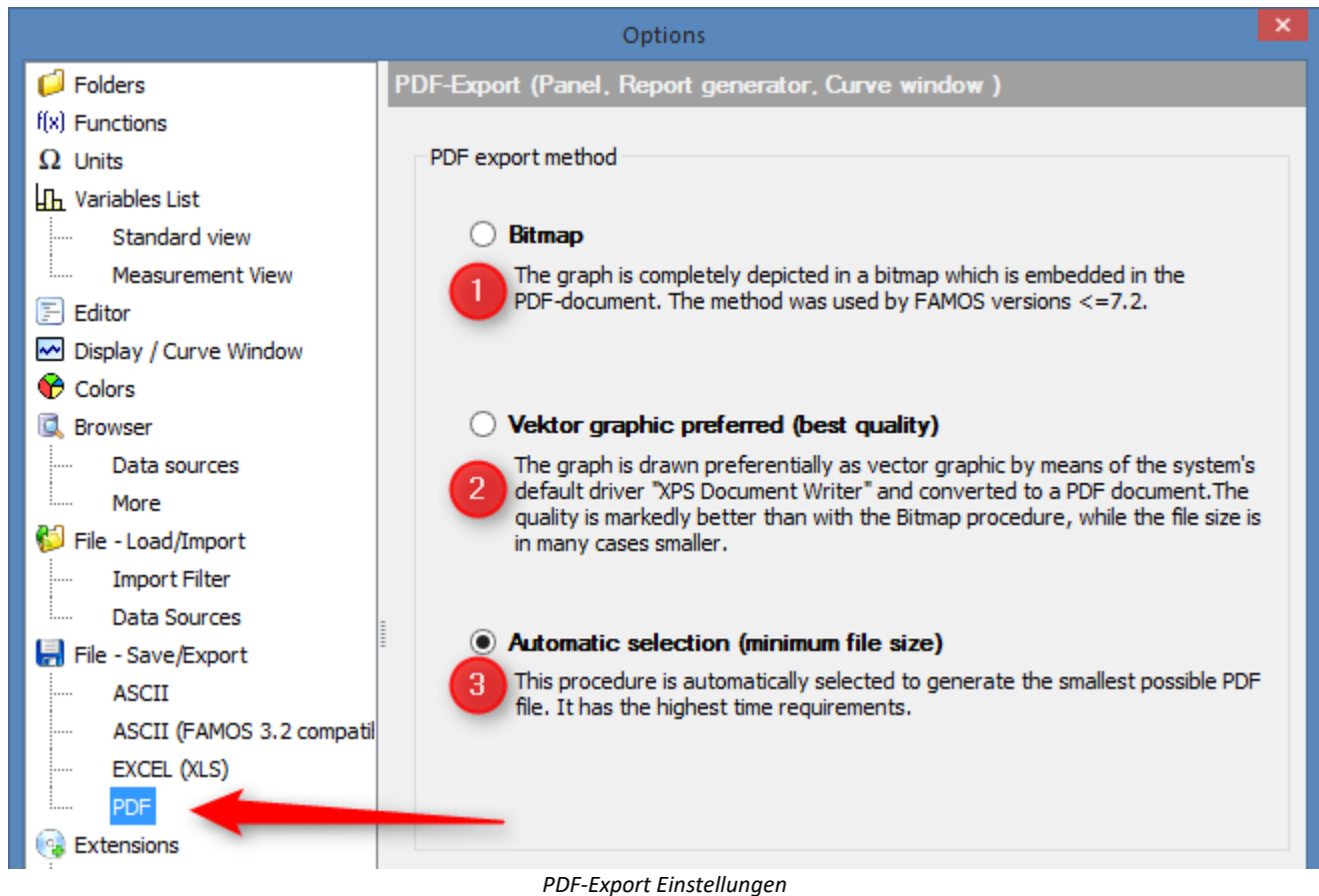
### 2.4.6.4 Status bar

The count of variables is now indicated in the Status bar.



## 2.4.7 PDF Export

PDF Export has been improved. For smaller file sizes, the quality has been significantly improved. This applies both for export of a **Panel** and **Report Generator** as well as to the export out of the **curve window**.



When creating the PDF file, graphics can be generated either as a bitmap or vector graphic. The rule of thumb is:

- Documents having a **high proportion of texts** and **simple curve graphics** produce smaller files with the **vector method**.
  - Documents having **complex curve graphics** and **large numbers of symbols** produce smaller files with the **bitmap method**.
1. **Bitmap**: Graphics and text are embedded as a bitmap. With curve windows having normal time plots, this generally produces larger files of lesser quality than with vector graphics.
  2. **Vector graphic preferred**: By means of Windows XPS Document Writer, texts and graphical sections are exported as individual objects and thus displayed in **highest and most scalable quality**. For text and "simple" graphics, this setting provides the best quality and smallest file size. However the file size advantage is reversed when the graphics are complex. Curve windows with symbols representing each measurement point, or with very many values, have much higher memory requirements for this technique.
  3. **Automatic selection**: With this setting, FAMOS produces the file according to the procedure which produces the smallest file size.

Furthermore, options in Settings and Handling of the curve window have been added to control the behaviour.

## 2.4.8 Curve Window

### 2.4.8.1 PDF Export

#### Graphic export:Create PDF files:

In the curve window menu *Options\Presettings\Handling global* the PDF export options have been added, which can be set in the [options dialog of imc FAMOS](#) <sup>39</sup>.

#### Graphic export:Export optimization:

In addition, *Options\Presettings\Settings* can be used to define how the **inner drawn area** of the curve window is exported.

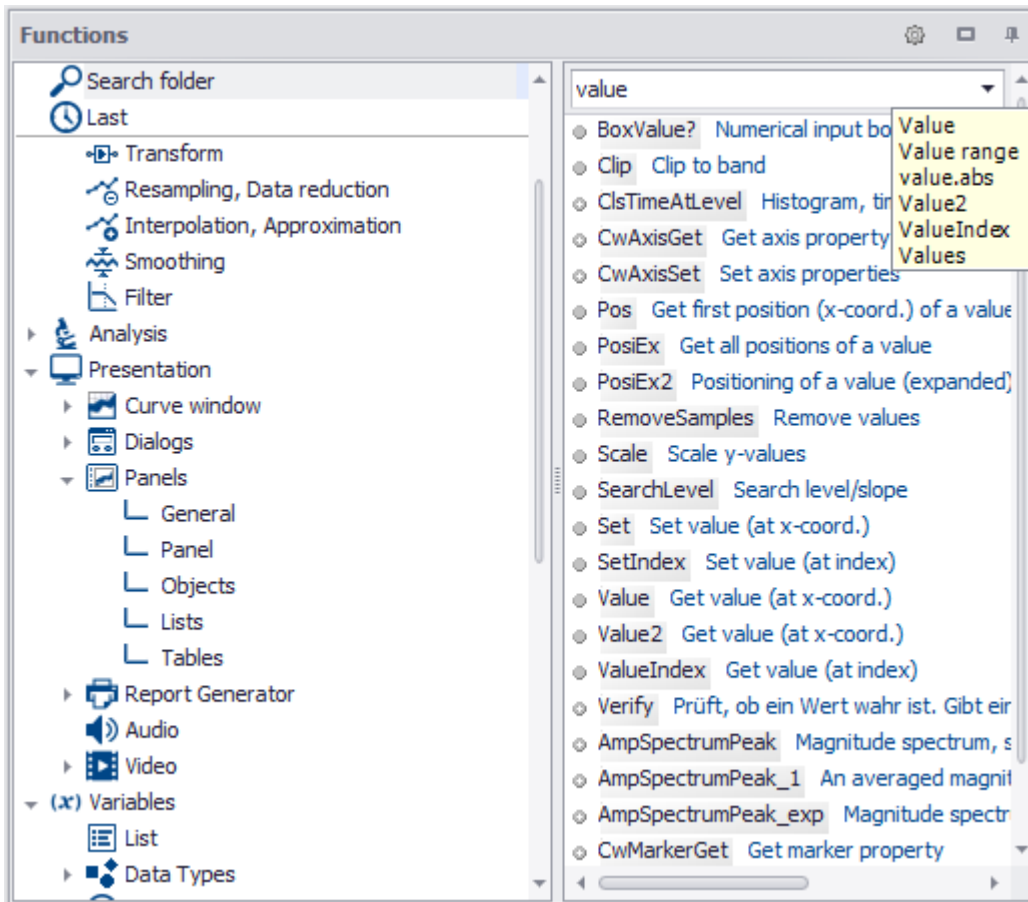
When *Bitmap* is activated, a bitmap is created containing the **interior of the coordinate system**, with its curves and graph lines. In consequence, when the graphic is complicated, having very many measurement points, graphics elements are not generated as a vector graphic, but only as a bitmap.

Markers, axis labels and legends are not affected and continue to be processed as text elements as vector graphics.

## 2.5 imc FAMOS Update-Info (Version 7.2)

### 2.5.1 Functions list

The Functions list has been completely revised. Targeted searching for functions is now possible, and they are arranged in a more clear pattern.



Toward this end, the groupings: *Favorites*, *Standard*, *Kits*, *DLL-Functions*, and *Boilerplates* have been merged into a unified tree diagram.



For the purpose of searching, a Such Folder with intelligent keyword searching has been implemented. In the search box it is possible to enter multiple terms separated by spaces. The search is then conducted as for an AND logical operation.

## 2.5.2 New and extended functions

### 2.5.2.1 Power

A new functions group for power calculations (similar to imc Online FAMOS)

Examples:

; with N\*PeriodDuration = multiple of sampling interval:

```
; with N*PeriodDuration = Multiple of sampling interval:
PowerSelect(1,1,1,1,1,1)
PowerParameter(50,10,0,0,0,0)
g1 = Power1(U1,I1)
g2 = Power2(U12,I1,U32, I3)
g3 = Power3(U1,I1,U2, I2, U3, I3)
```

; with variable frequency:

```
iv1 = IntervalFromLevel(U1,0,0,0,1,0,0,0,"")
PowerSelect(1,1,1,1,1,1)
PowerParameter(50,10,0,0,0,0)
g1 = Power1(U1,I1,iv1)
g2 = Power2(U12,I1,U32, I3, iv1)
g3 = Power3(U1,I1,U2, I2, U3, I3, iv1)
```

These functions are included as of the edition imc FAMOS Professional.

### 2.5.2.2 Intervals

For purposes of statistical evaluation of intervals, the following functions have been added:

**IntervalFromLevel**: Immediately adjacent intervals are generated from a signal, where the interval boundaries are determined by the signal's crossings through a threshold. Only if the intervals do not meet conditions regarding amplitude and width, they are discarded and leave gaps.

**IntervalFrom2Levels**(): Intervals are formed from a signal, where the boundaries are determined by the signal's crossings through specified thresholds.

**IntervalGetStatistic**(): For each of a data set's intervals, statistics such as Min, Max etc. are calculated.

These functions are included in the edition imc FAMOS Professional and higher.

### 2.5.2.3 Matrix

New functions for calculations with matrices.

These functions are included in the edition imc FAMOS Professional and higher.

**MatrixMult**: Multiplication of two matrices

**MatrixInverse**: Determine inverse matrix

**SolveLinEq**: Get solution of a linear equation

### 2.5.2.4 ApproNonLin()

Approximation by a function which can be non-linear in its coefficients. A function described by a formula is minimized in the sense of the least squares procedure. In the process, the formula's coefficients are determined. This function is included in the edition imc FAMOS Professional and higher.

### 2.5.2.5 Verify()

Checks whether a value is true, i.e. non-zero. Returns an error message otherwise. In that case, the sequence run aborts.

This function is included in the edition imc FAMOS Professional and higher.

### 2.5.2.6 Equal()

Compares two data sets for equality. The comparison is performed on each of a data set's readings in reference to the corresponding reading of the other data set. The data sets are only equal if exactly all the readings are equal.

This function is included in the edition imc FAMOS Professional and higher.

### 2.5.2.7 VarGetInit()

By calling VarGetInit(4) it is possible to determine the *number of parameters passed* in the subsequence called.

### 2.5.2.8 Text functions

New functions for texts and text arrays, including for regular expressions for Search and Replace.

- ◊ TxArrayDelete Deletes an element of a text array.
- ◊ TxArrayInsert Inserts a text or text array into a text array.
- ◊ TxSplit Function for splitting a text
- ◊ TxFind The system searches for a text in the text array or text.
- ◊ TxReplace The function searches for a text excerpt in a text or text array, and replaces it with different text.
- ◊ TxRegexMatch Finds texts in a text array or in a text by means of a regular expression.
- ◊ TxRegexReplace Replaces texts in a text array or in a text by means of a regular expression.
- ◊ TxFormatEx Function for formatting texts
- ◊ TxGetValidVarName The function forms a valid variable name from a text

### 2.5.2.9 Filesystem

New function to access the file system:

- FsGetFileNames: Read-in of files and folders. (fast alternative for FsFileListNew +FsFileListGetName)
- FsFileExists: Verifies whether the file or the folder exists.
- FsPathCombine:Combines two strings to a file path.

### 2.5.2.10 Internet

Functions for downloading internet-resources (HTTP GET-protocol)

- HttpGetText: Downloads the requested resource as a text.
- HttpGetFile: Downloads the requested resource and saves it to a local file.
- HttpOption: This function sets options for subsequent calls of HttpGetText() or HttpGetFile().

### 2.5.2.11 PnGetSelectedItem

The function *PnGetSelectedItem* now also supports the Panel-widget "CCV-Selector".

### 2.5.2.12 FOREACH VALUE

Matches the construct FOREACH SAMPLE, but is read-only and consequently faster.

### 2.5.2.13 Database-Kit

This Kit provides functions for accessing databases. The data can be transferred either from the database to FAMOS, or vice-versa from FAMOS to the database. The Kit provides access to:

- Oracle 10g, 11g, 12c
- MS SQL Server 2005, 2008 or higher
- MySQL 5.5, 5.6
- Microsoft SQL Server Compact Edition 4.0
- Database systems about ODBC

The Database Kit is not included in this edition of imc FAMOS and can be purchased separately.

## 2.5.3 Variable list

### 2.5.3.1 Measurements list

The default rules for measurement assignment ("*Grandparent folder*") have been supplemented. In consequence, it is possible, for example, to edit folder structures which are generated in imc STUDIO measurements with trigger folders.

### 2.5.3.2 Alphabetic sorting

The alphabetic sorting in the Variables list has been revised. Instead of "strong alphanumeric", the "natural sort order" familiar from the Windows-Explorer is used.

Consecutive digits in names are treated as multi-digit numbers and evaluated accordingly.

Previously: Channel1 -> Channel10 -> Channel2

Now: Channel1 -> Channel2 -> Channel10

## 2.5.4 Defining favorites

It is now possible to define multi-line boilerplates.

## 2.5.5 Panel

### 2.5.5.1 Page adjustment

In Design-Mode, the context menu item "Adapt page size" can be used to adapt the page size to the space available (correspondingly to imc STUDIO).

An additional "Options/Properties"-dialog governing the system behavior at run time, including setting the initial position (e.g. always docked, Fullscreen), automatic scaling of widgets when their size is changed, has been implemented.

### 2.5.5.2 Widgets property anchor

New property "*Anchor*" for all widgets used with automatic rescaling.

### 2.5.5.3 Button-Widget

In addition to a caption, an image can now also be displayed.

For this purpose, the properties "*Image*", "*Image-Alignment*", "*Text Alignment*", "*Padding*" have been added.

### 2.5.6 Help window

All Help window texts on the functions have been revised and uniformly structured.

### 2.5.7 Variables

It is now possible to initialize variables with multiple values, e.g. Coefficients = [1, 0.2 , -1.4e-5, 2]

Along with decimal numbers, integers in hexadecimal format are now also allowed.

See also the imc FAMOS user's manual in the chapter *Creating variables*.

### 2.5.8 Sequences

- Due to internal optimization, the running of sequences, particularly of such that contain loops with high iteration counts, has been significantly accelerated in some circumstances.
- The maximum number of parameters has been increased from 9 to 20.
- Sub-sequences are sorted in alphanumerical order.

### 2.5.9 Editor

- The content of single value or text variables can now be displayed in response to a "mouse-over":

`CurrentValue= ii`

- The variable under the mouse pointer is selected in the Variables list when you select the keyboard combination [CTRL+T]. This assists in searching for a variable in a long Variables list.

### 2.5.10 Datasources

The data type "*imc STUDIO Measurement data storage*" has been added, which is designed to accommodate the structure of measurement and video data recorded with imc STUDIO. For evaluation purposes, non-relevant subfolders ("*Meta*", "*Config*") are automatically hidden.

### 2.5.11 Curve window

#### 2.5.11.1 Copy/Paste

With Copy & Paste, you can transfer once curve window's configuration to another. To do this, copy the configuration of the selected window using **CTRL-c** and transfer it to another one using **CTRL-v**.

With embedded curve windows, it is additionally necessary to hold down the *SHIFT*-key (child-windows/widgets in the Panel).

#### 2.5.11.2 Connect (Link)

**Color maps** can also be linked in the y-direction. For this purpose, in the Options for the curve window, under *Settings*, the necessary properties have been added to the *Link*-property "*What is influenced in the Link*" accordingly:

"*x-, y-axis (color map)*" and "*y-axis*"

### 2.5.11.3 x-Axis

If the scaling of the x-axis is in abs./rel time, the format of the labeling can be specified:

- Auto ,Auto 1 line, Auto 2 lines
- fix 1 line or fix 2 lines.

### 2.5.11.4 Last Value As Number

Numerical values can also be formatted as *Floating point*, in *Hex-format*, or as *Date/Time*

## 2.6 imc FAMOS Update-Info (Version 7.1)

### 2.6.1 Local variables

Variables can be defined as "local" within a sequence. Such variables are only valid during the execution of the sequence; at the end of the sequence execution, such variables are deleted automatically. For this purpose, the new keyword "LOCAL" has been introduced.

The **declaration** is made directly in the assignment:

```
LOCAL temp = Ramp(0, 1, 100)
```

or by means of forwards declaration:

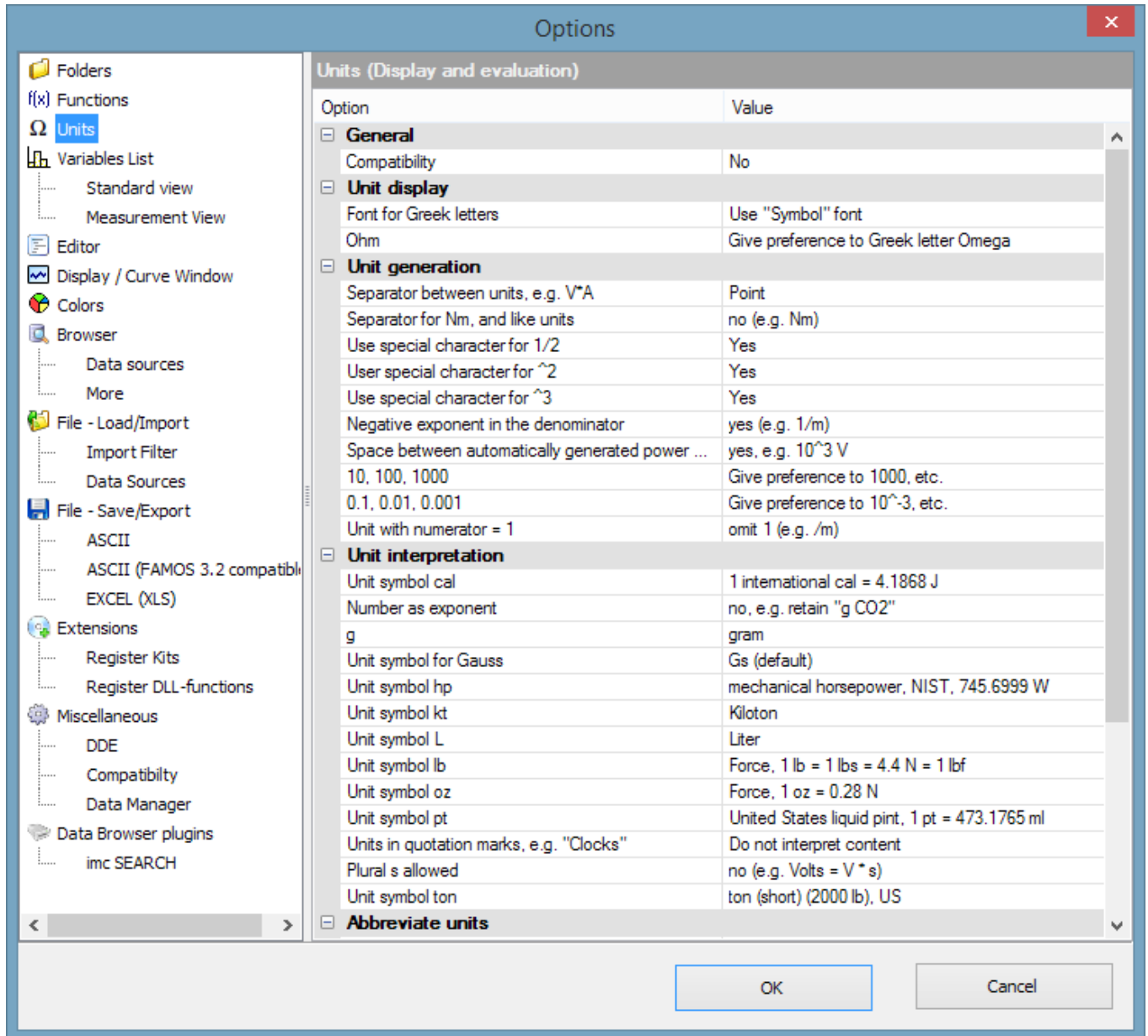
```
LOCAL temp  
temp = Ramp(0, 1, 100)
```

With the forwards declaration, it is also possible to use wildcards (\*, ?):

```
LOCAL ?      ; all variables with exactly one character  
LOCAL #*    ; all variables which begin with '#'
```

## 2.6.2 Handling physical units

Improved display and computation of physical variables. In addition to the fundamental SI-units, many other commonly used units are now also recognized. The detailed behavior of the units manager can be specified:



## 2.6.3 New functions

### 2.6.3.1 ConvertUnit ()

This function converts a data set's physical units and changes the numerical values accordingly.

Examples:

```
Signal = ConvertUnit(Signal, "km/h", 1)
; Y-unit 'm/s' => Event: 'km/h', all Y-values are multiplied by 3.6
```

A common application is normalizing to fundamental SI-units:

```
Signal = ConvertUnit(Signal, "SI0", 1)
; Y-unit 'kV' => Event: 'V', all Y-values are multiplied by 1000
```

```
; Y-unit 'min' => Event: 's', all Y-values are multiplied by 60
; Y-unit '°C' => Event: 'K', 273.16 is added to all Y-values
; Y-unit 'V/A' => Event: 'Ohm', Y-values unchanged
```

See also the topic of units in the [curve window](#)<sup>49</sup>.

### 2.6.3.2 Measurements

New functions for working with measurements offer an alternative to manual selection of measurements/channels in the Variables list/Measurement view.

Thus, for instance, it is now possible for many measurements to be selected in succession by means of a sequence and incorporated in a report.

<a href="#">MeasNames?</a>	Finds existing measurements
<a href="#">MeasChanNames?</a>	Finds a measurement's existing channels
<a href="#">SelMeasListSetName</a>	Sets an entry in the Data Selector's Measurement list
<a href="#">SelChanListSetName</a>	Sets an entry in the Data Selector's channel list
<a href="#">SelListControl</a>	Various Data Selector actions (emptying, updating)

Further, it is now possible to specify a measurement association immediately when creating a new variable (by assignment):

```
Developer@Measurement27 = "John Doe"
```

This principle is also applicable in combination with specifying a default measurement by means of `SelUseMeasurement()`. The measurement name then simply remains empty:

```
SelUseMeasurement(1)
MeanOfLevel@ = Mean( Level )
```

If the first selected measurement in the Data Selector has the name "Measurement27" and contains a channel "Level", then the previous notation is equivalent to:

```
MeanOfLevel@Measurement27 = Mean( Level@Measurement27 )
```

### 2.6.3.3 Measurement uncertainty

The group 8> Statistics has been supplemented with functions for determining the measurement uncertainty.

These features are not available in the Standard Edition!

#### **UncertaintySet(Variable, TxPropName, Value)**

Sets a user-defined property in the field of measurement uncertainty.

#### **UncertaintyGet(Variable, TxPropName) -> Value**

Queries a user-defined property in the field of measurement uncertainty.

#### **UncertaintyModify(Variable) -> Result**

Adds noise to a signal for the purpose of determining the measurement uncertainty according to the Monte-Carlo method.

**UncertaintyCalc**(Variable [, coverage probability] [, Reserved] [, Extended1] [, Extended2] [, Extended3] [, Extended4])

Determines the measurement uncertainty by the Monte-Carlo method.

**UncertaintySnapshot**(Variable [, Option])

Collection of trial variants for a variable created by the Monte-Carlo method within an UNCERTAINTY\_LOOP.

**UNCERTAINTY\_LOOP** Trial count EwInit

Loop for determining the measurement uncertainty results from an algorithm using the Monte-Carlo method (MCM).

### 2.6.3.4 FOR, FOREACH

For the iteration variable, it is now also permitted to use the notation "Groupname:ChannelName".

### 2.6.3.5 Comparison operators, logic

New functions in group 20 for bit-wise operations:

- BitAND Bit-wise AND operation
- BitOr Bit-wise OR operation
- BitNot Bit-wise inversion
- BitShift Shifting of bit pattern
- BitSet Setting of a bit
- BitGet Querying of a bit

### 2.6.3.6 Spectral Kit

Savitzky-Golay filtering for smoothing signals has been added.

### 2.6.3.7 Class-counting Kit

Calculation of quantiles of a distribution given in histogram form.

### 2.6.3.8 Curve Window Kit

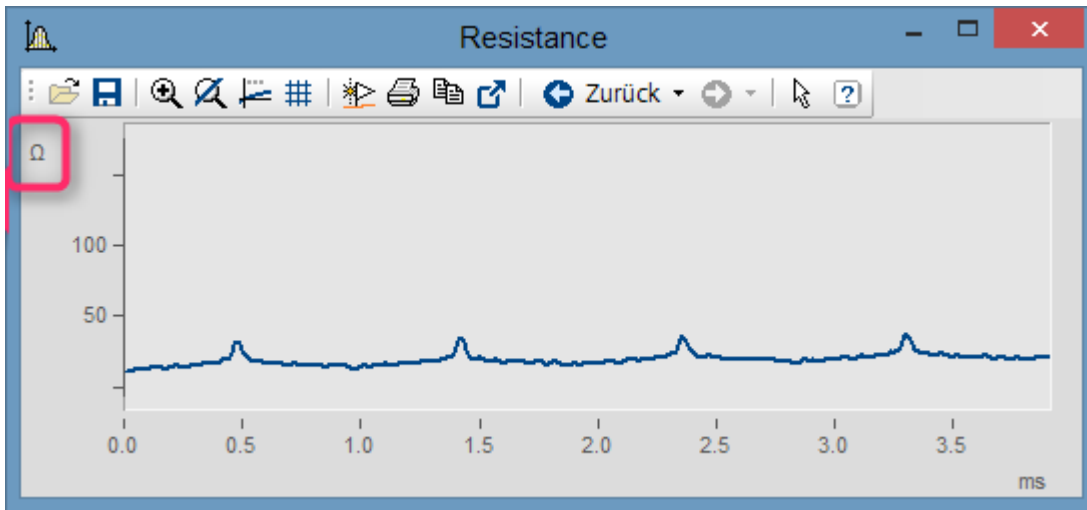
Various properties for CwAxisSet, CwLineSet, CwMarkerSet, CwGlobalSet have been added.



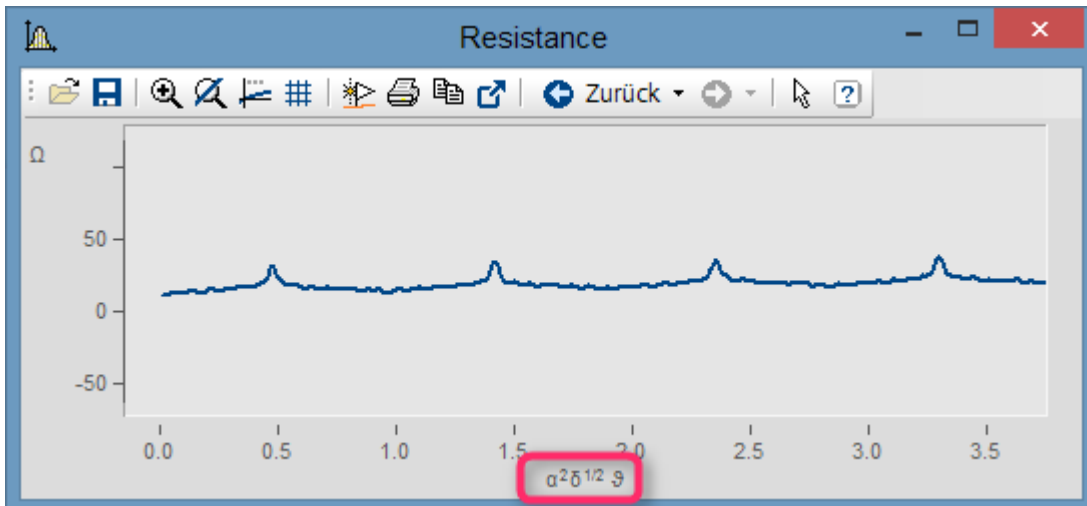
## 2.6.4 Curve Window

### 2.6.4.1 Units

- Units with Greek letters:



Ohm as a unit in the curve window



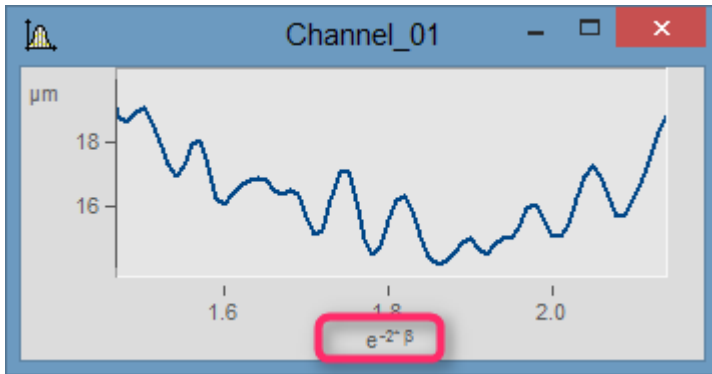
Greek letters by means of placeholders:  
 $\langle g*a \rangle^2 \langle g*d \rangle^{1/2} \langle g*ta \rangle$

The screenshot shows the "Axes" configuration dialog box with the "Text" tab selected. The "Text" field contains the placeholder text  $\langle g*a \rangle^2 \langle g*d \rangle^{1/2} \langle g*ta \rangle$ . Other settings like "Options description", "Font size", "Color", and "Placement" are also visible.

Greek letters by means of placeholders:  
 $\langle g*a \rangle^2 \langle g*d \rangle^{1/2} \langle g*ta \rangle$

Placeholder, Unicode, Meaning

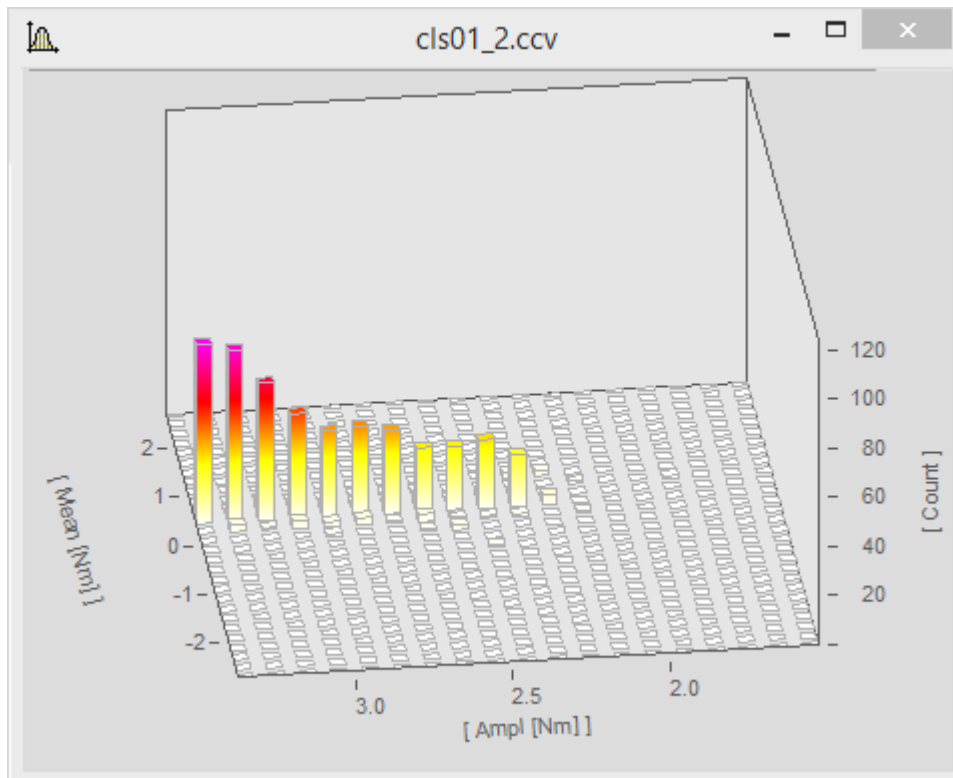
'a': 0x3b1 // Alpha	'm': 0x3bc // My
'b': 0x3b2 // Beta	'n': 0x3bd // Ny
'g': 0x3b3 // Gamma	'x': 0x3be // Xi
'G': 0x393 // Gamma groß	'X': 0x39e // Xi groß
'd': 0x3b4 // Delta	'p': 0x3c0 // Pi
'D': 0x394 // Delta groß	'ph': 0x3c6 // Phi
'e': 0x3b5 // Epsilon	'ps': 0x3c8 // Psi
'et': 0x3b7 // Eta	'P': 0x3a0 // Pi groß
'z': 0x3b6 // Zeta	'Ph': 0x3a6 // Phi groß
'th': 0x3b8 // theta	'Ps': 0x3a8 // Psi groß
'ta': 0x3d1 // theta, (gewohnte) Schreibweise	'r': 0x3c1 // Rho
't': 0x3c4 // tau	's': 0x3c3 // Sigma
'Th': 0x398 // Theta groß	'S': 0x3a3 // Sigma groß
'k': 0x3ba // Kappa	'ch': 0x3c7 // Chi
'l': 0x3bb // Lambda	'Ch': 0x3a7 // Chi groß
'L': 0x39b // Lambda groß	'o': 0x3c9 // Omega
	'O': 0x3a9 // Omega groß

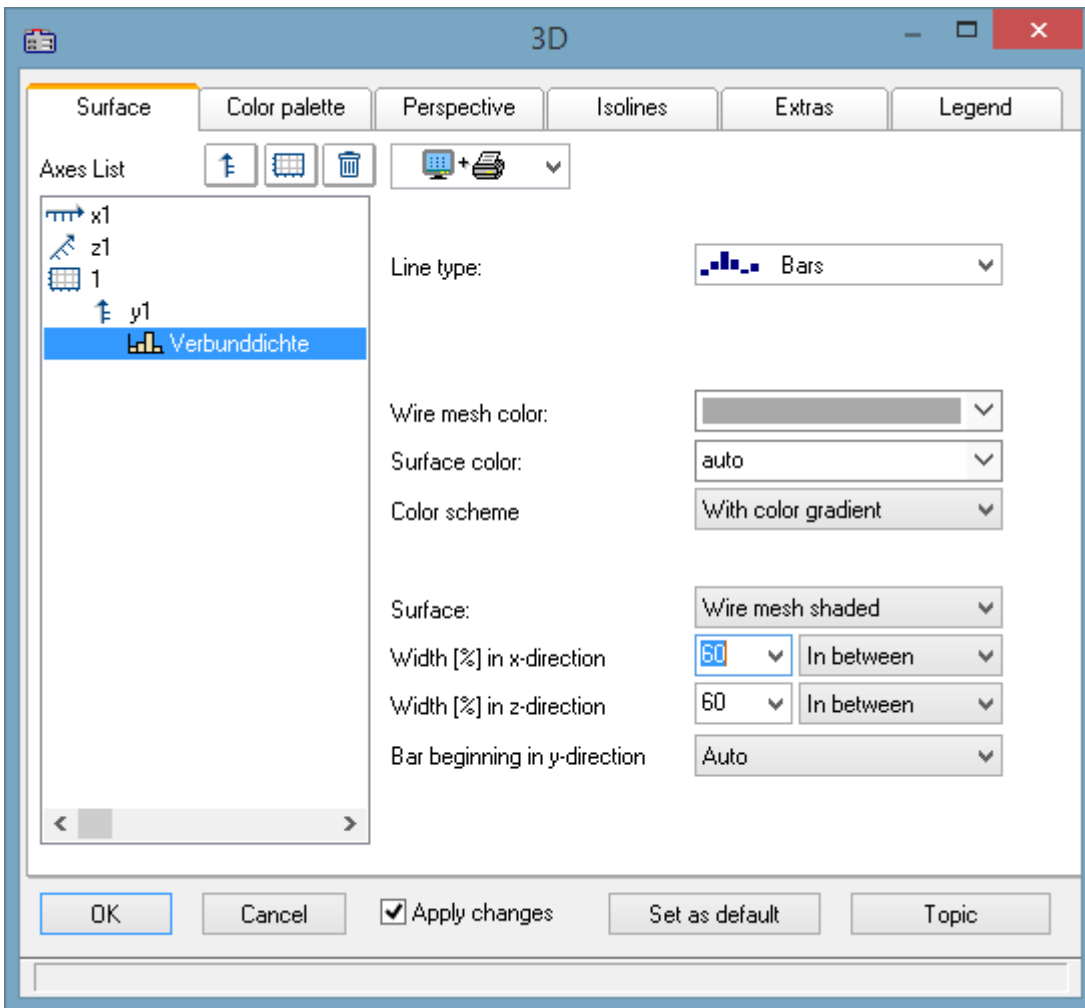


Exponent of placeholder in parentheses:  $e^{-(2\cdot g\cdot b)}$

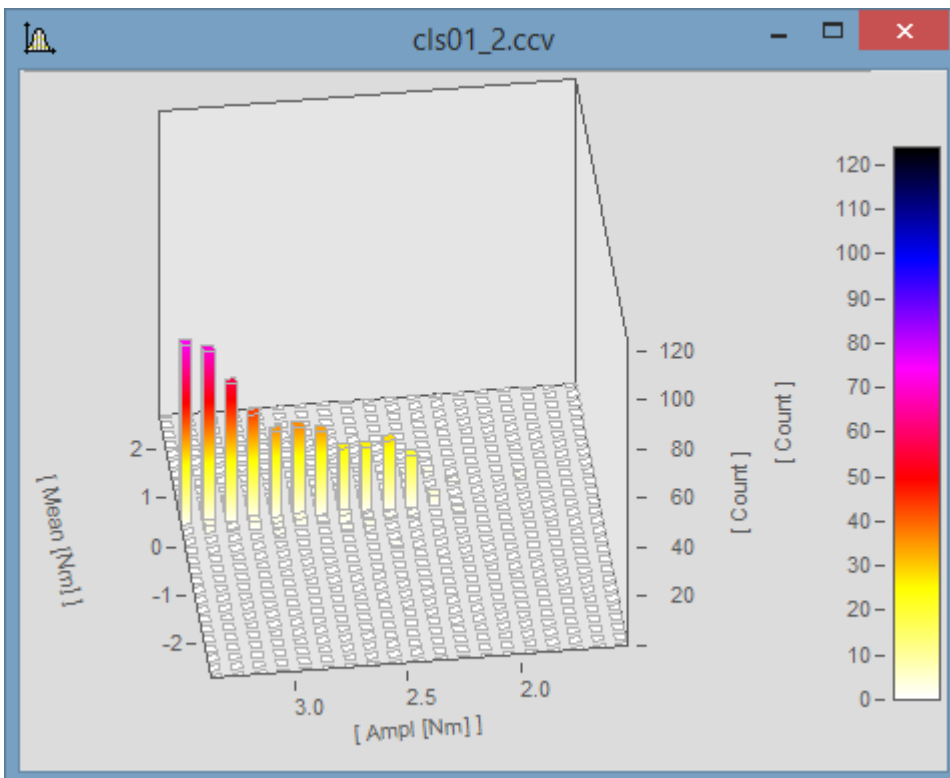
- Furthermore, the display of orders of magnitudes of units has been improved. If the unit is mm, for example, then in the curve window, the units m and µm may be displayed. Absurd unit specifications are avoided.

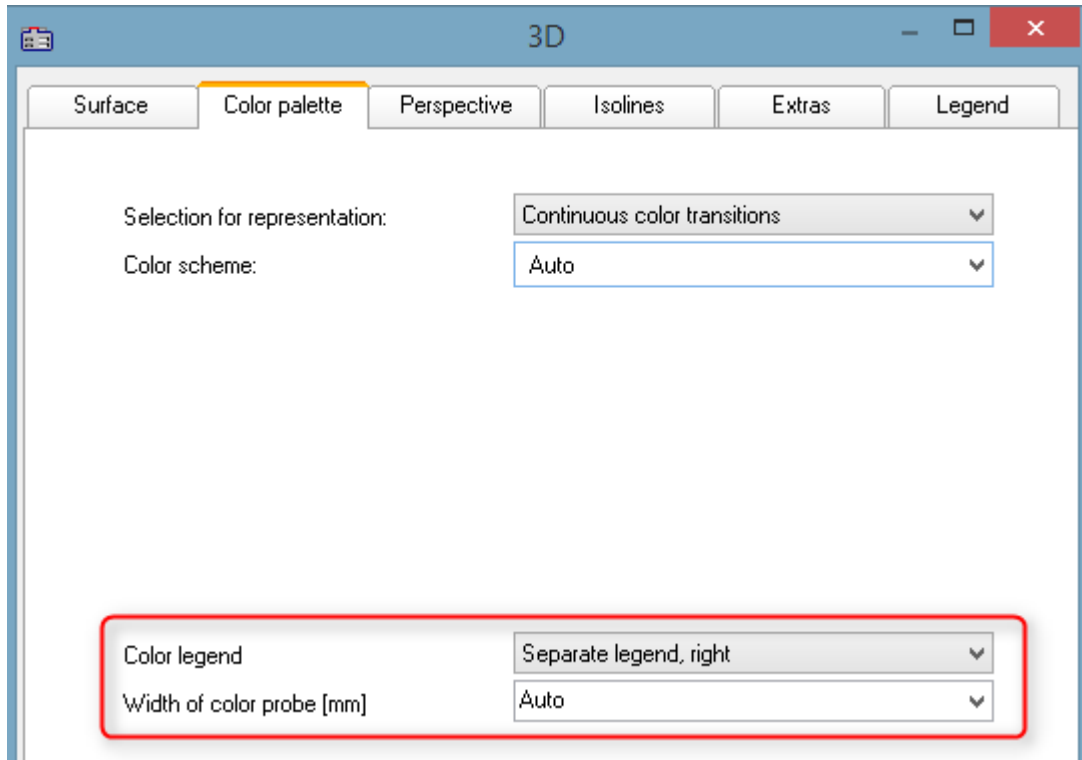
2.6.4.2 3D bars



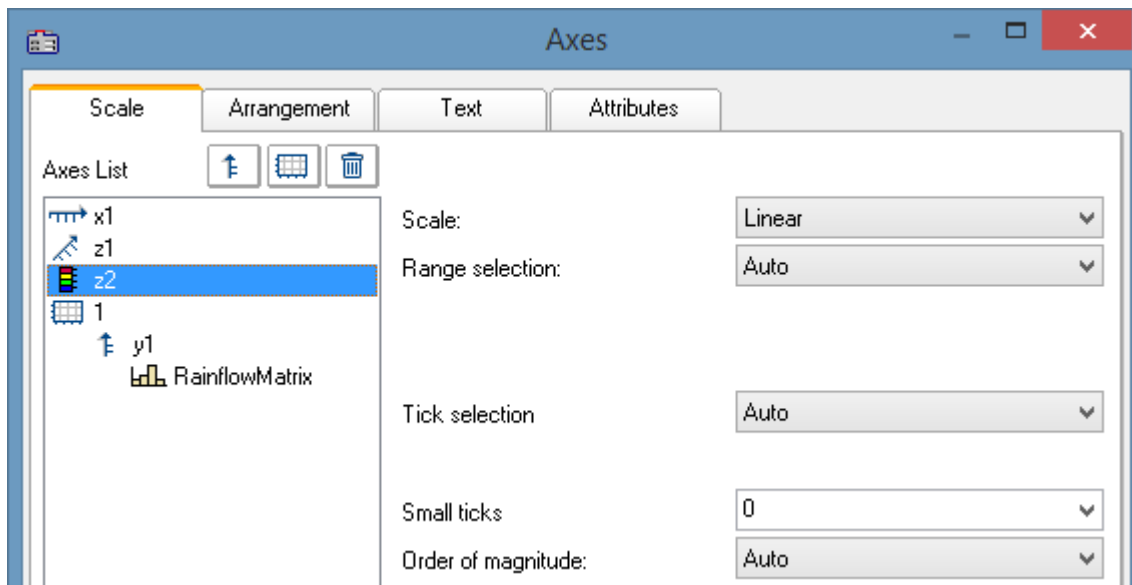


### 2.6.4.3 Color legend for 3D

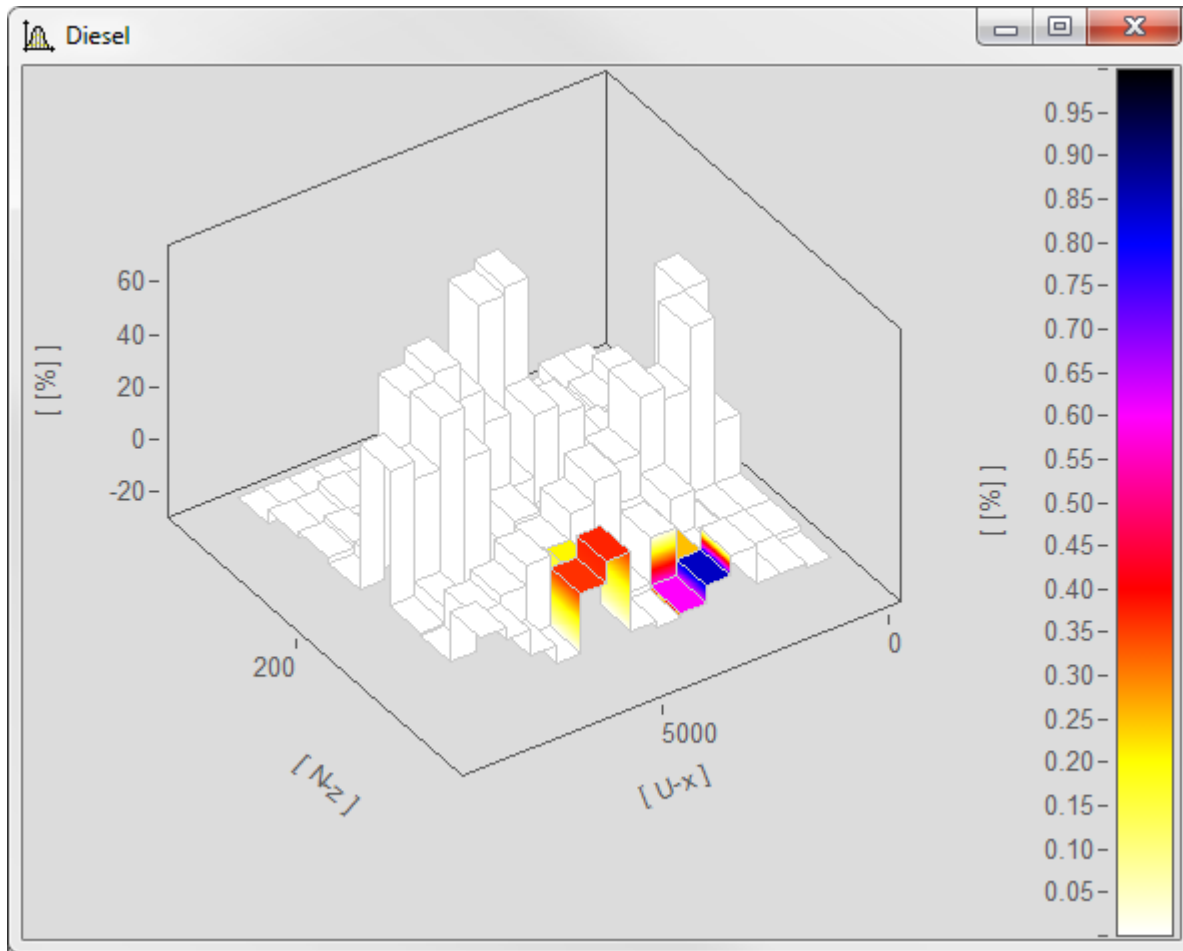




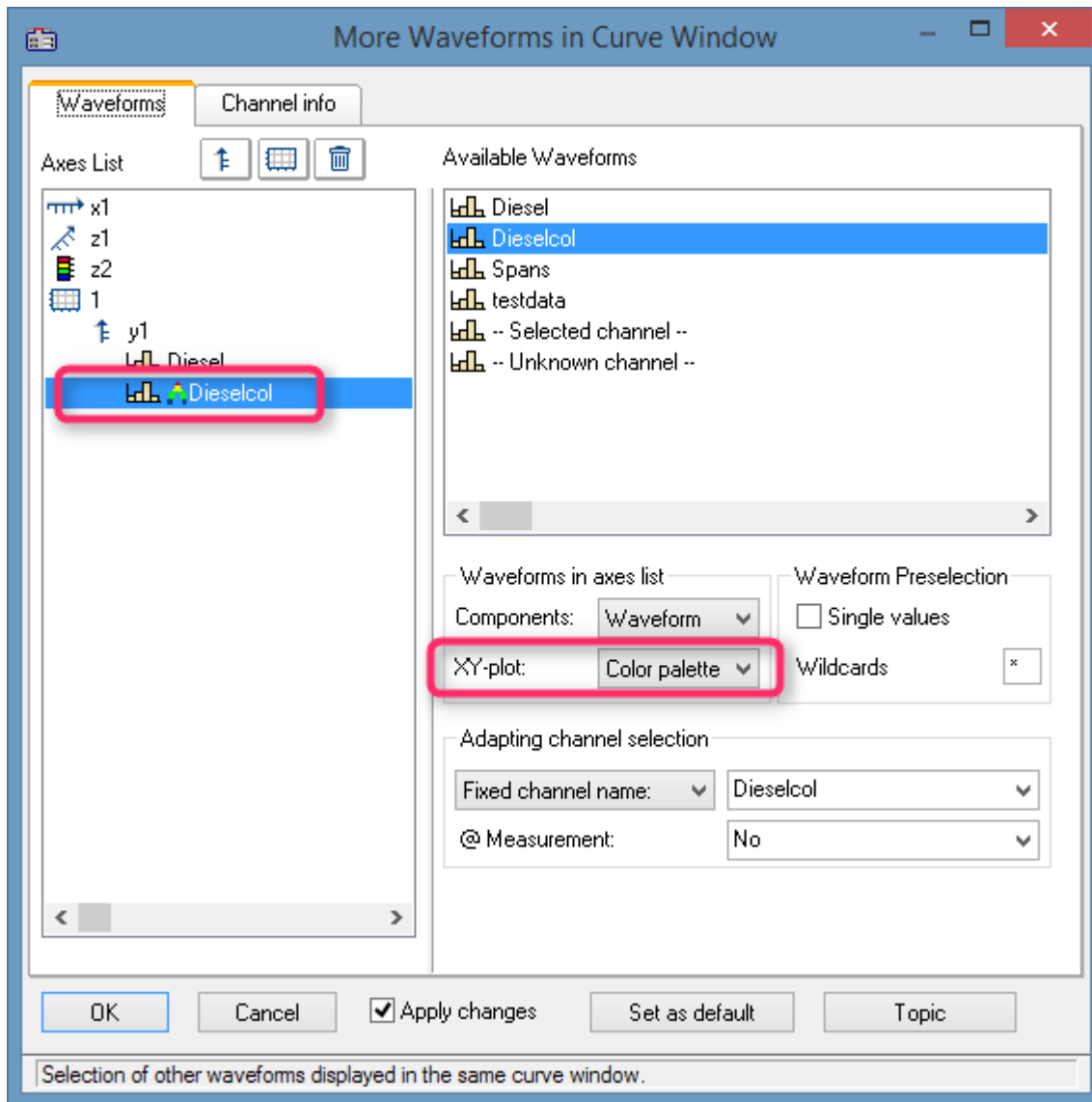
With a separate color legend, the color is specified independently of the displayed y-range. The color legend can also adhere to the y-axis. Then the y-coordinate always corresponds to the color. Color axis settings:



### 2.6.4.4 4D (3D + color)



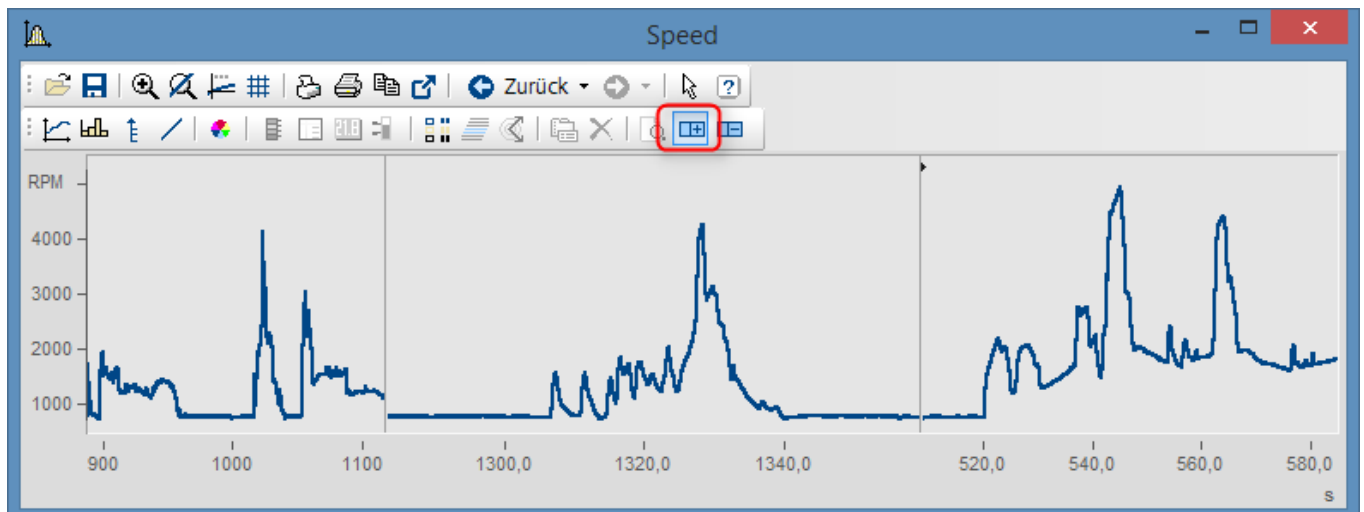
Selection of the color-determining channel (exactly same structure as channel for 3D display):



The color legend must be selected.

### 2.6.4.5 Split-Mode

In the *Construction* toolbox, the new Split mode has been introduced. With it, a curve window can be subdivided an arbitrary amount of times in order to focus on different regions of a signal.



### 2.6.4.6 Selection of measurement uncertainty

The curve window dialog *Configuration / Lines.. / Extras* has been supplemented with the entry *Selection of measurement uncertainty*.

The available options are:

- *Expanded uncertainty*: Product of a combined standard measurement uncertainty and a factor larger than the number one.
- *Standard uncertainty*: Uncertainty of the result of a measurement expressed as a standard deviation.

### 2.6.4.7 Channel info

The curve window dialog *Configuration / More channels* now also displays the user-defined properties on the page *Channel info*.

### 2.6.4.8 Presettings

The function "*Movement by means of mouse*" can now be suppressed.

## 2.6.5 Panel

### 2.6.5.1 New widgets

#### Datagrid

This widget serves to display data in tabular form. In contrast to the cell-oriented widget "*Table*", this is optimized for column-wise display of data and also allows values to be changed.

Time	Channel1	Channel2
15:59:05,00	-0.0803828	-0.25438
15:59:05,09	-0.0795863	0.0349026
15:59:05,20	0.167201	0.0258671
15:59:05,29	0.535072	0.165248
15:59:05,40	0.654936	0.303725
15:59:05,50	0.786296	0.440971
15:59:05,59	0.672474	0.576611
15:59:05,70	0.929553	0.859233
15:59:05,79	1.08243	0.692321
15:59:05,90	1.20453	1.11852
15:59:06,00	1.23624	1.0945
15:59:06,00	1.67983	1.91681

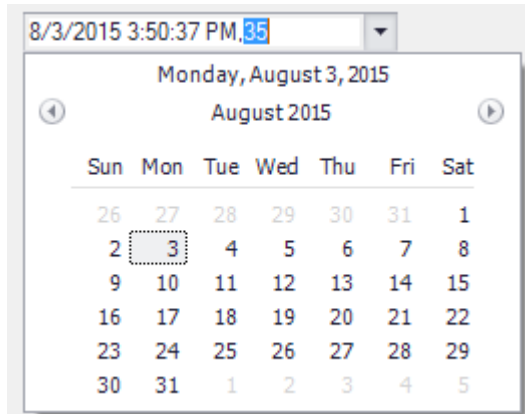
#### Slider

Graphical element for display/selection of a value from within a defined value range.



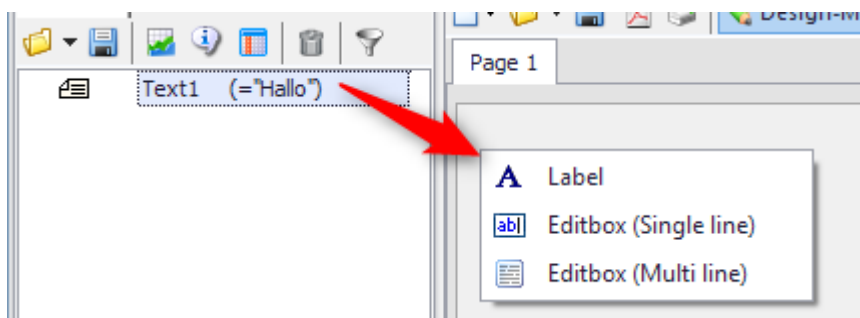
## Date Time

Widget for optimized display and entry of date and time.



### 2.6.5.2 Drag&Drop for text variables

When applying Drag&Drop to move text variables onto a Panel in Design mode, a selection menu of available widgets (labels, input boxes, etc.) is now displayed.



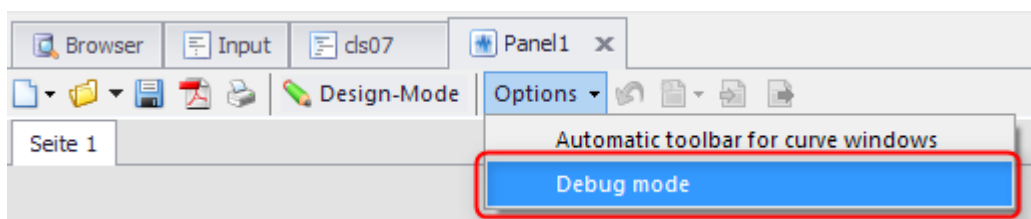
### 2.6.5.3 Panel remote control

- New event for input boxes - "Changed". The condition is that the widget be linked with a variable.  
The event "Changed" is triggered if the value of the linked variable has changed.
- For the functions `PnTableSetColumn()` and `PnTableSetRow()`, text arrays are now also allowed as parameters.

### 2.6.5.4 Debugging Panel-event sequences

A Debug mode for debugging Panel event sequences has been added.

For the process of developing complex panels, this facility makes it easier to find errors. As with "normal" sequences, it is possible to define breakpoints at which execution of the sequence is interrupted. The sequence is displayed in the Editor and can be resumed step-by-step starting at the current command line. The same applies when the sequence run encounters a (syntax-) error.





## 2.6.6 Variable list

### 2.6.6.1 Filtering for the Variables list

"Inverse" filter condition added.

With a preceding "!", the pattern can be inverted.

#### Example:

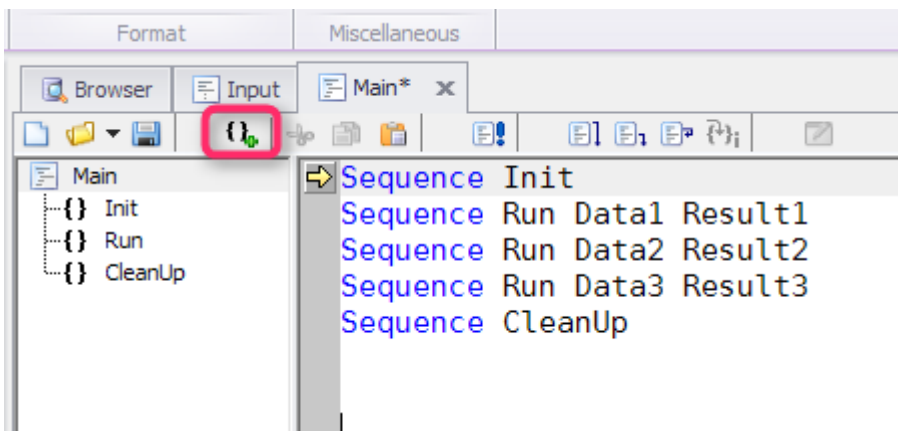
"!a\*" Displays all variables which DO NOT begin with the letter "a".

"!sp\*" Displays all variables which DO NOT begin with the letter "sp".

## 2.6.7 Editor

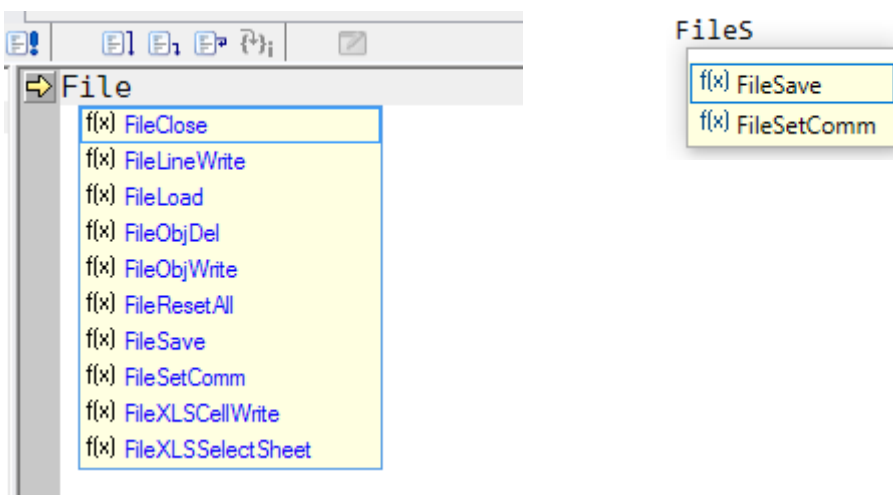
### 2.6.7.1 Editor with sub-sequences

Sub-sequences can now be directly embedded into the calling sequence and no longer need to be saved in a separate sequence file.



### 2.6.7.2 Autocomplete

When entering sequence code, a selection list is provided to the user, which contains suggestions representing sensible completions of the user's entry thus far. For example, these could be a function name, a variable's name, or lists of function parameters.

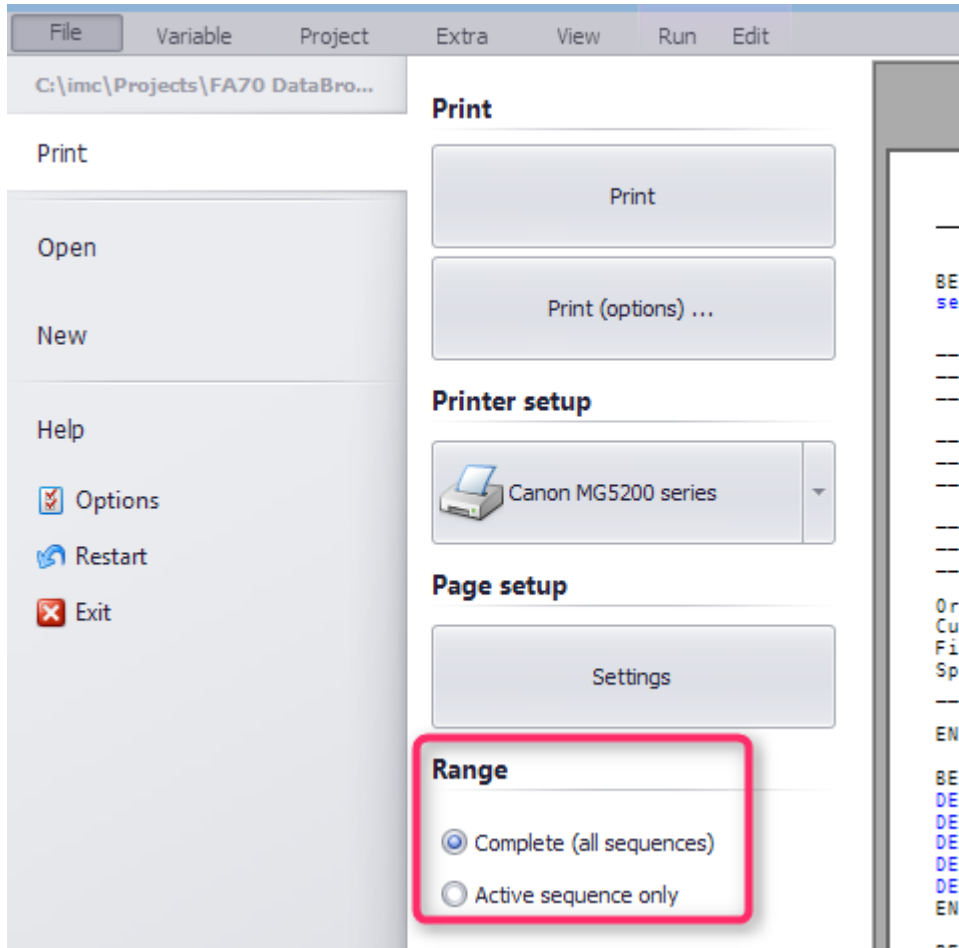


### 2.6.7.3 Text as HTML text

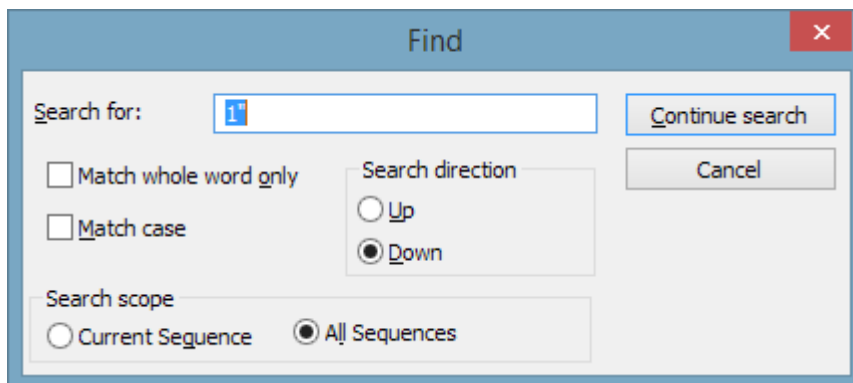
Copying to the Clipboard can now additionally be performed in HTML-format. Thus, the sequence text can now be copied from text processing programs while maintaining the color-coding for syntax.

### 2.6.7.4 Printing

With Panels and dialogs, it is now possible to print all the associated (event-) sequences simultaneously.

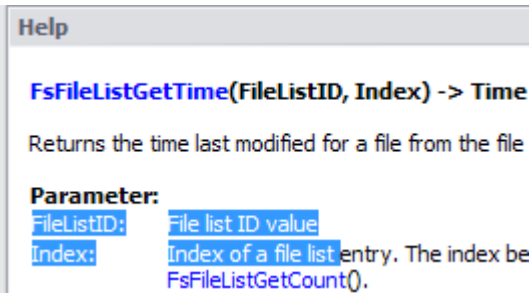


As well, global find/replace of text across all partial sequences is possible.



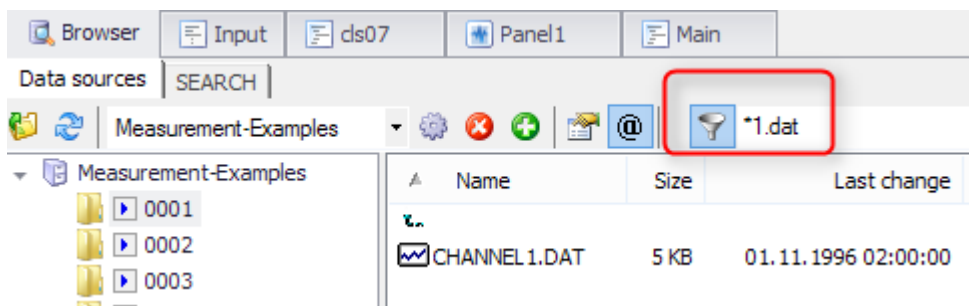
### 2.6.7.5 Help window

Texts in the help window can now be arbitrarily selected and copied.



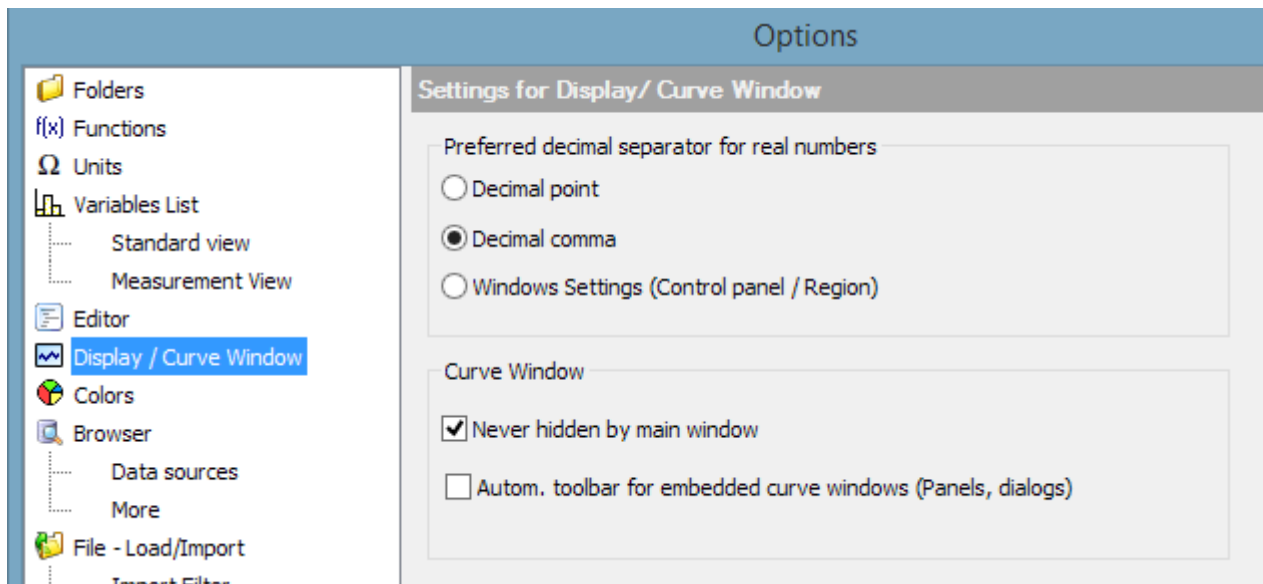
### 2.6.8 Data sources-Browser

A filter governing the display of data sources has been added.



### 2.6.9 Display / Curve window

Optionally, real numbers can now be displayed with a decimal comma (curve window, Panel, Report Generator).



### 2.6.10 Import/Export

#### 2.6.10.1 Excel 2016

Excel-linkage has been extended to the EXCEL 2016 version.

## 2.7 imc FAMOS Update-Info (Version 7.0)

### 2.7.1 Look and Feel

- **New GUI design**

- A Panel is now an intrinsic component of the standard user interface. When you go to a Panel-page's Design-mode, the Widget Properties are automatically displayed.
- The Variables box and Data Browser (Measurements) have been combined in one window.
- The concept of data sources has been revised.
- The user interface has been completely revised and redesigned with ribbon menus.
- Visual display in a variety of Skins.

- **Flexible user interface layout**

- Drag & Drop of interface elements
- Windows freely positionable
- Freely configurable toolbars

### 2.7.2 Functionality

#### **Boilerplates**

*Boilerplates* (conditions, FOR loops, etc.) are now below Functions on the page "*Boilerplates*"

#### **Multi-instances**

It is now possible to run multiple instances of FAMOS on one PC. For this purpose, the start parameter /N has been introduced.

#### **imc FAMOS Reader**

The free edition of imc FAMOS Reader no longer requires registration.

## 2.7.3 New keyboard combinations

as of imc FAMOS 7.0	Description	until imc FAMOS 6.3
CTRL + TAB	Document-selector	-
CTRL + PageUp/PageDown	Changing the active page in the Variables list, Functions list, Browser window and Panel	CTRL + Tab
F2	Switches between Browser-window and last sequence/Panel-window used	-
SHIFT+F2	Load measurement value file dialog	F2
F3	Save selected variables together	SHIFT+F3
SHIFT + F3	Save selected variables individually	F3
F4	Show selected variables together	SHIFT+F4
SHIFT + F4	Show selected variables individually	F4
F6	Selected variables in the Data Editor ( <i>remains empty!</i> )	F10
SHIFT + F6	Call Data Editor	-
(ALT+F1)	When the cursor moves to over a function's name, the associated Quickhelp text is displayed. The previous behavior (CTRL+F1) can still be obtained using the keyboard combination ALT+F1, if the setting " <i>Display automatically</i> " is previously deactivated under " <i>Extras\Options\Editor</i> " -> " <i>Syntax Help</i> ".	CTRL+F1
F8	Call Project-Explorer	-
F10	Activates/deactivates access key infos. (ALT has same function.)	-
CTRL + SHIFT + S	Save sequence/Panel as...	-
-	Toggles active window between normal/maximized state	CTRL+ F9

## 2.7.4 New functions

### Edit

***RemoveSamples()***: Deletes values in a data set

### Panel

***DbSetPanelWindow()***: Positioning of a panel on the screen

***SelUseMeasurement()*** : Along with the measurement number, it is now also possible to specify a measurement name.

### System

***GetSystemInfo()***: Queries the screen resolution

### Video

**Showing a Video-variable** opens a pre-defined Panel with a video widget and loads the video file.

### Time-Stamp ASCII data

***TSAJoin()***: Allows data to be joined together in TimeStampASCII-format.

### 2.7.5 ASCII/EXCEL-Import

The ASCII-Import-Assistant can now also be used for EXCEL-files.

The format-name has thus been changed from "*ASCII-Import...*" to "*ASCII/Excel-Import...*".

### 2.7.6 PDF-Export

PDF-export for Panels and Reports has been supplemented with a new option "*Append to existing file*". This option has also been implemented in the Kit commands PnExportPDF and RgDocExportEx.

### 2.7.7 64-bit support

At installation, along with the 32-bit version, the 64-bit version is now available.

This renders certain limitations of 32 bits obsolete:

- Data set size > 2GByte
- Data set length > 2G Samples
- Working memory requirement per FAMOS instance > 2GByte

## 2.7.8 Curve window

### 2.7.8.1 Menu navigation and settings dialogs

The menu organization has been revised:

- **Options\Transfer-Options** are now collected under "Options\Presettings\Handling" in the section "Transfer to imc FAMOS".
- Double-clicking no longer activates **Selection mode** if "Double-click on empty areas" is set to "no action" under "Options\Presettings\Handling" in the section "Mouse".
- The **measurement cursors** now remain at the data position if "When x-axis changes" is set to "Measurement cursor remains at its coordinate" under "Options\Presettings\Handling" in the section "Measurement window". In consequence, the measurement cursors now also remain if they were previously set in a zoomed segment.
- The **colors** are now set under "Options\Presettings\Colors". Color selection controls also allow arbitrary colors; entries can be made in terms of RGB or HSL.
- **Colors** can now also be set **individually** for a curve window if "Individualized colors for this window" is set to "Yes" under "Options\Presettings\Colors\" in the section "What settings are to be made?".
- It is now possible to set limits for the memory space for the **history**, if "Max. memory [MByte]" is set to a fixed value under "Options\Presettings\Settings\" in the section "History (Switch forwards/back between views)".

### 2.7.8.2 Scaling

- **Zoom:** The size of the range displayed can now be altered using the mouse wheel. If the measurement cursor is located over a curve, the X and Y axes are scaled simultaneously. If the mouse is over an axis, only it is scaled.
- **Moving range:** By keeping the left mouse button pressed, it is possible to change what region of the data is displayed.
- **Y-axis stays automatic:** The Y-scaling now also stays on the setting "auto" when scrolling, if "Navigation in x-direction" is set to "y-axes stay automatic" under "Options\Presettings\Handling\" in the section "Axes".
- Scaling of data either in mm or relative to the coordinate system's total dimensions.

### 2.7.8.3 Map

- **Dynamic display of maps:** If a map is selected as the background, it can be automatically updated via Internet in terms of the scaling. ("Configuration\Display\Map"-> "Map (from Internet)")
- Optional compensation of Mercator projection distortion

### 2.7.8.4 Export as graphic

By means of "Edit\Grafic export...", it is now possible to export a curve window directly as a graphic (bmp, jpg, png, pdf as exact copy of screen).

### 2.7.8.5 Moving/selecting curve window entries

Axes list on the page "More Waveforms", channel selection: Drag&Drop is now no longer initiated by clicking in the left third. Now, the first click selects, the second click drags, and it drags to anywhere desired. This behavior is like in the MS-Explorer.

### 2.7.8.6 Markers

- New, clearly organized dialog for the marker settings
- New default values for markers
- Color selection "*Like associated curve*", or arbitrary definition of color.
- Markers of the type Horizontal or Vertical Line can now be freely moved, even without reference to a variable.
- Advanced placeholders, with formatting
- Option "*Move marker*" eliminated. Moving is still possible by means of updating numerical values.

### 2.7.8.7 Drag & Drop, Mouse wheel

#### Drag & Drop in the curve window has been enhanced:

- Moving data within the curve window is now possible by holding down the CTRL-key.
- When the CTRL-key is not pressed, the region of the data displayed now moves.

#### Mouse wheel support added

- It is now possible to use the mouse wheel to increase or reduce the region of data displayed around the measurement cursor.

### 2.7.8.8 Display uncertainty

Display of tolerance ranges (measurement uncertainty)

### 2.7.9 Curve-Kit

- **New functions**
  - CwColor\*() added
  - CwNewElement() for all marker types
  - CwNewChannel() various new options
- All old Cv\*() functions replaced by new functions/options

### 2.7.10 Spectral Analysis Kit

- Articulation index with the function SoundIndex ()

### 2.7.11 Class Counting Kit

- Rainflow in accordance with ASTM E1049; see ClsOffRainflowInit2, Calculation=2
- Time-At-Level, histograms in measurement values, times, optionally with interpolation of values, with the function ClsTimeAtLevel().
- Proportional frequency (in percent) with function ClsTimeAtLevel()
- Amplitude probability density, with function ClsTimeAtLevel()

## 2.8 imc FAMOS Update-Info (Version 6.3)

### 2.8.1 Sequences

Additional flow control commands (loops and branching) are now available, by means of which the programming of complex sequences is substantially simplified and more clearly organized.



### 2.8.1.1 FOR-loop

Counter-based loop

Example: Calculating the factorial of 5.

```
F = 1
FOR i = 2 TO 5
  F = F * i
END
```

### 2.8.1.2 FOREACH-loop

Convenient enumeration of all constituent elements (Samples, segments, events) belonging to a waveform or all of a data group's channels.

**Example:**

All signal disturbances are to be eliminated from a data set [data]. These are distinguished by a value > 1000. These signal peaks are replaced by the respective last valid value.

```
lastValid = 0
FOREACH SAMPLE s in data
  IF s > 1000
    s = lastValid
  ELSE
    lastValid = s
  END
END
```

### 2.8.1.3 Conditional alternative branch (ELSEIF)

Enhancement of the previous *IF/ELSE* – alternative.

**Example:**

A descriptive text is generated to accompany a value normally lying in the range 0 to 100.

```
r = Round(value, 1)
IF r >= 0 AND r < 48
  Tx = "Lower half"
ELSEIF r = 50
  Tx = "Center"
ELSEIF r >= 48 AND r <= 52
  Tx = "Near center"
ELSEIF r > 52 AND r <= 100
  Tx = "Upper half"
ELSE
  Tx = "Invalid Value"
END
```

### 2.8.1.4 Conditional branch (SWITCH, CASE, BREAK, CONTINUE)

*SWITCH - CASE* branch. Often the better alternative to complex IF/ELSE/ELSEIF branches.

**Example:**

A descriptive text is generated to accompany a value normally lying in the range 0 to 100.

```
SWITCH Round(value, 1)
CASE 0 TO 47
  Tx = "Lower half"
CASE 50
  Tx = "Center"
CASE 48, 49, 51, 52
  Tx = "Near center"
CASE 53 To 100
  Tx = "Upper half"
DEFAULT
  Tx = "Invalid Value"
END
```

This group includes the new commands *BREAK* and *CONTINUE*, by means of which it is possible to prematurely interrupt the execution of commands contained in the loop body.

## 2.8.2 Text variables

### Limitation

The constraint limiting the length of text variables to 255 characters no longer applies. The new theoretical maximum length is  $2^{31}-1$ , meaning over 2 billion characters. Text variables can now be written directly to a text file or be filled with the contents of a text file.

### Text array

New variable format: Text arrays with dynamic dimensions.

## 2.8.3 Data Browser / Panel

### New widgets

In the Data Browser's Panel, the familiar types of lists are now available as new widget types. To be specific, these are the normal list with single- and multi-selection ("ListBox"), the "DropDownList", and the "Combobox" (droplist with input box). The functions library for remote control of the Panels has been expanded by the functions necessary for controlling these widgets.

### New event

Also new, the event "Page activated", which is triggered when an page is activated. The user can place instructions for initializing the page's widgets in the associated sequence code, for instance.

### Print/Export

For input boxes, button, switch and lists, it can now be set as a Design-property, whether these are to be included along with the printout/PDF-export, or only displayed on the screen.

## 2.8.4 ASCII Import-Assistant

Various enhancements, e.g. EXCEL and UNIX time, numbers of increased precision, selectable filename extensions.

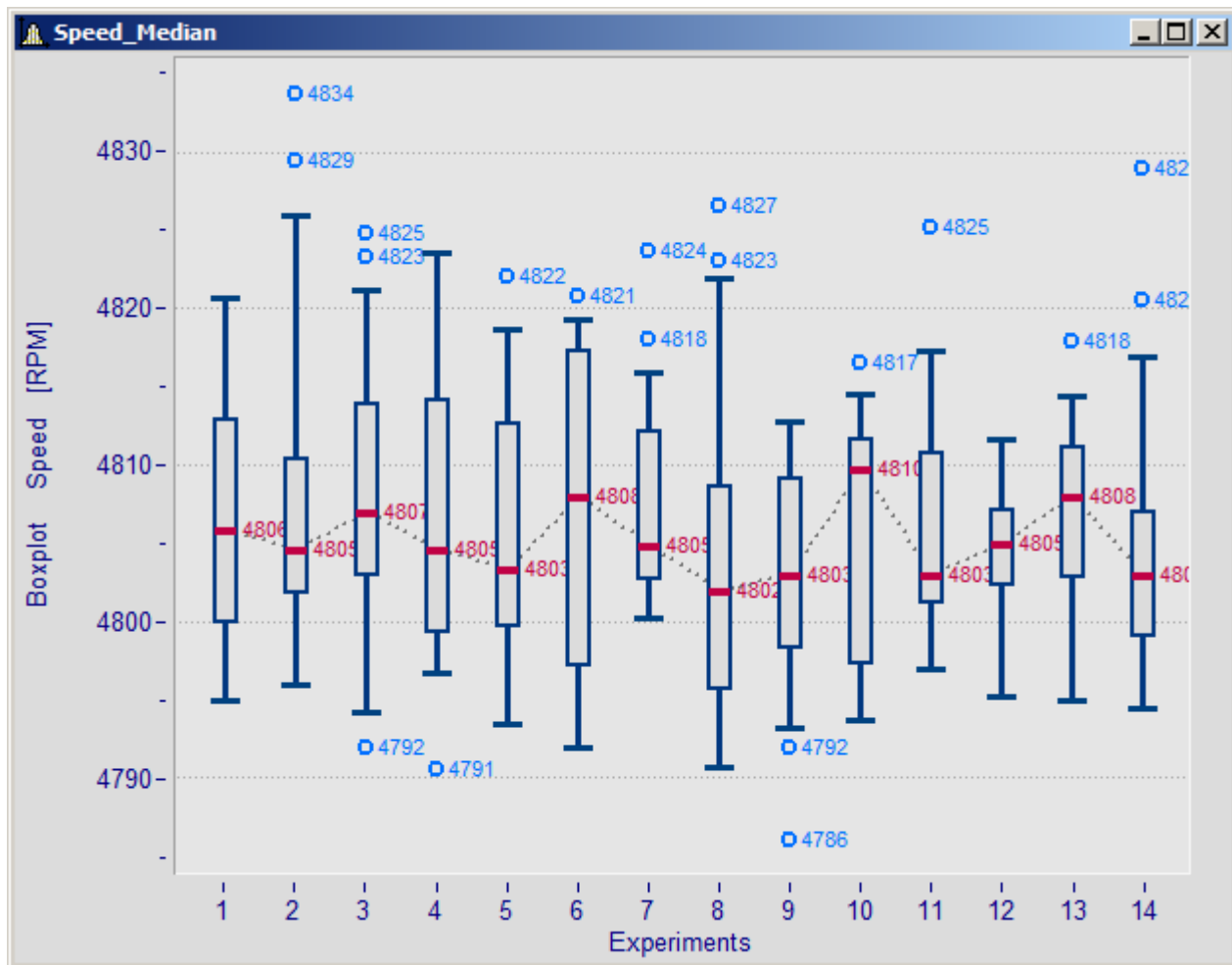
## 2.8.5 Measurement data

New option under "*Extra/Options/Folders*": "*Sync. file filter with central repository*"

If this option is activated (or, after the data storage folder is changed), the file filters locally available are synchronized with the specified folder (which is typically located on a network server). This process is then repeated automatically each time imc FAMOS is started.

## 2.8.6 Curve window

New display form "Boxplot" (displaying position and variance of a distribution)



## 2.8.7 Function library

### 2.8.7.1 LOAD - SAVE

The function library has been augmented by the functions *FileLoad* and *FileSave*, which imitate and expand on the functioning of the sequence commands LOAD and SAVE.

The new functions are more convenient and flexible to use; for example, all available import- and export formats are supported.

### 2.8.7.2 EXCEL Functions Kit

A new supplemental library (kit) for remote control of Microsoft EXCEL is included in all editions from imc FAMOS Standard upward. The EXCEL-Kit augments the previous capabilities for data exchange with EXCEL and additionally contains further functions for controlling EXCEL such as Load/Save/Print for files, adding and deleting worksheets and running EXCEL macros.

### 2.8.7.3 Curves-Kit

The "Curves-Kit" for remote control of the curve window has been complemented with functionalities which had previously been missing.

#### 2.8.7.4 Ordertracking-kit

New function OtrTachoToSpeedX: Calculation of RPM signal from speedometer signal with time track.

#### 2.8.7.5 Miscellaneous functions

- Function *DlgFileName()*: New option for "Save" dialog
- Function *FsDlgSelectDirectory ()*: Modern design of the dialog
- Function *XY()*: Max. length of result increased from 16000 to 10e6

## 2.9 imc FAMOS Update-Info (Version 6.2)

### 2.9.1 File filters provided

imc FAMOS now comes by default with a variety of import- and export filters. These cover the majority of file formats which are prevalent in measurement engineering.

These have been newly created:

- Import- and export filters for ASAM-ODS ATFXML format. Data come with diverse meta-information, which appear among the new user-defined channel properties.
- Import bus filter, DBC-files
- Log files from CAN-Bus can be opened together with a DBC file. Then all channels in the files will be extracted automatically. For the Logfile formats ASCII, MDF, imc Devices. Alternatively to the DBC file, it is also possible to use a cba file from imc Devices. imc FAMOS is also capable of processing an embedded extraction instruction from the \*.raw file.
- Import of Video-files

### 2.9.2 Derivative import filters

Import filters can be configured, both by means of global, format-independent options (e.g. imported data can be assigned to particular measurements) and also by means of private, format-dependent options belonging to the particular filter. A derivative import filter bundles the actual importer together with the desired options under a new name. In this way, you can create your own import filters, which import the same file format as the actual importer, but whose import results are adapted to your specific requirements.

**Define import filter** ? X

**Format**

Base-format: EXCEL Options

Type: XLS

Name: EXCEL #1

Comment: channel\*.xls, 2nd sheet

File display filter:  Auto \*.xls;\*.xlsx

**Import - options**

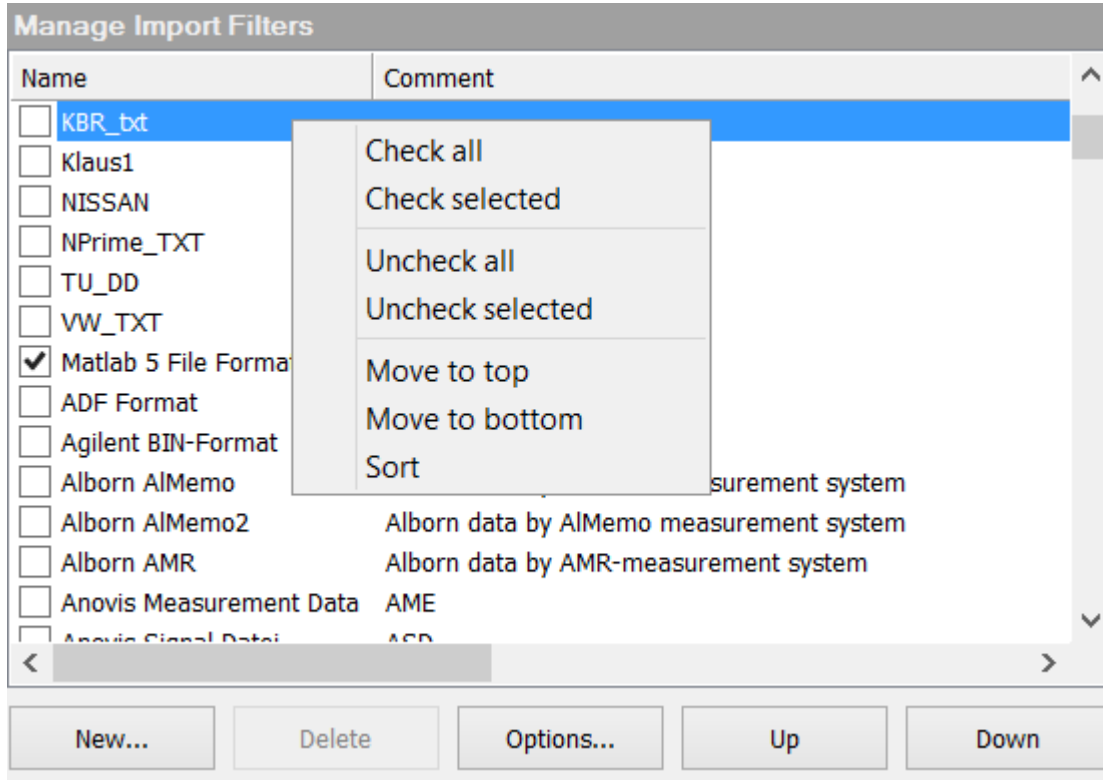
Expand Groups

Meas. Assignment: <ParentFolder>

OK Cancel

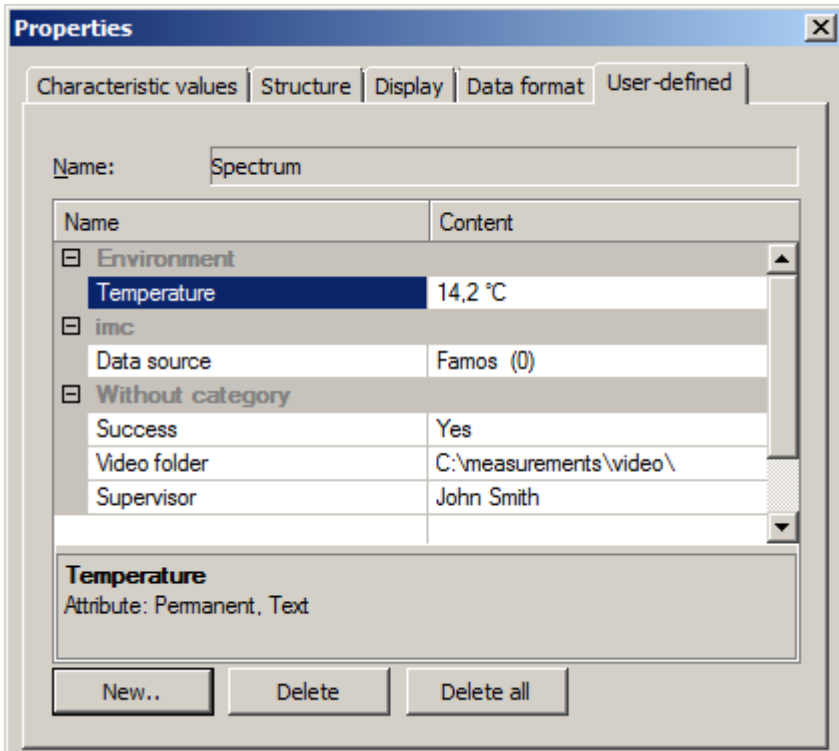
### 2.9.3 Administering import filters

A new dialog enables administration of all import filters installed on your system. In particular, you can adapt the visibility of and the filters' order in the list, for instance, in order to place filters most commonly used at the top. The priority of import filters set here is also used to find the appropriate filter for the files selected when the format setting "automatic" is active.



### 2.9.4 Properties/User-defined dialog

The default properties assigned to a variable (such as the sampling interval and units) can be supplemented by the user as desired. Creating, changing and querying such properties (often called meta-data) is possible both manually by dialog and by the use of functions. User-defined properties can optionally be saved in imc file format and are then permanently available.



User-defined properties can be used in ASCII/EXCEL export by means of placeholders and in the Data Browser Panel.

## 2.9.5 The data source system concept

The concept of "data sources" enables quick and convenient access to various storage areas for measured data within the file system.

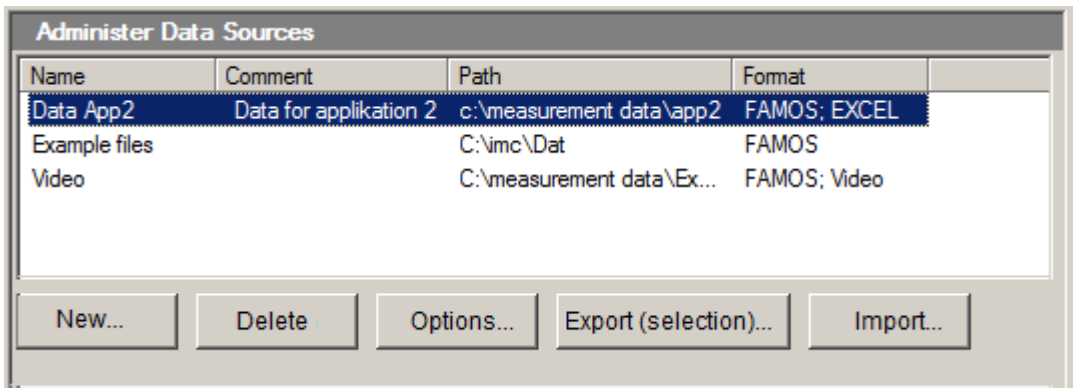
A data source is mainly characterized by its location in the file system and the file type (and thus the import filter to use with it).

The use of data sources is particularly useful for users who must frequently handle measured data originating from a variety of equipment. Even mixed data stores (meaning files of measured values in different formats all together in one folder) are supported, since it is possible to assign multiple import filters to one data source. In this way, the contents of such folders can be opened "in one stroke", without having to change the format in the middle of the process.

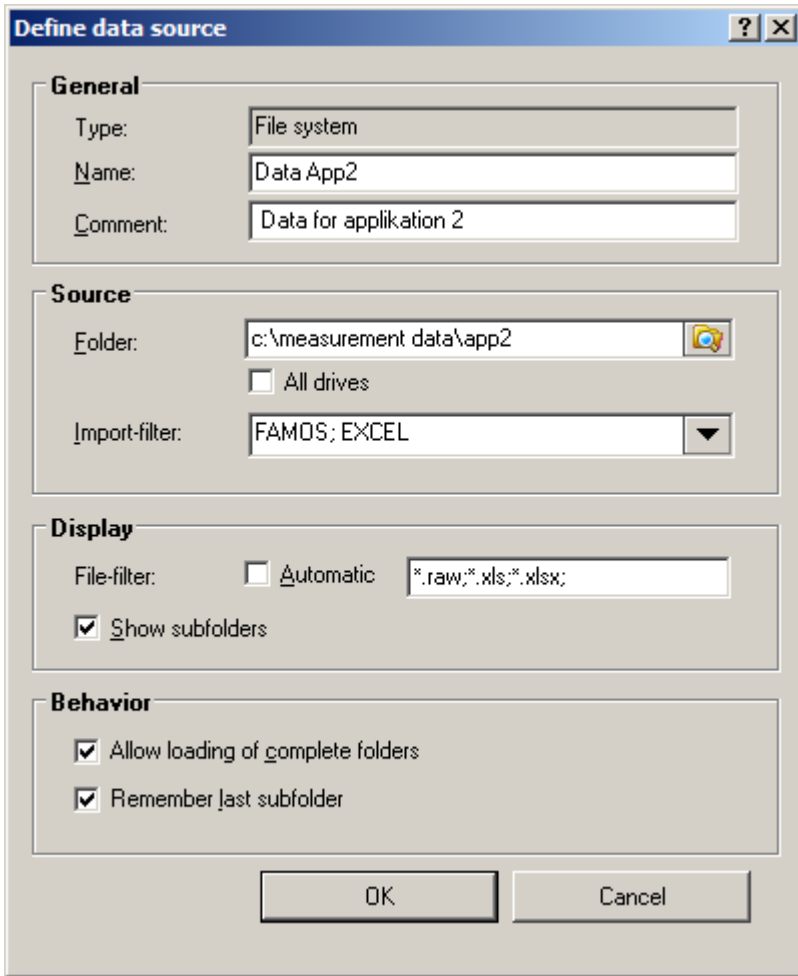
Once the data sources have been defined, just clicking on the corresponding views in the Browser switches from one data source to another, bringing the user to the "right" location within the file system along with appropriately selected import filters.

Following installation of imc FAMOS, one data source named "Sample Data" is already set up, and it refers to the folder selected during installation for the purpose of storing sample data.

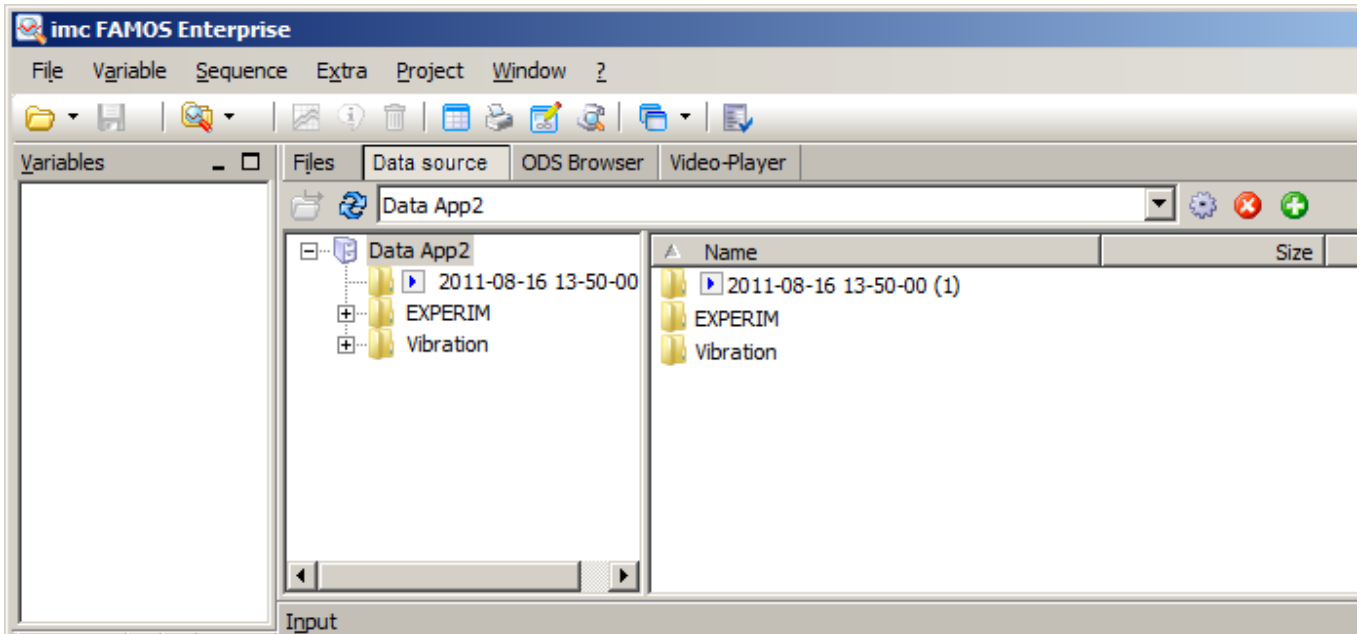
To list and administer data sources, use the dialog "Administer Data Sources" .







Definition of a data source



Example files with measurement data

### 2.9.6 Import and export of EXCEL data

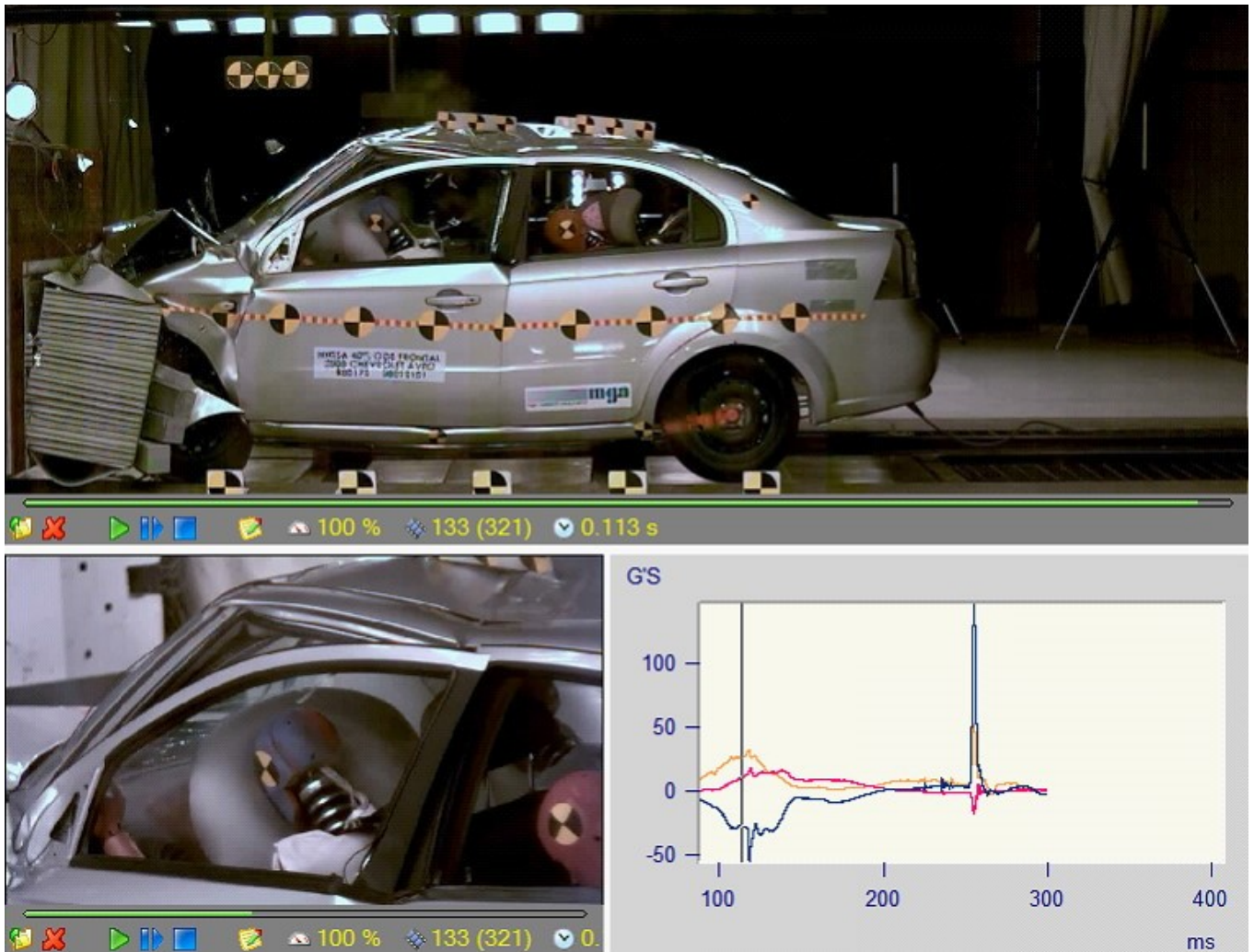
Import and export of EXCEL files was previously limited to the first sheet of an EXCEL spreadsheet, but now any sheet desired can be specified. There is also a new function for writing to EXCEL tables cell-by-cell.

#### Template-defined ASCII and EXCEL-export:

New placeholders for user-defined properties.

### 2.9.7 Data Browser

New control: Video Player – Playback of video files. Synchronization with measured data by means of adjusting the start-time and the frame rate. Remote control is possible with imc FAMOS Professional.



#### Other changes:

- It is now possible to assign a **clock** to a Panel page, by which means an event sequence can be called cyclically.
- For each **individual Panel page**, it is now possible to set whether it is to be included in the **printout or in the PDF-export** of the entire Panel.
- **New placeholders** for user-defined properties.

## 2.9.8 Function Library

### 2.9.8.1 New functions

#### **Value2**

Enhances the Value() function with selectable interpolation type.

#### **PosiEx2**

Enhancement of the PosiEx function with additional options (e.g. Slope)

#### **XYdt2**

Enhancement of the XYdt function with selectable interpolation.

#### **Round**

Rounding function with selectable precision level

#### **TLike**

Text comparison, with wildcard characters

#### **UserProp\***

Function group for editing user-defined properties

#### **FileXLSSelectSheet**

EXCEL-import and export: selection of the table sheet

#### **FileXLSCellWrite**

EXCEL-export: Writing to one cell

#### **PnSetTimer [Data Browser Kit]**

Control of the system clock

#### **VpSelect [Video-Kit, as of Professional Edition]**

Selection of the Video Player element in the Panel to be addressed

#### **Curve Manager Kit**

Functions for importing the map, and their properties

#### **Class Counting Kit: ClsOffFromRainflowGetSpans**

Frequency of spans from the Rainflow matrix

### 2.9.8.2 Enhancements of existing functions

#### **Enhancements of existing functions for XY-data sets**

Ipli, Regr, eRegr, Kenn, Band, Skali, Kenn, Spieg, Sort, Histo,  
LowerValue, UpperValue [2]

Comparison operators (<, >...) [2]

Logical operators (AND, OR...) [2]

lpol, PTast, PTast0, Poly [4]

### Enhancements of existing functions for segmented data sets

Cmp1, Cmp2, CmpX, CmpY, Kenn,

Compl [1]

XYof [3]

### Enhancements of existing functions for event-based data sets

Basic arithmetic [1]

Basic math. functions (sin, cos, quad...)

Kenn, Band, Skali, CmpX, CmpY, Cmp1, Cmp2, Pol, Kart

Compl [1]

XYof [3]

Comparison operators (<, >...) [1]

Logical operators (AND, OR...) [1]

LowerValue, UpperValue [1]

[1]: Both parameters must have the same dimension or the 1st parameter is a single value

[2]: One parameter must be a single value

[3]: Both parameters must have the identical segment/event-structure

[4]: Only for monotonic XY-data

### Class Counting Kit

ClsOffRainflowInit3

Supplementary option "precise = 3" implemented. For particularly precise Rainflow matrix.

### Spectrum Analysis Kit

VibrationFilter: Supplemented with vibration evaluation standards

- Wb. per ISO 2631-4, 1st edition, 2001. (passenger and crew comfort in fixed-guideway transport systems)
- Wm per ISO 2631-2, 2nd edition, 2003 (human exposure to vibration in buildings)
- Acceleration input. per ISO 6954, 2nd edition, 2000
- Velocity input. per ISO 6954, 2nd edition, 2000
- ISO 5349-1, 2001
- ISO 8041:2005 Wb
- ISO 8041:2005 Wc
- ISO 8041:2005 Wd
- ISO 8041:2005 We
- ISO 8041:2005 Wf
- ISO 8041:2005 Wj
- ISO 8041:2005 Wk
- ISO 8041:2005 Wm

### 2.9.8.3 Miscellaneous

#### Charact

The maximum length of the characteristic curve has been increased to  $2^{23}$  values.

#### FileOpenFAS

Improved Function Assistant for parameterizing the function, now with a selection list of all installed FAS import filter.

#### FileOpenXLS2, FileOpenASCII2

Improved Function Assistant for parameterizing the function, now with a selection list of all installed export templates.

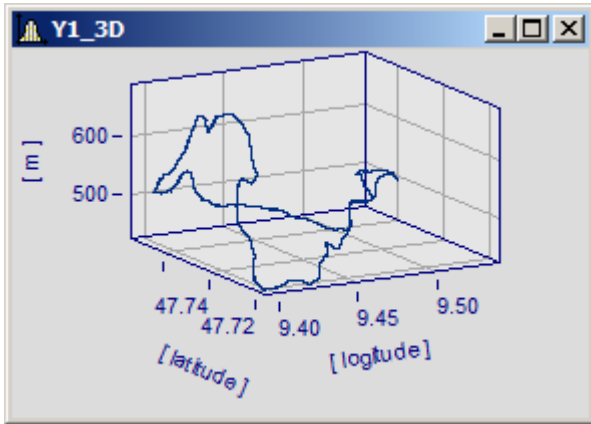
#### Commenting blocks in/out

New commands in the Sequence Editor: . Ctrl + k

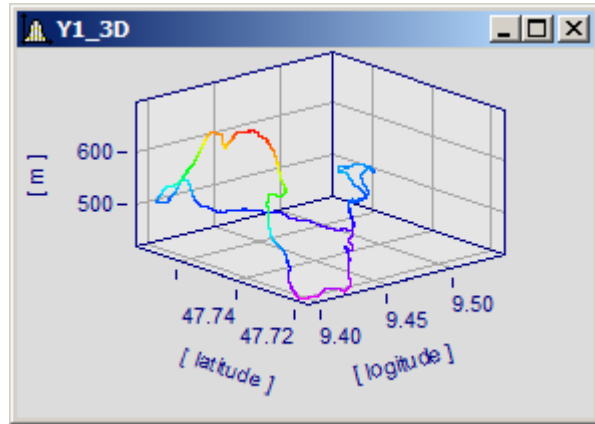
## 2.9.9 Curve Window

### 2.9.9.1 Space curve

- New 3D option: Space curve



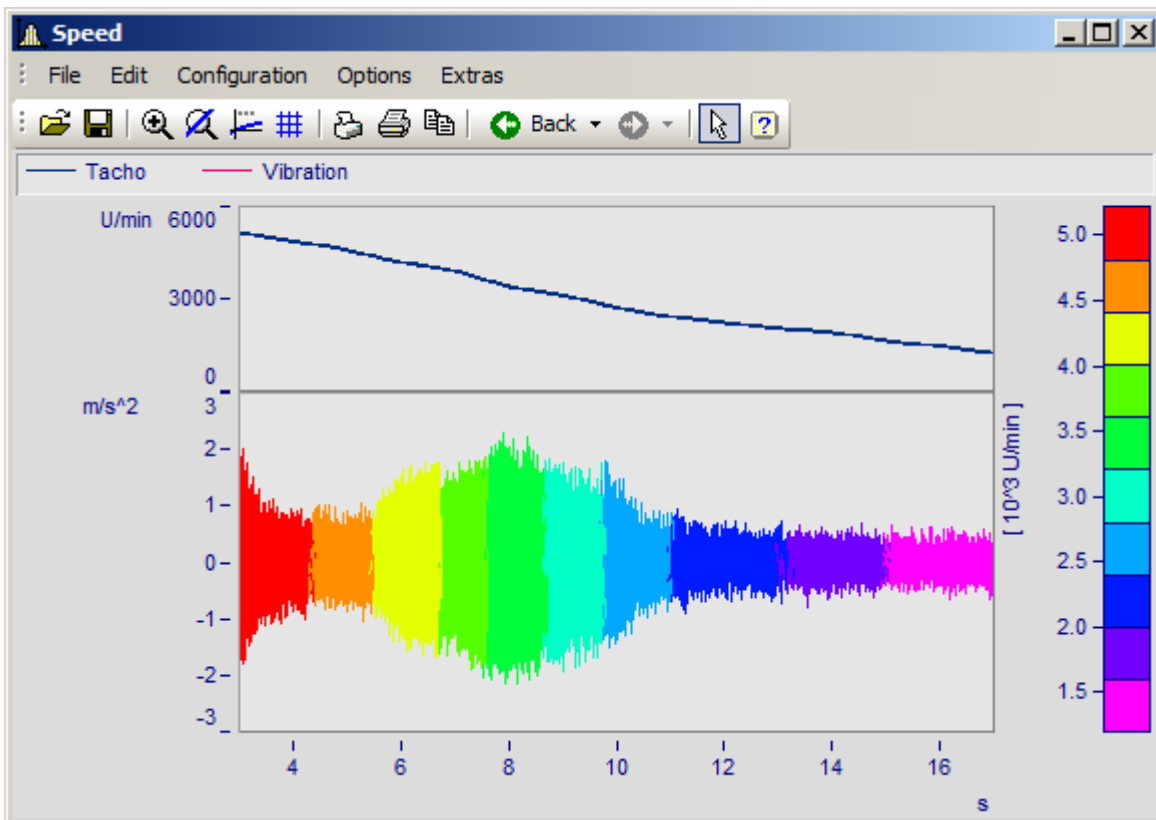
Raumkurve einfarbig



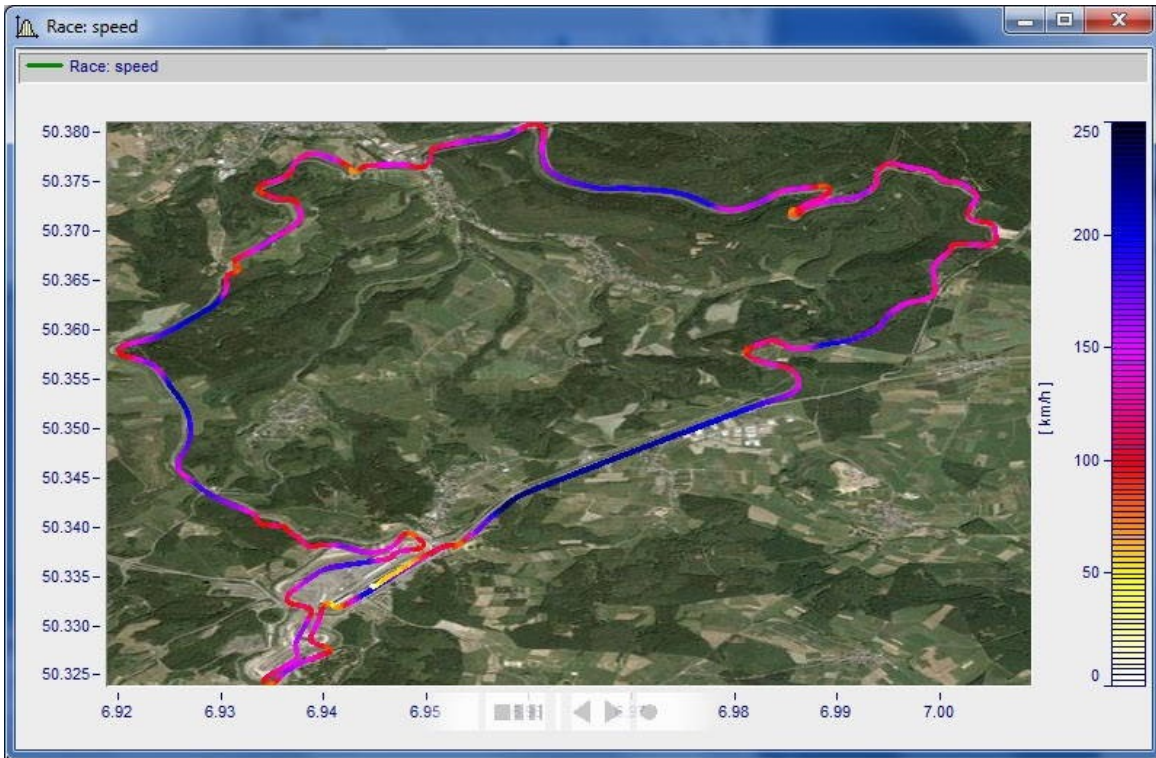
Raumkurve in Farbpalette

### 2.9.9.2 Line color reflecting amplitude

A channel's color can be controlled by a reference channel's amplitude.



Line color of vibration depending on RPM



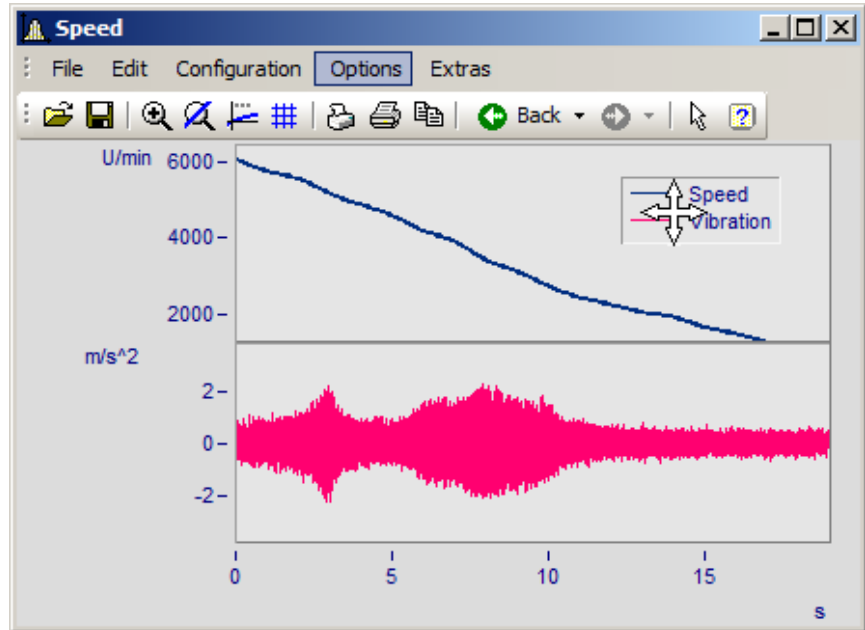
*Color of position signals depending on speed*



### 2.9.9.3 Legend

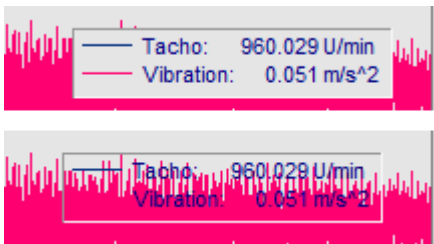
#### 2.9.9.3.1 Legend freely movable

More options are now available for placing legends within the coordinate system. The legend can be moved within the coordinate system at any time by mouse.



#### 2.9.9.3.2 Legend with last value as number

While the measurement runs, the momentary values can be displayed in the legend.



Numerical values	
With numerical values	Last value as number
Separator	:
Units	Yes
Max. digits	2

Alternatively, the comment can be placed instead of or in addition to the name.

The legend can also be displayed in transparent font, see the picture at left.



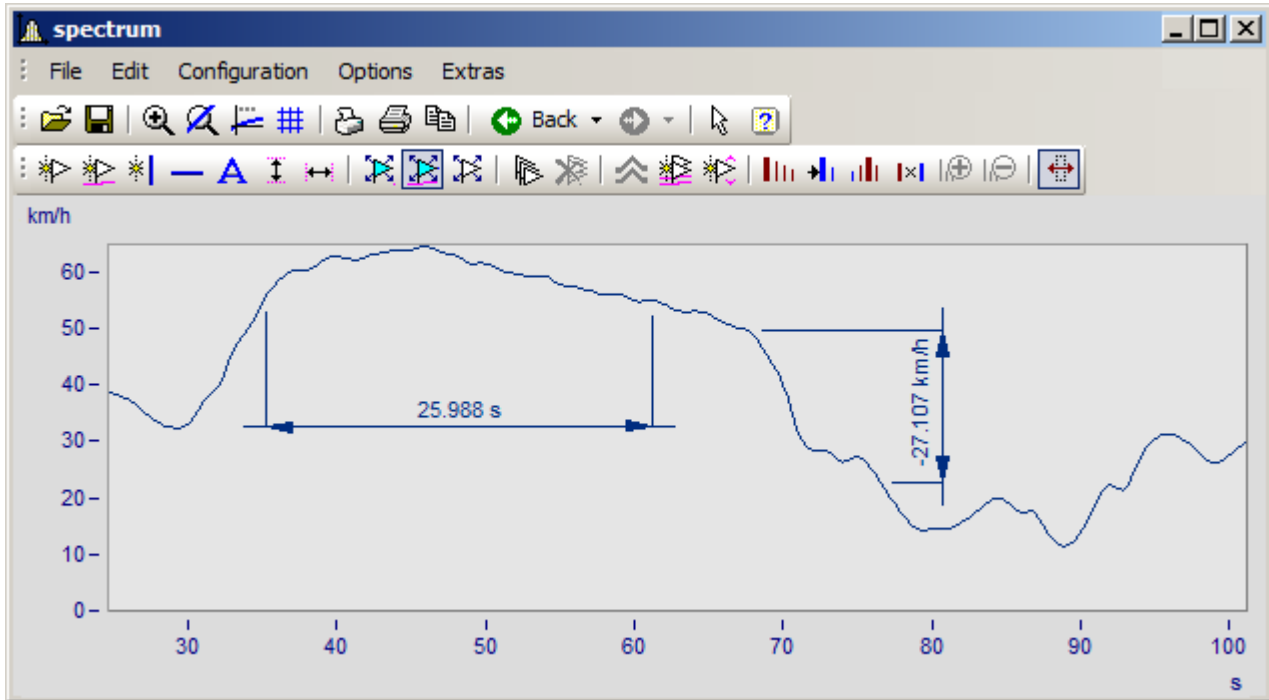
### 2.9.9.4 Markers

#### Same x follows ( )

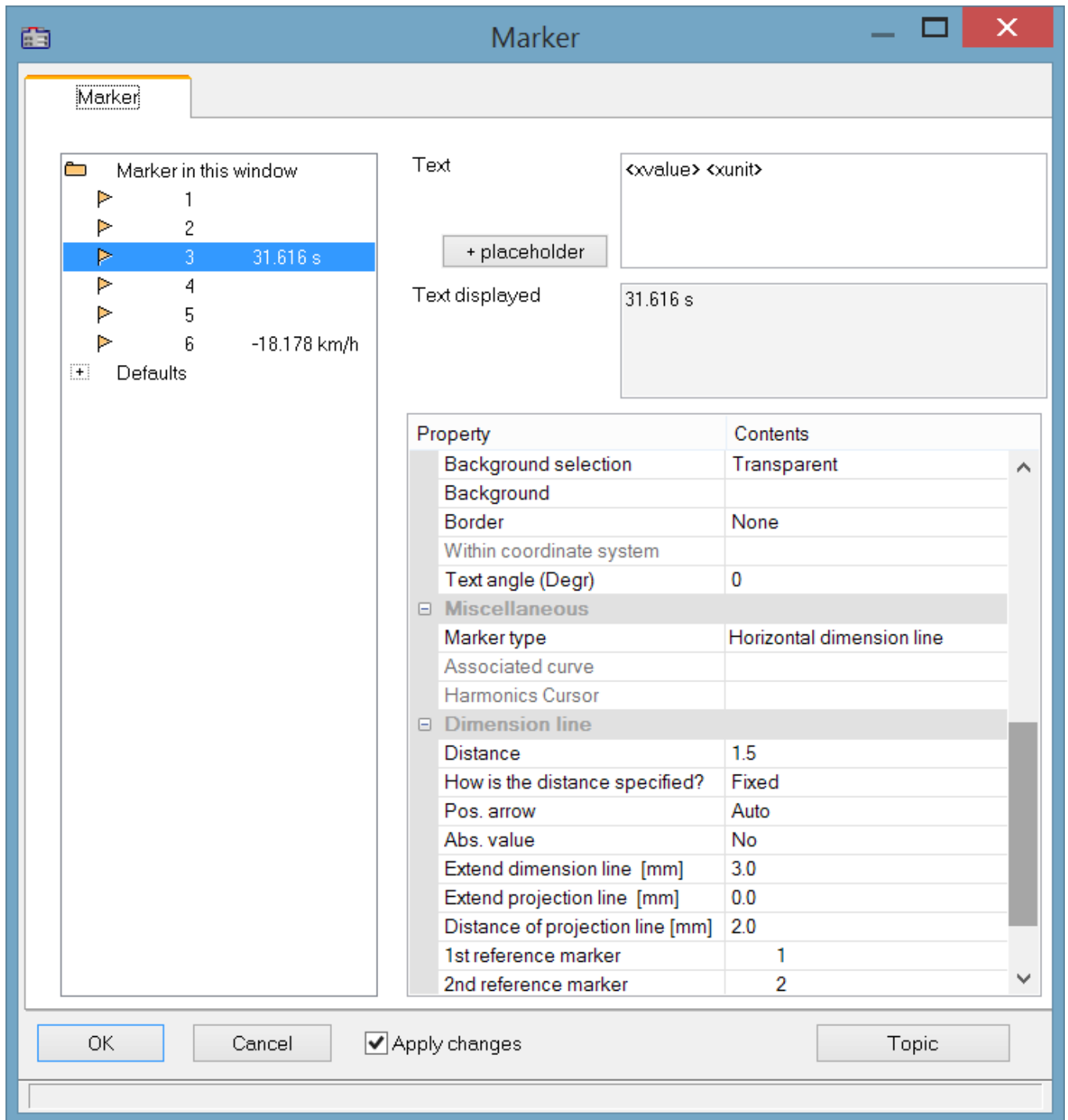
Markers which are assigned to the same x-position can be moved jointly by means of this function.

#### New vertical dimension line and New Horizontal dimension line

Create a vertical or horizontal dimension line.



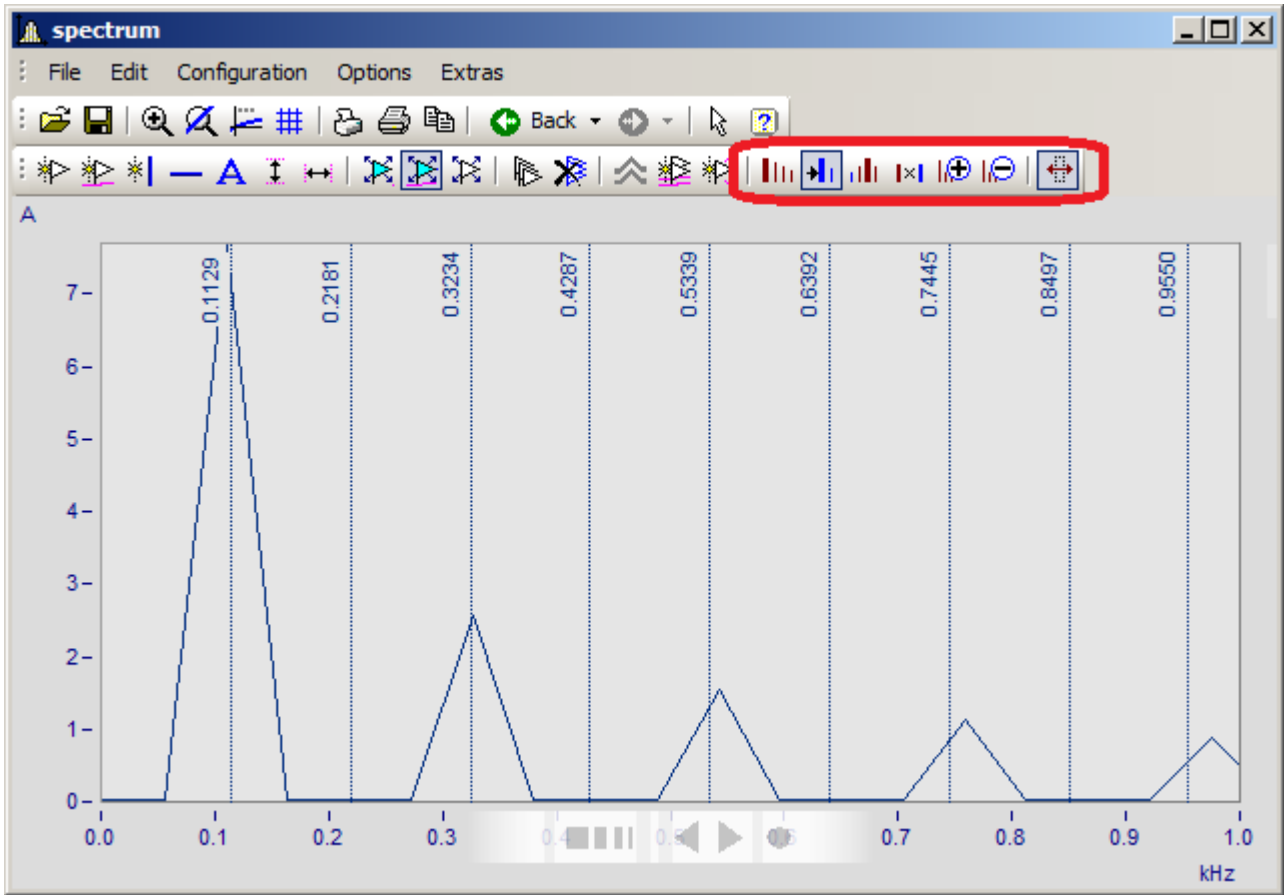
- The dimension line can be moved by means of Drag & Drop.
- If markers already exist, they can be used as reference points.
- The font and arrow sizes can be adjusted.



**Retain markers when lines are changed**

If new lines are added or existing lines deleted, the markers' assignments to lines remains intact.

### 2.9.9.4.1 Harmonics cursor



Harmonics cursors for

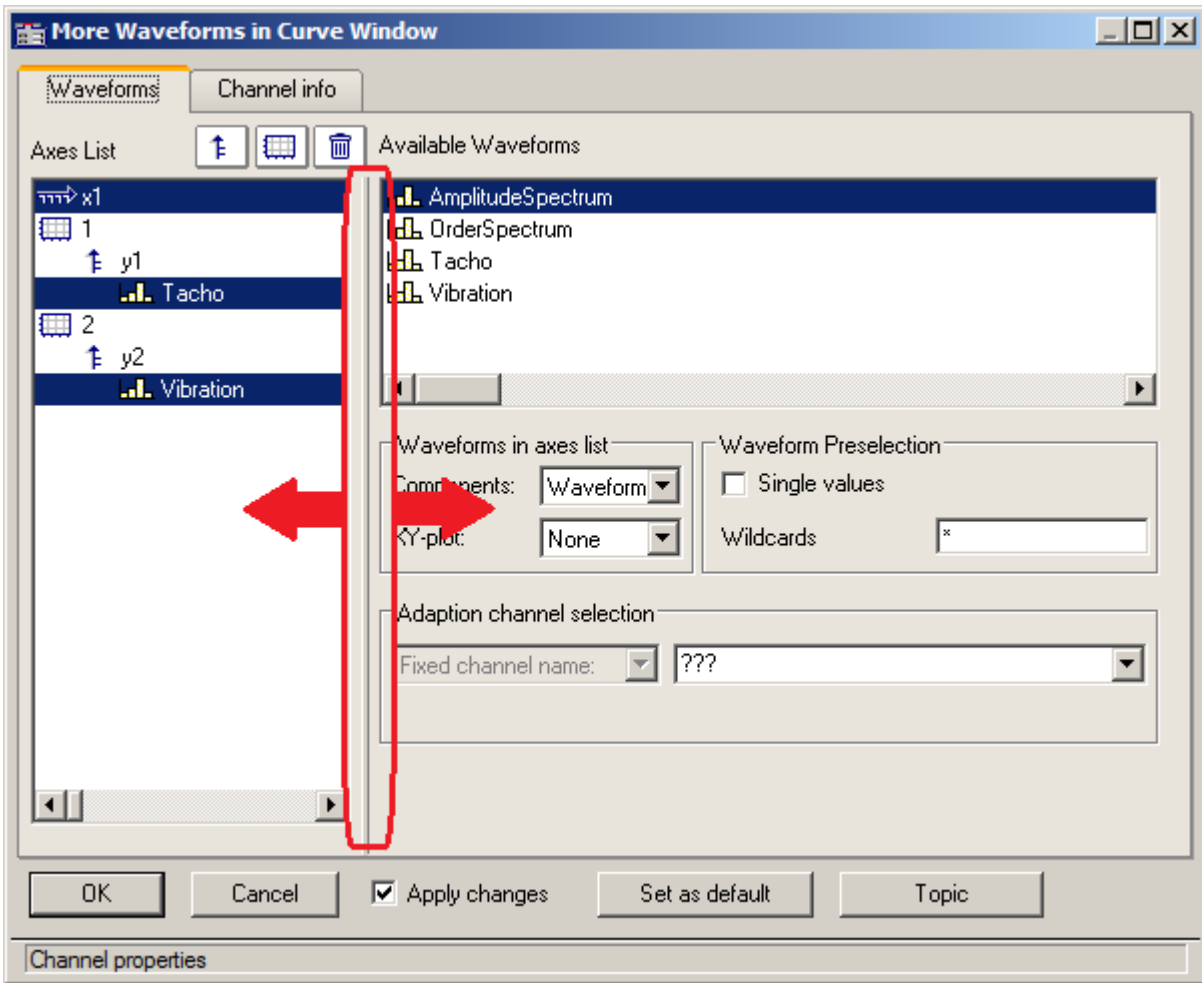
- Fundamental oscillation with harmonics
- Periodic processes with arbitrary start
- Fundamental oscillation with sidebands
- Distance in fixed ratio

The amount of cursors can be increased or decreased.

### 2.9.9.5 Miscellaneous

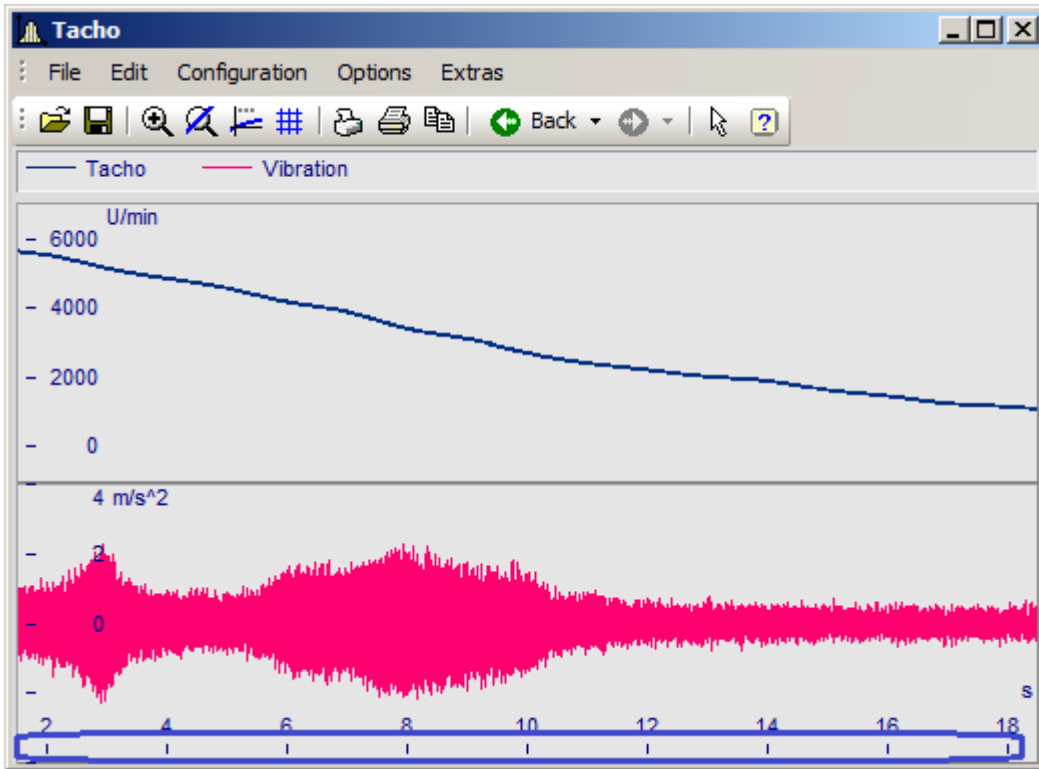
- **Dialog *More Waveforms...* with scalable list.**

This can save room for input boxes involving filter specification and channel selection.



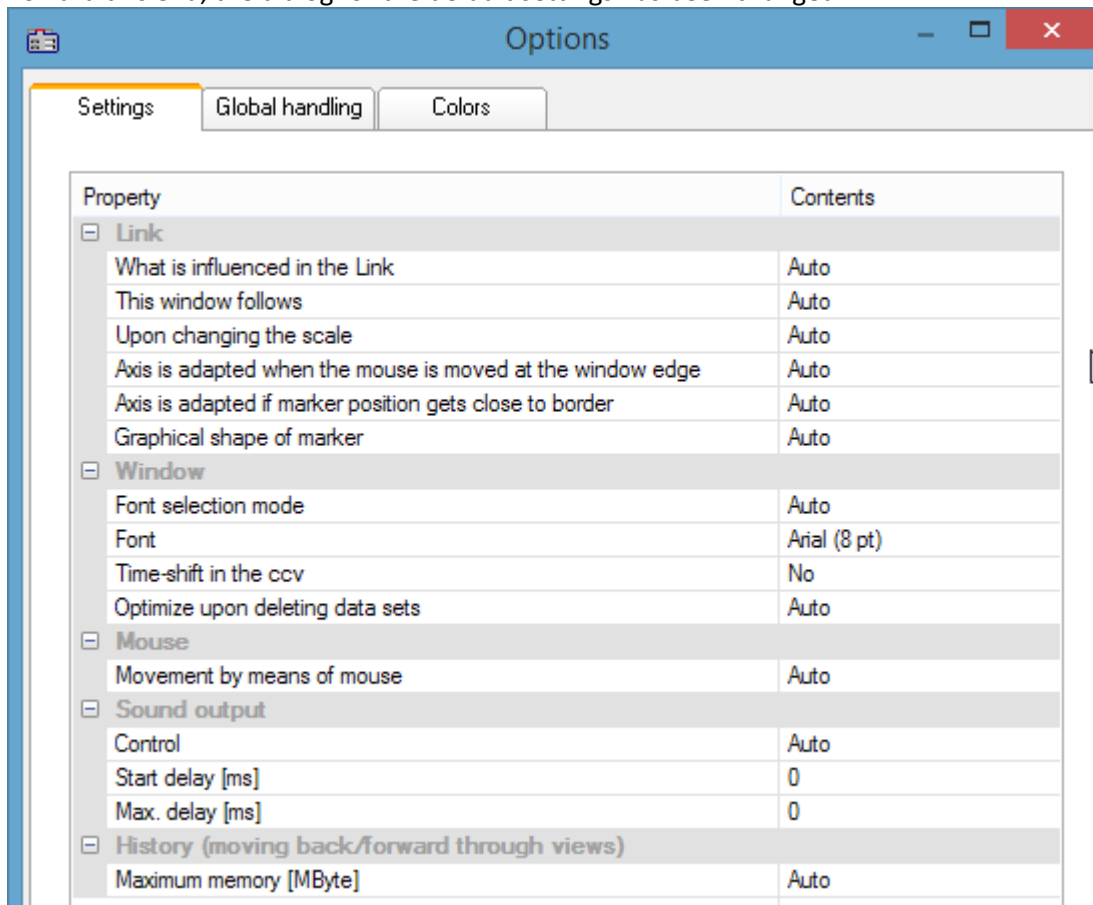
- **Moving coordinate systems with maximized display**

Drag & Drop of an axis or coordinate system all the way down is now also possible for maximized windows. The cursor changes when in the lowest portion of the window.



• **New options for linkage of curve windows (x-Link)**

Toward this end, the dialog for the default settings has been changed.



Voreinstellungen - Karte: Einstellungen

It is now possible to set how the window responds when the Link-cursor is moved. For example, it is possible to set whether the cursor or the curve moves; for cases when the Link-cursor reaches the area outside of the visible range, it is now possible to set whether the range is extended, etc.

## 2.10 imc FAMOS Update Info (Version 6.1)

### 2.10.1 imc FAMOS Packages

imc FAMOS is now available in different editions.

Using Start parameters it is possible to force the use of a particular edition:

#### 2.10.1.1 FAMOS Reader

Start parameter /VR

The base version consists of the Variables list and the File Browser.

This enables

- data import
- display in the curve window
- documentation of measured data

#### 2.10.1.2 FAMOS Standard

Start parameter /VS

The scope of the imc FAMOS Reader is augmented with the following functions:

- Analysis
  - editing and analysis of measured data
  - saving / export of events
  - mathematics + statistics function library
- Sequences (macros)

#### 2.10.1.3 FAMOS Professional

Start parameter /VP

The scope of imc FAMOS Standard is augmented with the following functions:

- Project Management (organization of all files needed for a task (measured data, reports, sequences) in one project, including Pack&Go for easy transfer)
- Dialog-Editor (creating dialogs to be added to sequences by the user)
- Video-Kit
- Spectrum Analysis Kit

#### 2.10.1.4 FAMOS Enterprise

Start parameter /VE

The scope of the imc FAMOS Professional is augmented with the following functions:

- Class-counting package
- Order Tracking Analysis Kit
- ASAM-ODS-Browser

### 2.10.2 System prerequisites

Supported OS versions

:

- Windows XP (as of SP2), 2003 Server, Vista, Windows 7, 2008 Server

## Note

Windows 2000 is no longer supported.

### 2.10.3 imc FAMOS Basis

#### 2.10.3.1 License Manager

The License Manager replaces the Hardlock

As of Version 6.1, the license query is handled by the License Manager. The Hardlock protection plug is no longer required.

#### 2.10.3.2 English and German sequences

Both English-language and German-language sequences can now be run, regardless of the user interface's language version.

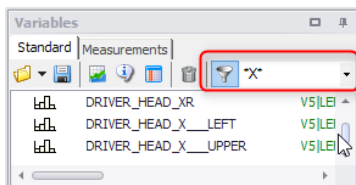
#### 2.10.3.3 Project

- Pack And Go, saves projects in a transportable way, by means of the menu item *Project\ Pack...*
- With *Save Project As*, an open project can be saved with a different name.

#### 2.10.3.4 Miscellaneous

- Data Editor: The physical unit is written after the channel name in the first row in square brackets.
- Alternatively, imc FAMOS notes the last folder for Loading/Saving measured data

### 2.10.4 Variables list



Variablenliste mit gefilterter Ansicht

- the variables list can be filtered by name
- channels in groups can be displayed in alphabetical order

### 2.10.5 Functions

#### 2.10.5.1 FFT

The FFT function can now process data sets of lengths up to 16,777,215 ( $2^{24}-1$ ).

#### 2.10.5.2 FileLineWrite

New option for last parameter: 1= no line feed

#### 2.10.5.3 GetLastError

Get last critical error as text.



### 2.10.5.4 PSampEx

Prototype-resampling, sampling of a data set at the sampling times of a reference with selectable interpolation.

### 2.10.5.5 Resamp2

The Resamp2 function can now process data sets of lengths up to 16,777,215 ( $2^{24}-1$ ).

### 2.10.6 Data Browser

- Kit functions for controlling the Data Browser.
- Transparency property for many elements
- New element groups *Forms* (Square and round brackets, circles, ellipses). The "Line element" was moved from the group *Standard* to *Forms*.
- New element *Switch*
- All elements can now be moved to the center by means of a *Move* symbol. Double-clicking opens the Properties dialog.
- *Grid* property now also for the page (previously only for elements)
- Assignment of calculated data to measurements. New option for measurement naming (filename with extension)
- Cut/Copy/Paste icons on the toolbar
- Control for selecting curve configurations
- Dialog "Page Setup" as for Report and Dialog mode
- PDF-export in the Page context menu: Now exports the current page, not the entire document.
- Expanded placeholders

### 2.10.7 Curve Window

#### 2.10.7.1 Axis

- Font size, colors, line thickness etc. individually adjustable for each axis
- Line ends freely movable
- Labeling of the x-, z-axis with a channel name
- With 3D, the legend options are possible for labeling the channel names at the axes.
- Order of magnitude of the axis scaling as pre-setting

#### 2.10.7.2 Campbell Diagram

Campbell diagram also with underlaid grid

#### 2.10.7.3 Re-processed signals

##### 2.10.7.3.1 XY-data

Editing of measured values now also possible for xy-data.

### 2.10.7.3.2 Multiplication

Multiplication function enhanced

### 2.10.7.4 Markers

- Vertical, horizontal lines as markers
- Marker text also outside of the coordinate system
- Markers containing only text
- Separate pre-settings for standard markers and other marker shapes.

### 2.10.7.5 Bar meters

- Alternative appearance/function of overmodulation monitoring
- Symmetric overmodulation monitoring
- Marking of input ranges
- Colors/other slave pointers
- Color change permanent after value level violation

### 2.10.7.6 Background images and maps

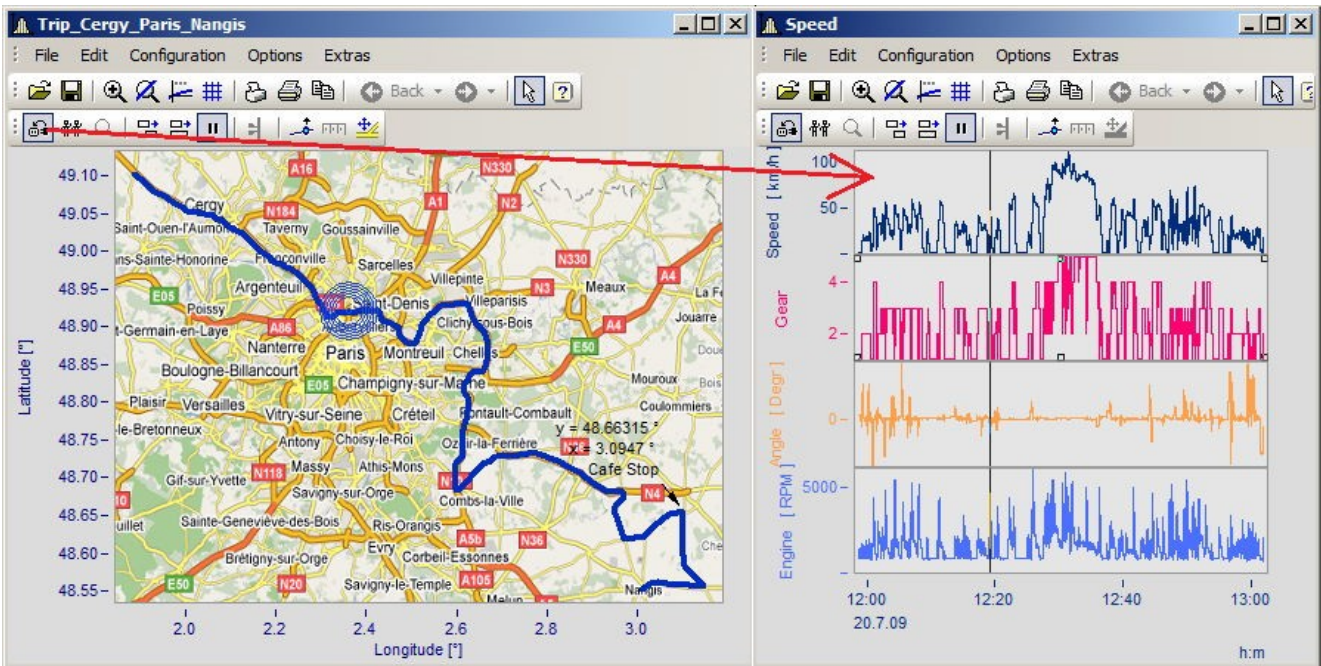
Pictures can be added for the background.



Input of maps including adaptation of the scale, surveying functions.

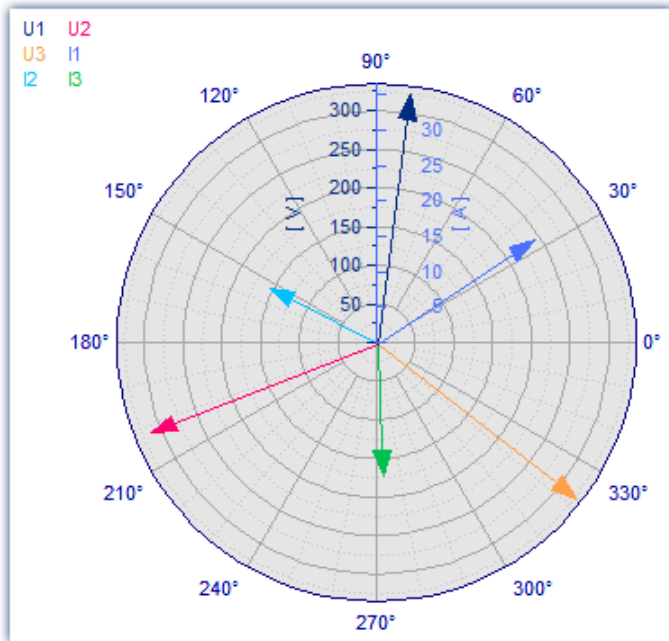


Linkage of map display with associated time data

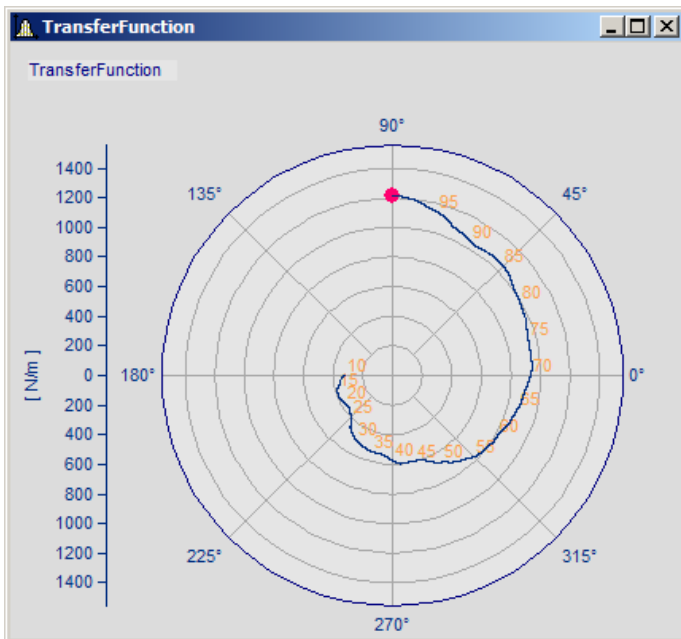


### 2.10.7.7 Polar diagram

New display style: Polar diagram



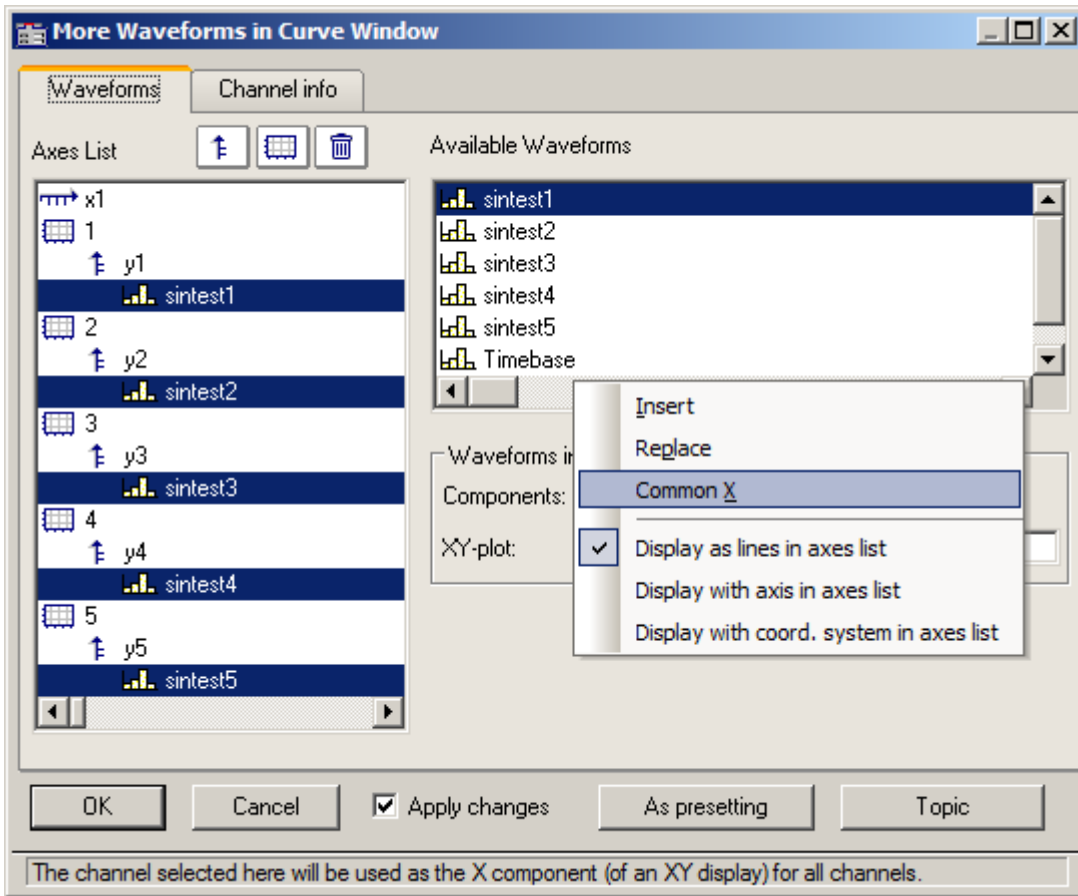
Complex single values as vector diagram

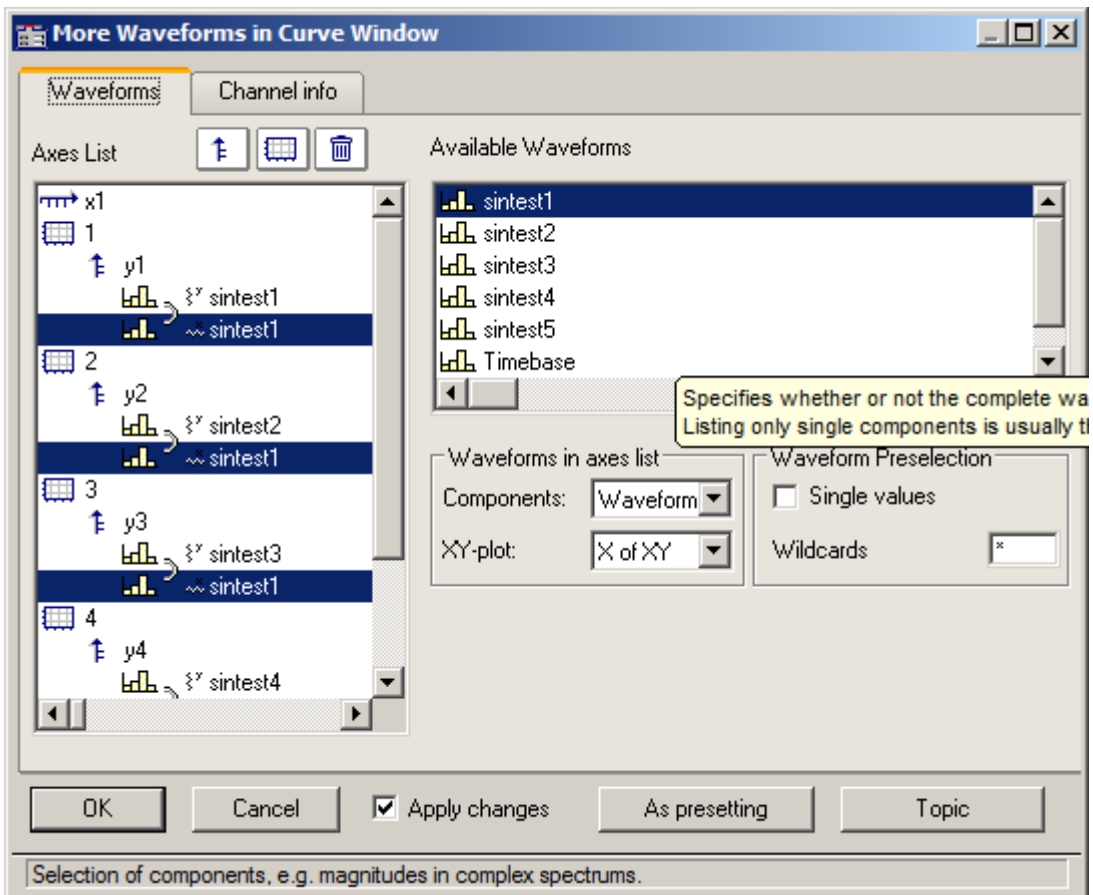


Example transfer function

### 2.10.7.8 More Waveforms

New context menu for channel settings, adding channels, XY-constructions.





### 2.10.7.9 Miscellaneous

- Selection mode optimized for a calmer display
- Floating toolbar in the Panel optimized
- Selection of samples for display, e.g. last N samples
- Measurement value window magnifiable in a helpful way
- Text along lines also with x, magnitude, phase, instead of only y-value

## 2.11 imc FAMOS Update-Info (Version 6.0)

This information is particularly intended for users familiar with previous imc FAMOS versions. It includes a brief summary of new features and changes in the new version.

This chapter describes changes from the predecessor version 5.0. The links in this chapter refer to the appropriate Online Help topics.

If you have been working with a version older than that, you should first study the appropriate update information:

[Version 5.0](#)<sup>[104]</sup>, [Version 4.0](#)<sup>[108]</sup> | [Version 3.2](#)<sup>[111]</sup> | [Version 3.1](#)<sup>[114]</sup> | [Version 3.0](#)<sup>[117]</sup>

### What's new in imc FAMOS 6.0 ?

The innovations of imc FAMOS Version 6 divide into the following main topics:

[Curve Window](#)<sup>[95]</sup>

[Data Browser](#)  99

[Report Generator](#)  101

[Write/Read Protection for imc FAMOS Sequences](#)  102

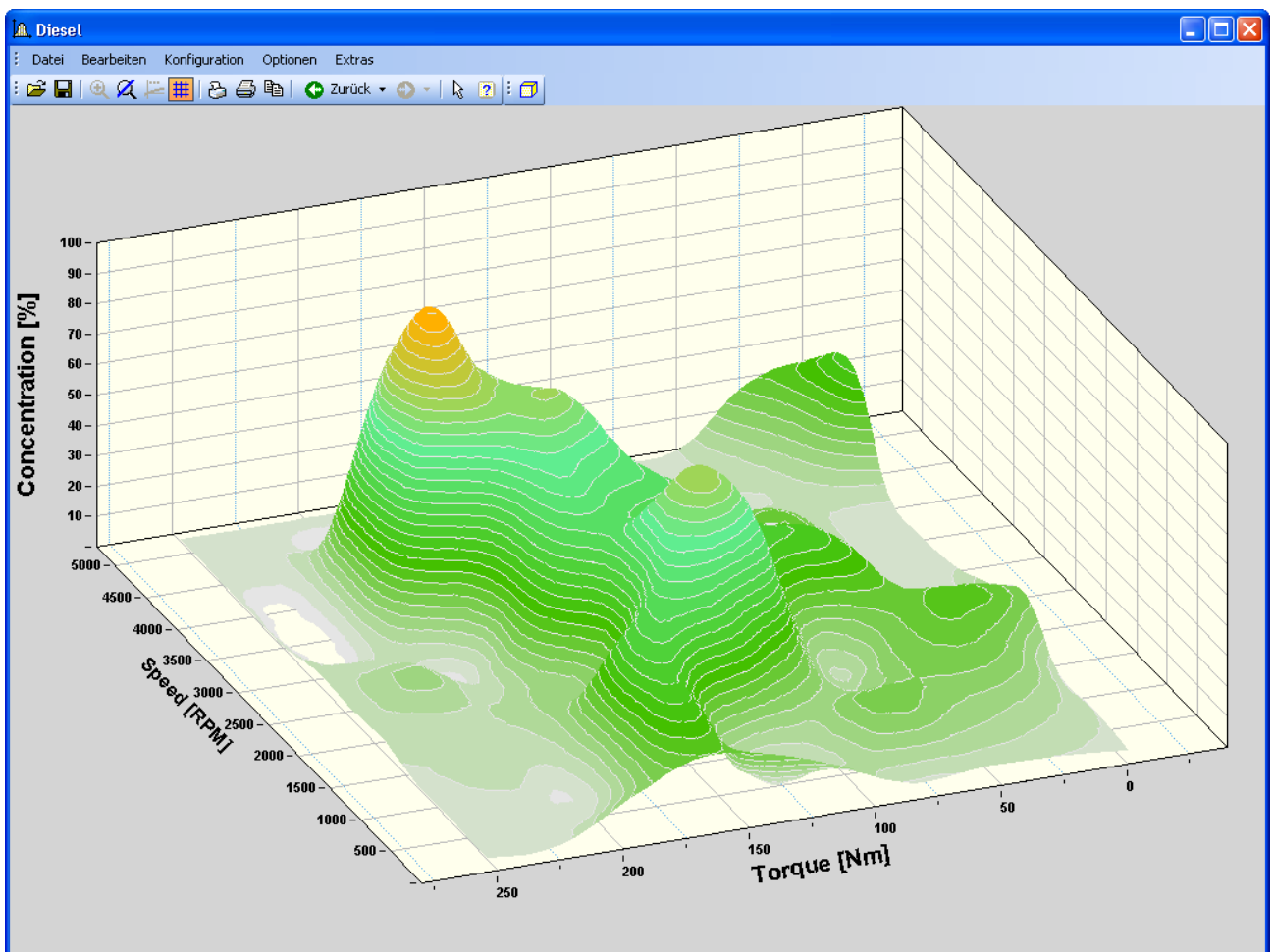
[New / Changed Functions](#)  103

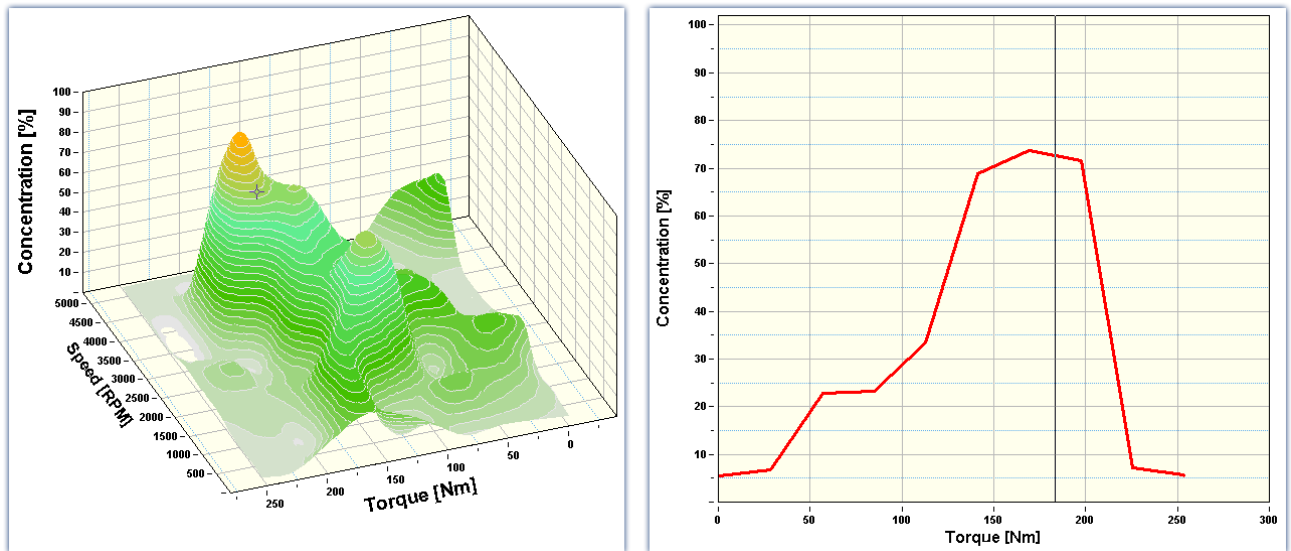
## Curve Window

### 3D Display

- Display of a surface (segmented data set or composite of x-, y-, and z-components). The color corresponds to the amplitude.
- Wire mesh display, point clouds, volume-filling grid, see 3D/ Surface
- 3D/ Isolines
- Comparison of multiple data sets, see documentation on Curve Window, chapter 3D Display ("Comparison").
- Perspective: rotation using mouse
- Vertical cross sections parallel to the independent axes. Moving the cross-section plane with the mouse.
- Invertible axes orientation, see the chapters on axes, arrangement

### Graphics examples





Example: connection of 3D data set with default display (cross-section through the Z-axis)

### Sound output

- Sound toolbar
- Playback of a window's first curve via the computer's sound card
- Selectable playback region (one-time permanent, cyclical, all), set by mouse in terms of size and position
- Playback position displayed as cursor, editable with the mouse even during playback
- A-B comparison possible

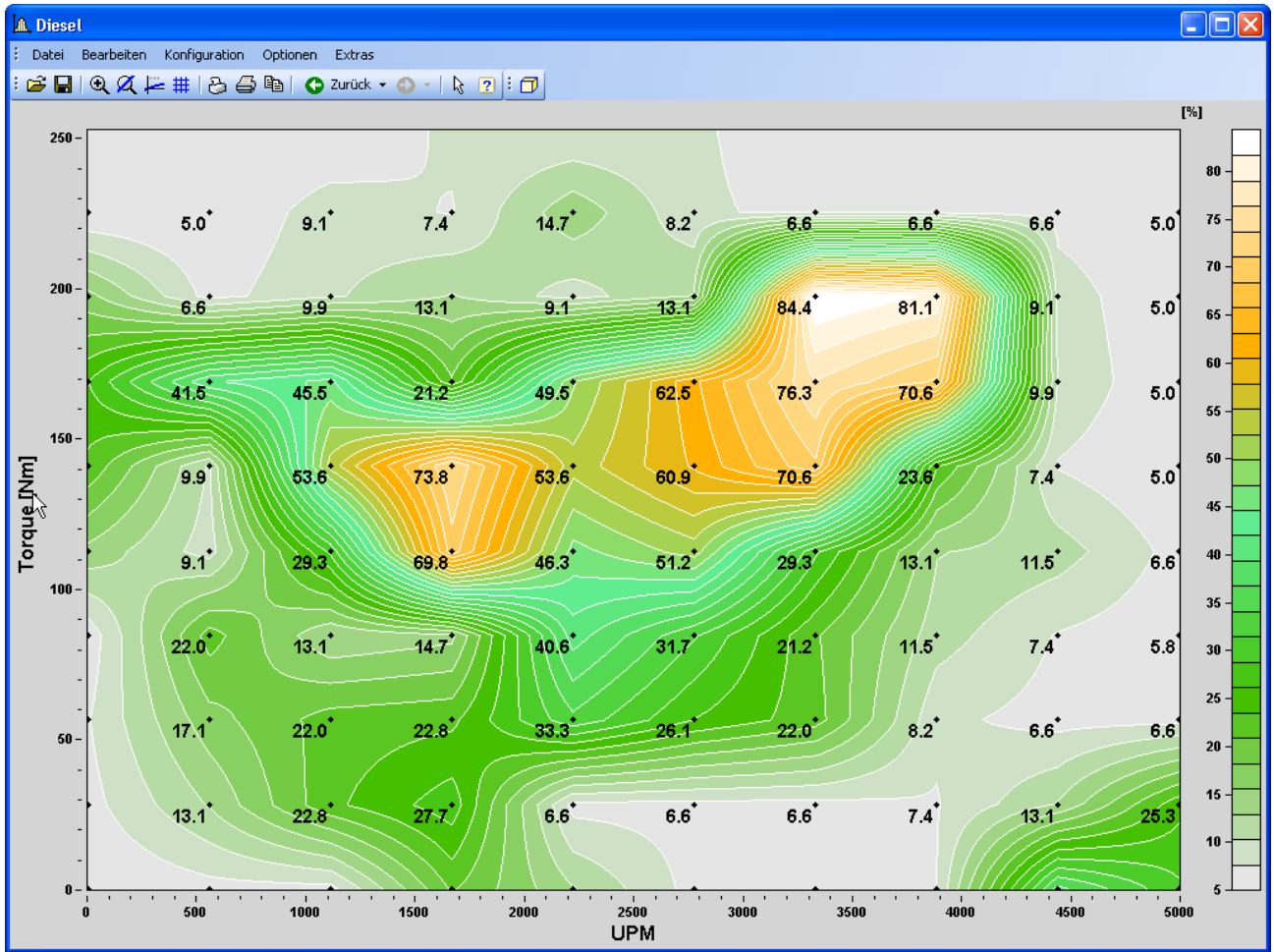
Details in the Curve Windows documentation, chapter Sound.

### Operation

- Multi-level Undo with "Back" and "Forwards"-functions
- Select mode: Optical distinction of the selected element (axis, line, marker, ...)
- Flyby marking: selectable elements become visible when brushed over with mouse
- Multi-selection
- Context menu dependent on the elements selected
- Toolbar also available for embedded curve windows, see also Data Browser, *Menu: Options*
- Measurement cursor also freely movable along with the curves (already from V5.0 R7 onward)

### Color maps



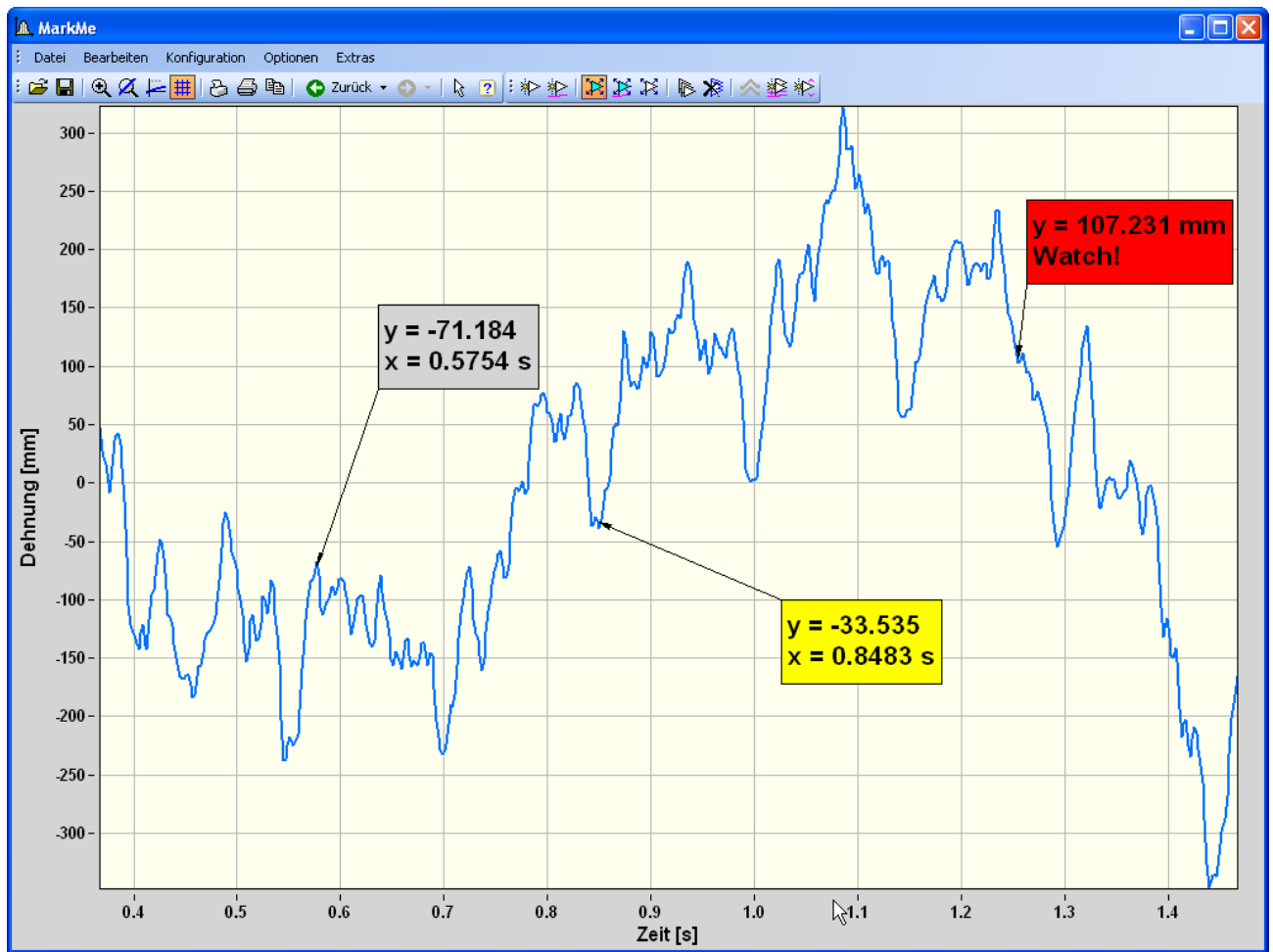


Example: Color map display with ISO lines

- Superposition of line graphics
- Line graphics as border lines for the color map
- Display and labeling of the measurement points

Details provided in the chapter Color Map Display.

### Markers



- Moving a marker and its text box directly by mouse
- Shifting a marker along a curve
- Automatic updating of the marker text
- Placeholders in the marker text for determining format of automatic updating
- Markers positioned at curve minimum and maximum by single mouse click
- Markers positioned on all curves at specified x-coordinate by single mouse click

Details provided in the Curve Window documentation, chapter Markers.

### Axes

- Automatically displayed controls for changing the axis scaling (moving and magnifying/reduction of the scale, auto)
- Labeling text on the axis (permanent, automatic with name and unit, freely selected with placeholders)

Details provided in the chapter Axes.

### Lines

- Labeling of points
- Symbol size determined separately for each curve
- Line pattern (dotted, dashed) determined separately for each curve

Details provided in the chapter Lines.

### **Miscellaneous**

- Changing of measurement point amplitude: editing of the data set itself ("Modify values")
- Visible shifting of lines in horizontal and vertical direction
- Changing the height of coordinate systems (arrangement) by mouse for multiple, stacked coordinate systems
- Info on the channels displayed available

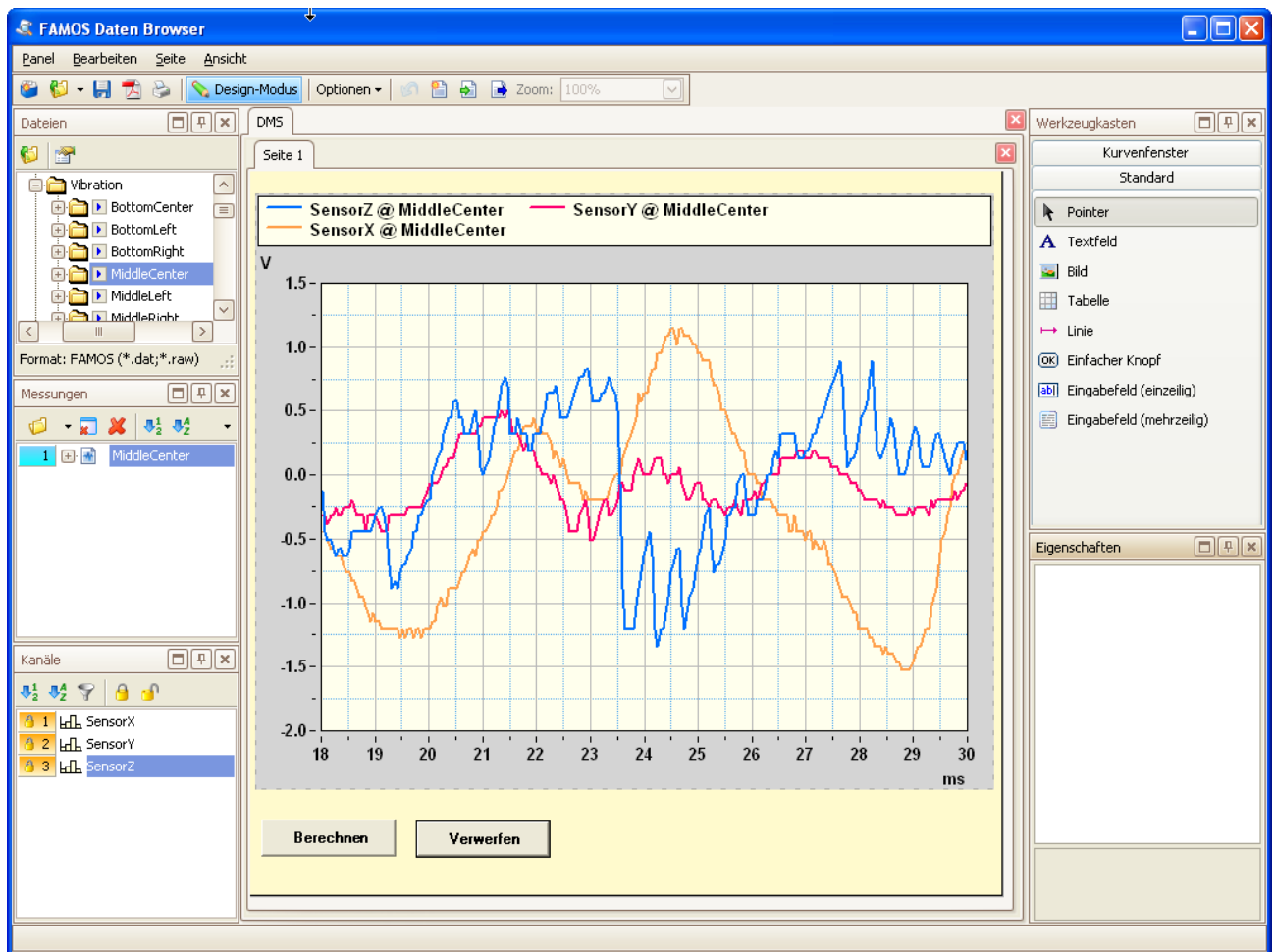
### **Data selection**

- Selection of channels to be displayed by editable name
- Selection of the channels to be displayed via the selection in the Data Browser (selected channel, channel fixed for selected measurement)
- Details provided in the chapter Adapting channel selection

### **WYSIWYG**

- For embedded curve windows in the panel, switching between screen operation mode and "What you see is what you get" (WYSIWYG)
- Axis labeling is then like for the printout. But the curve window can still be operated as before, e.g.: Zoom, etc.
- Curve window to clipboard also in the proportions currently displayed

## **Data Browser**



The Data Browser is a new tool for quick and easy visualization of measured data.

The Data Browser supplements the curve window functions with flexible assignment of measurement channels.

The panels in the Data Browser combine the properties of dialog and reports.

## Presentation with panels

For display and documentation of measured data, so-called panels are used. A panel contains one or more pages. You can arrange a variety of display elements on a page. Typical elements include curve windows, tables and text boxes. It is also possible to position interactive elements such as buttons and input boxes for text in the forms. Such interactive elements can either start sequences or be linked directly with imc FAMOS variables (data binding).

## Design mode / Run mode

To create or edit panels, you switch the Data-Browser to **Design Mode**.

In this mode, there are additional tools available

- Toolbar for selecting the panel elements
- Editors with which to determine the panel element properties

Panels designed in this way (file extension: \*.panel) can later be loaded during the **run** and either automatically or manually "filled" with the current measurement data. You can use the input boxes and buttons, and print the presentation of the data, as well as save the data in a variety of formats such as Adobe Acrobat PDF, PNG, and BMP.

## Data selection

The new way to select data solves two common application cases.

- Often, channels have duplicate names. Using only the imc FAMOS curve window, simultaneous processing or viewing of identically named channels can only be accomplished by renaming them, or by taking other steps (for instance, forming data groups).
- Display elements such as curve windows are normally designed so that the data to be displayed are specified by their (channel) names. For the presentation, the channels currently desired must then either be renamed appropriately or be replaced in the curve window.

Data selection is governed by two principles:

### Assigning the channels to measurements

When opening files of measured data, the channels they include are automatically assigned to a "Measurement". The measurement's name can be derived from the name of the file of measured data, for example (in the case of multi-channel files), or from the name of the folder to which it belongs.

### Selection/Numbering

The measurement and channel names in imc FAMOS are displayed in separate list boxes and can be selected by the user. To each measurement, as well as to each of its constituent channels, a unique number can be assigned.

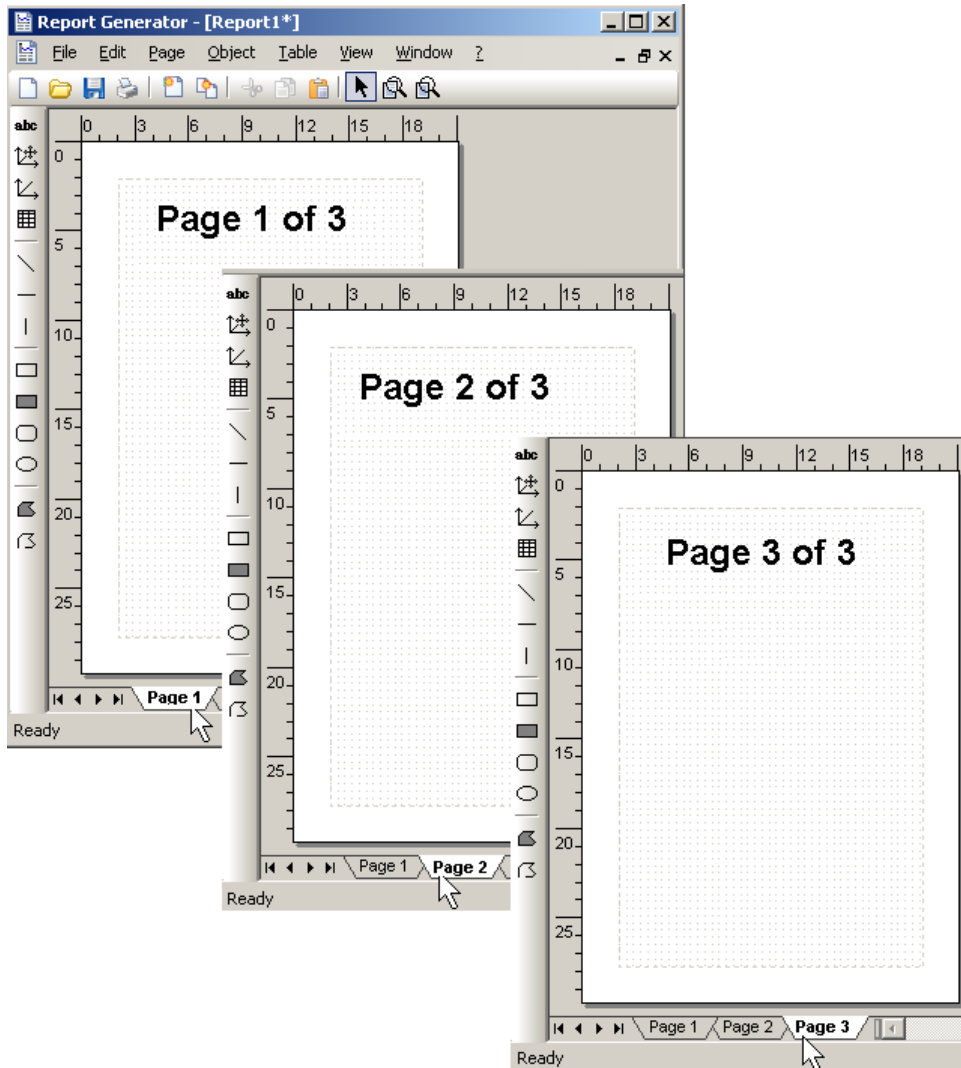
Curve windows and other display elements for measurement data can now be configured in such a way that -instead of concrete channel names- references to the current selection can be entered in these lists.

## Report Generator

### Multi-page reports

The Report Generator can now be used to compose multi-page reports.

A new menu "Page" has been introduced.

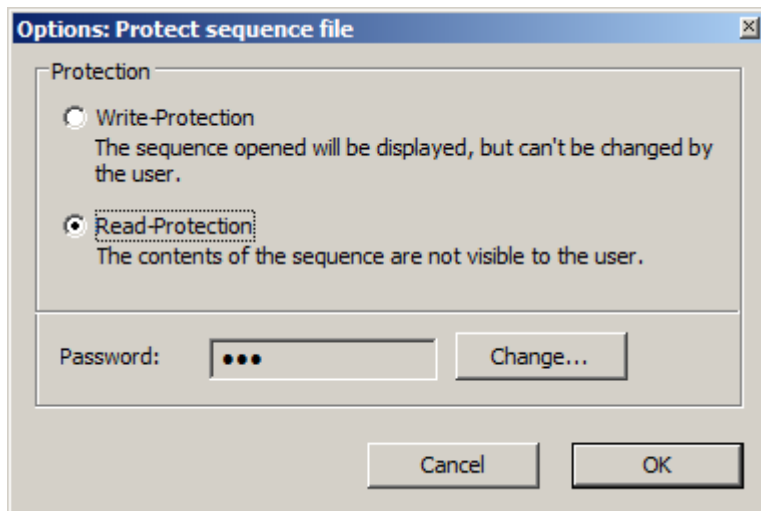


*The Report Generator can create multi-page reports*

See also [New/Changed Functions](#)<sup>103</sup> for appropriate changes of Report Kit functions.

## Write/Read Protection for imc FAMOS Sequences and Dialogs

As of imc FAMOS 5.0 Revision 7, sequences and dialogs can be saved in a password-protected file format. Such files provide only limited access unless a password is entered:



There is a distinction between two protection types:

### Write-protection

Both data types can be opened and displayed using the imc FAMOS input box, but are protected against editing. All debug options in the input box such as running of single steps and breakpoints are also allowed.

Typically used for distributing sequences within a company, while preventing the sequences from accidentally being altered by the user.

### Read-protection

Both file types can be opened and run in the imc FAMOS input box, but the source code of the sequence(s) is not displayed. The imc FAMOS input box only posts a message prompting the user to enter a password for enabling the display.

Typically used for passing sequences to external users without revealing the exact code and algorithms used.

## New / Changed Functions

### Function RSamp0

Prototype re-sampling, sampling of a waveform at a reference waveform's sampling times, with constant interpolation.

#### Declaration:

```
RSamp0 (NWData, NWReference) -> NWResult
```

#### Description:

The waveform named as the first parameter is re-sampled at the points in time (x-coordinates) determined by the reference waveform (second parameter).

The result value associated with a particular reference waveform's x-coordinate is considered to be the input waveform's value at the x-coordinate closest to the reference waveform's coordinate.

Thus, **in contrast to the function pSamp(), interpolation is not linear**, the result waveform only consists of values which also exist in the input waveform.

For details see Function Reference for [RSamp0](#).

### New Functions for use with Data Browser

[SelMeasListSize?](#)

Dataselector: Size of Measurement list

<a href="#">SelMeasListName?</a>	Dataselector: Query Measurement list item
<a href="#">SelChanListSize?</a>	Dataselector: Size of Channel list
<a href="#">SelChanListName?</a>	Dataselector: Query Channel list item
<a href="#">SelBuildVarName</a>	Dataselector: Build variable name
<a href="#">SelUseMeasurement</a>	Dataselector/Formula interpreter: Use measurement no.

### New Kit Functions

The following new kit functions are created for remote control of the multi-page reports. Details on the new functions are provided in the corresponding chapters of the Report Kit documentation:

- [RgDocExportEx](#)
- [RgDocGetPageCount](#)
- [RgDocInsertPage](#)
- [RgDocRemovePage](#)
- [RgDocSetActivePage](#)

### Changed Functions

A number of Report Kit functions has been changed to reflect the addition of multi-page reports (select the current page).

## 2.12 imc FAMOS Update-Info (Version 5.0)

This information is particularly intended for users familiar with previous imc FAMOS versions. It includes a brief summary of new features and changes in the new version:

[What's new in imc FAMOS 5.0](#)<sup>[104]</sup>

[Remarks on compatibility](#)<sup>[107]</sup>

This document describes changes from the predecessor version 4.0. If you have been working with a version older than that, you should first study the below-mentioned documents:

Update information on: [Version 4.0](#)<sup>[108]</sup> | [Version 3.2](#)<sup>[111]</sup> | [Version 3.1](#)<sup>[114]</sup> | [Version 3.0](#)

### What's new in imc FAMOS 5.0 ?

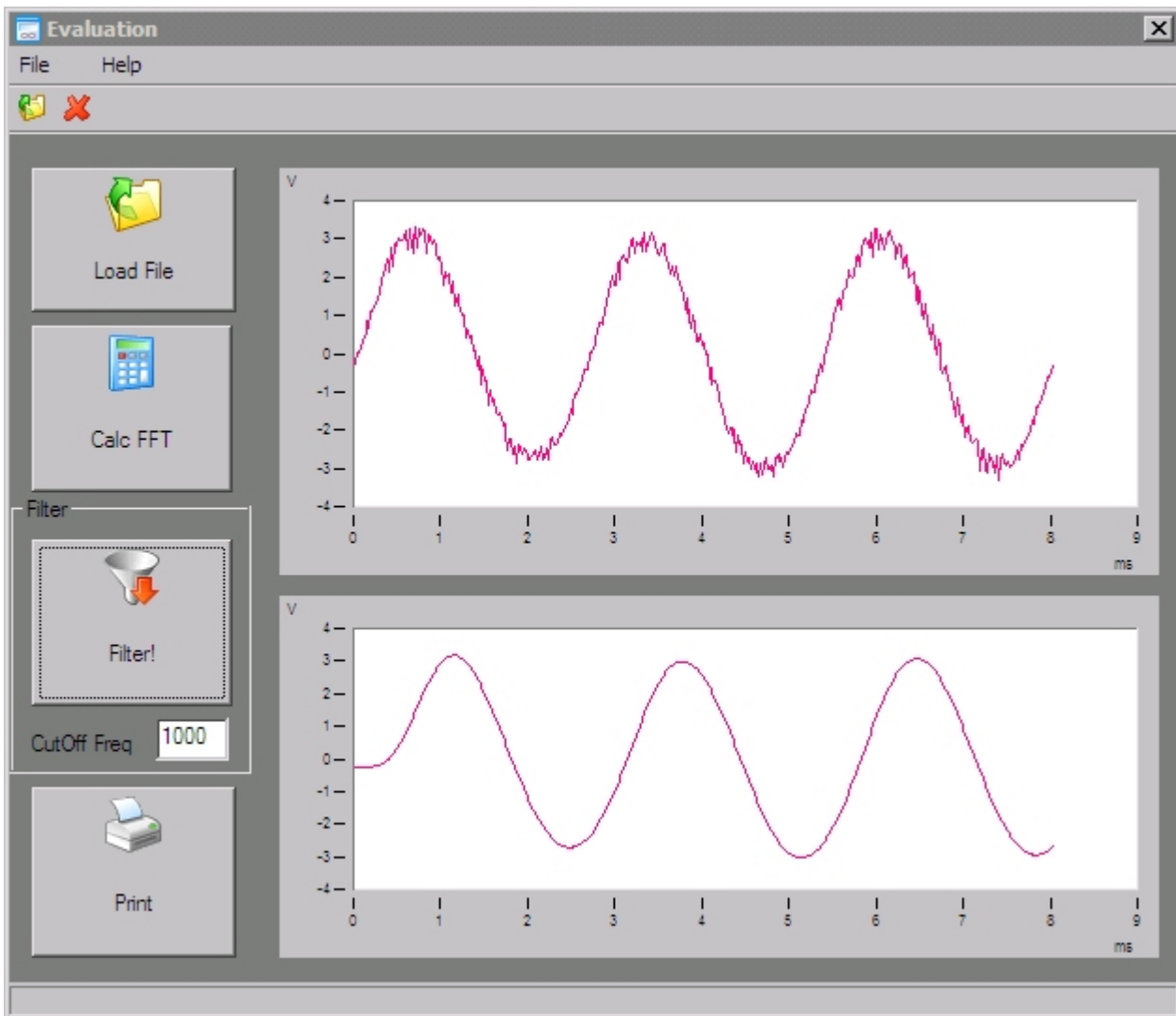
#### User-defined dialogs

imc FAMOS 5.0 offers the user the chance to create his own dialogs and to link them with sequences. Dialogs are input/ output windows enabling communication with the user. They can be used, for example, to prompt the user to supply input, and/ or to present results.

A dialog's appearance, properties and structure (i.e. the controls it contains) are defined by means of a convenient graphic editor.

For control of a dialog during runtime, an extensive function library is available.



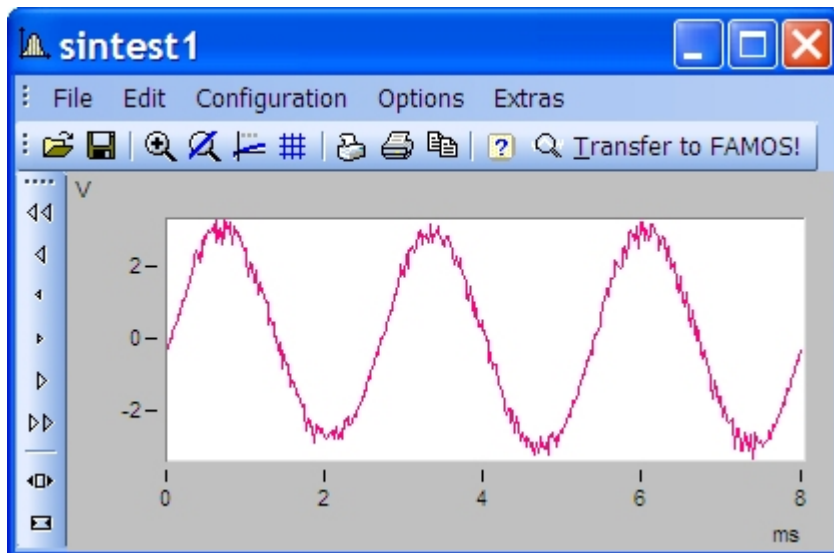


### Project management

A imc FAMOS project consists of a collection of sequences, dialogs, reports, curve configurations and default settings which are needed in concert for solving a particular task. This collection is then stored as a unit, in order to achieve significant convenience for its use, maintenance and transfer.

### Curve windows: Operation

The operation of the curve window was comprehensively modernized. Along with a newly arranged menu, a variety of freely positionable toolbars are provided. The menu and toolbars can be adapted to the user's needs. New settings dialogs, for example, for axis and line options, simplify and speed up the configuration process.



### Curve windows: Properties

- Additional line property: line thickness
- Additional line property: Individual color
- Y-axes can be arranged one above the other in one coordinate system.
- Color map: Marking measured points with symbols

### Logic operators and arithmetical comparisons

New logic operators **AND**, **OR**, **XOR**, **NOT** for composing logical expressions

The applicability of the **comparison operators** such as "<" ">", "<>" was expanded. They can now be used within to commands IF and WHILE in arithmetical expressions.

All operators can be applied not only to single values, but to complete data sets (waveforms). This makes very elegant and efficient range monitoring tasks possible, for instance..

**Example:** All values within a waveform which are below a certain threshold are set to 0:

```
Result = Channel1 * (Channel1 < 20)
```

**Example:** 2 waveforms with the same time base are investigated. All points in time are found, at which at least one waveform was above a given threshold:

```
t = Top( (Channel1 > 3) OR (Channel2 > 3), 0.5)
```

The new functions **UpperValue** and **LowerValue** determine the respective greater or lesser of two values. For the parameter combination data set/ single value, the 2nd parameter's value serves as the upper/ lower limit for the data set values. If both parameters are data sets, the result is the upper/ lower envelope curve.

### Extended syntax for variable names

Variable name which even contain spaces and other special characters, or which begin with a digit, are now permitted. In order to apply such names in formulas, they must be written inside curved brackets.

### Data-import and -export

imc FAMOS 5.0 is able to integrate extra expansion libraries for importing and exporting data. As it is with the imc File Assistant, these import- and export filters fit seamlessly into both the user's interface and the function library (function: FileOpenFAS). This makes it possible for imc to react more quickly and flexibly to user wishes involving new file formats to support. One example is the now standard included import and export of the **MATLAB** file format.

### Miscellaneous notes

- Report Generator: **PDF-Export**

- New start parameter **/X**. Can be combined with **/S**, in order to close imc FAMOS once the sequence called has been executed.
- New DDE-command **[EXIT]** for closing imc FAMOS.
- Functions **RgDocOpen**, **CvConfig** and **SEQUENCE**: Unless the complete file path is specified, the file is first searched for in the current working folder, then in the configured default folder for the respective file type. The "working folder" signifies the folder from which the calling sequence was opened.
- New function **VarGetInit2**: Enumeration of the imc FAMOS variables available at the moment the functions is called.
- Function **DatFormat?()**: Can now be applied to texts and data groups. Thus, the function can also be used to determine a imc FAMOS variable's basic type.
- Printout of sequences with syntax-denoting colors

### Remarks on compatibility

- System requirements: **Windows 95 is no longer supported**. The video mode required is "HighColor" (corresponding to 65536 colors) and higher.
- Earlier versions can be run as **Server-Only-Installations**, i.e. imc FAMOS was installed on only one file server and started via the network from the Client PC. For reasons of performance, this was not recommended, though technically possible. From imc FAMOS 5.0 on, this will no longer be supported; imc FAMOS absolutely must be locally installed on every PC using it.
- **Canceling sequences**: Sequences no longer can be canceled by clicking on the title bar. Instead, during a running sequence, an additional icon appears in the notification area of the Windows Taskbar (System-Tray). Double-clicking on the icon cancels the running sequence, right-clicking opens a context menu with the associated options.



In earlier imc FAMOS versions, opening waveforms sometimes was accompanied by **automatic correction of the resulting variable names**, in order to adapt them to the syntax requirements. For instance, with a LOAD command, a prefixed digit in the variable name was replaced by a letter, and forbidden characters (spaces etc.) were replaced by underlines. imc FAMOS 5.0 no longer performs such corrections by default, since the syntax for variable names has been extended instead. If you are using sequences which require the former conditions, you can use the menu item "Extras" / "Options" to open a dialog in which the tree diagram entry "Miscellaneous" / "Compatibility" accesses a control to force imc FAMOS 4.0-compatible behavior.

- **Report Generator: The place holders in text objects** in the German and English versions were brought into line with each other. Now, text is always represented by "#s", the time by "#z" and the unit by "#u". Reports already composed remain compatible without changes.
- **Import filters created with the imc File Assistant (\*.fas) no longer need to be registered explicitly**. The "Load file"-dialog in imc FAMOS now always lists all import filters available in the imc FAMOS definitions folder (e.g. "c:\imc\def").
- The alternative **user's interface "imc FAMOS 3.2 compatible"** is no longer provided.

## 2.13 imc FAMOS Update-Info (Version 4.0)

The material here is mainly addressed to users familiar with past versions of imc FAMOS and provides a brief overview of changes and innovations reflected in this version:

[What's new in imc FAMOS 4.0](#) <sup>108</sup>

[Q&A for upgraders](#) <sup>110</sup>

The info presented here describes changes from the predecessor version 3.2. If your experience is with an even older version, you should first familiarize yourself with the changes realized in the meantime:

Update-information for: [Version 3.2](#) <sup>111</sup> | [Version 3.1](#) <sup>114</sup> | [Version 3.0](#)

### What's new in imc FAMOS 4.0 ?

#### User interface

imc FAMOS' user interface was substantially revised. The major changes from predecessor versions are:

A new, **built-in Sequence Editor** replaces both the one-line input box and the external Sequence Editor. The Editor features the following improvements over its predecessors:

- improved debugging possibilities and error tracing, with breakpoints, single steps into the subsequence, automatic reloading of subsequences in case of error and display of error position
- improved, multi-stage Undo/Redo
- automatic formatting (indentation adapted to program structure)
- automatic inserting of new sequence lines
- Bookmarks
- ParameterTip for functions
- insertion of text boilerplates
- file commentary for sequences
- optional security copy when saving sequences

**The combination of buttons and lists used until now to select functions and commands has been replaced by a hierarchical tree diagram.** At the same time, this replaces the overview dialog for the Functions Assistant which is thus better integrated into the system. The "User-defined function buttons" are replaced by a hierarchical "Favorites list".

The new **Plugin-concept** allows expansion modules having their own user interface to be easily integrated. To date, an ASAM-ODS-Browser and a Video-Player have been realized.

Merging of various presettings dialogs to a single, hierarchically structured **options dialog**.

#### New functions

**Random:** Generates a random series of numbers having a specified distribution (equal, normal, exponential, and binominal distribution).

**PosiEx:** Expansion of the Posi-function. Returns (by interpolation) all positions of a given value in a waveform.

**SetOption,GetOption:** Functions for setting and querying various presettings, such as folders, options for math functions, DDE etc. Replaces and complements previously separate commands including LDIR, SDIR, FFTOption, DDESepar...

**Execute:** Starts an executable file and/or edits a document file. Optionally waits for started application to close.

**Sleep:** Interrupts processing of sequence for specifiable standby time.

**FileOpenASCII2, FileOpenXLS, FileOpenXLS2, FileXLSColumnRead, FileXLSCellRead:** Functions for ASCII-export as well as EXCEL (XLS) import and export

**File management-Kit:** approx. 25 new file management functions, e.g. enumeration of folders/files, copying, renaming, deleting, selection dialogs for files and folders, file attributes and more. Used, for example, for sequences which automatically process whole directory structures.

**MatrixTranspose, MatrixSumLines, MatrixCut:** Special functions for editing segmented waveforms (or matrices). Transposing a matrix, computing sums over a row or column in a table, or making a (diagonal) section through a matrix.

**Median:** Median-filtering over a specified number of points

**SetFlag / Flag?:** Set/query special waveform attributes, such as "Retain file format" attribute

**Timestamp Ascii Kit:** A collection of various functions for handling the new data type "Timestamp Ascii". This data type enables administration of texts and time stamps in the typical manner of a log book or protocol.

### Expansions of existing functions

**<+> Operator:** Can now be used on text variables. The Tadd()-function is thus largely obsolete.

"~xxx" in text constants is interpreted as direct entry of ASCII-code, e.g. "~009" for the tab-character. The SvtoChar () function is thus largely obsolete.

**EXITSEQUENCE:** New options (differentiating whether to completely abort processing of sequence or to return to the calling parent sequence).

**Regr, Eregr:** Along with the interpolated curve, the coefficients can now also be polled in a simple manner.

**FileOpenASCII:** 64k-limit on reading has been abolished

**TForm:** Additional format options

**SEQUENCE:** In calls containing the wildcard characters (\*,?) in filenames, complete path locations can now be entered.

**Segmented waveforms:** Many basic math functions can now be directly applied to segmented waveforms. In particular, segmented waveforms can be subjected to the basic arithmetic operations (+, -, \*, /) together with a single value or with another segmented waveform of the same shape (i.e. with the same length and segment length).

**SetBoxPos:** Can now also be used for dialogs created with BoxMessage() andDlgFileName().

### Export / Import

**Improved export to ASCII-format.** The particular format is defined by means of a so-called export template which can be layouted by dialog. This includes defining file and column headers, setting up and formatting of scaling columns, column separator characters etc. The templates created are then available as export formats in the "Save file" dialog. Selected variables can thus be exported as a multi-column ASCII file in a very simple manner.

**Linking up to Microsoft EXCEL (XLS-format).** If EXCEL is installed, XLS-files can be directly read and written. Saving is template-driven, as for ASCII-export, import is configured by dialog. Thus, a complete Excel-table in XLS-format can be loaded to imc FAMOS all in one go, or the variables currently selected in imc FAMOS can be saved directly together with a XLS-file.

### Miscellaneous

**The maximum number of variables** was increased to 32000. General higher performance in working with multiple variables, e.g. significantly faster loading of imc files having very many channels.

**Import of Nicolet-files:** Limit of 8 on channel names abolished

**USB-Hardlock** available as alternative to parallel port hardlock

**imc FAMOS file format, single values:** Single values are more efficiently saved in imc FAMOS-format files. For this purpose, a new key has been introduced in the file header.

## New optional expansions

### Order Tracking-Kit

**ASAM-ODS Browser** (available soon)

**Video-Player** for synchronized playback of measurement data and videos

### Report Generator

**Export to various graphics formats** (JPEG, PNG, Bitmap, Metafile)

### New Kit functions:

**RgDocExport:** Export of reports into various graphics formats

**RgDocPrintSetup:** Sets printer and output medium (e.g. filename)

**RgObjSetSize, RgObjMove, RgObjGetPos:** Positions report objects

**RgObjDelete:** Deletes an object

### Curve window

**Color map:** Selection of available colors and additional options such as graduated colors, display without linear interpolation; also ISO-lines (contour lines). As an alternative to color coding, measurement data can be represented by symbols of varying size or variable fill. A context menu for color map settings is available in the curve window.

**Tables:** For displaying protocols, data can be presented in a table in chronological order. Select via the "Display" dialog.

**Display of Timestamp Ascii data:** These data can conveniently be presented in tables in the curve window (log-book representation), or also in time traces at the correct times.

**Postprocessing signals:** A segment of data highlighted between the measurement cursors can be post-processed. This enables spikes and outliers to be removed, signals to be smoothed, offsets and drifts to be corrected. The functionality is called via the measurement value window's context menu.

**Default colors:** The default colors in the curve window have been slightly changed.

## Q&A for upgraders

### \* The interface looks different; do I have to re-learn it?

The changes are not as profound as they seem at first glance, as the notes below will illustrate.

### \* But I want the old GUI appearance back!

A switch is provided under Extra / Options / Miscellaneous/ Compatibility which accesses a GUI resembling imc FAMOS 3.2 (single-line Operations box, external Sequence Editor, "Function buttons".) However, using this option prevents you from taking advantage of many of the new features offered by imc FAMOS 4.0. This especially applies to the built-in Sequence Editor whose performance is substantially better (for editing as well as for error finding) than the "old" 3.2 Sequence Editor.

### \* Where are the function buttons?

The combination of buttons and lists used until now to select functions and commands has been replaced by a hierarchical tree diagram (bottom left, "Standard" index card). The assignment of functions into separate groups has been kept,; double-clicking on the entry for a group opens the corresponding branch and indicates all the functions it contains. Right-clicking the mouse calls the context menu which then shows the available options.

### \* What about the user-defined function buttons?

These are now termed "Favorites" and can be found on the index card of the same name, at the lower left.

### \* Where are the "Kits" and the "External"-menu?

The Kit- and external DLL-functions are now also at the lower left in the tree diagram, on the index cards "Kits" and "DLL", respectively.

**\* ..and the button for calling the Assistant?**

The Formula Assistant is now integrated into the functions list. Simply select the desired function, and then SHIFT+F1 or context menu / "Assistant".

**\* Why all these changes after I became accustomed to the "pocket calculator" layout?**

Here are just some of the advantages:

- No more cryptic abbreviations of function names due to lack of space of "button" surfaces.
- All functions, whether built-in, or provided by Kit or DLL, are now all in one spot. A short functions description is now always visible (next to the function name).
- Two choices for structuring the list (toggling between alphabetic listing and tree diagram)
- Favorites can be grouped any way desired, functions used often can be copied to the lists of defaults and favorites in a very simple manner.

**\* Multiselection and Drag&Drop with the mouse are somehow different...?**

The behavior has been changes to correspond to Windows standards. The old distinction: mouse over left third -> Drag&Drop; mouse over right half -> multi selection, was not very common. Now it's the same as in the Windows Explorer: click on an unselected entry and drag the mouse over other entries -> Multiselection; click on an already selected entry and drag mouse -> Drag&Drop.

**\* Where are the Operations line and the "Execute"-button? How do you call up the Sequence Editor?**

The former, one-line Operation box and the extra sequence window have now been joined to a common, multi-line built-in input window. The respective active line is denoted by a small key with a yellow arrow (practically the analog of the Execute button). To execute a formula, select the index card "Input", structure the formula in the usual way on one line and the press Ctrl + Enter or the yellow arrow button, if it is on the correct line. A new formula can be written in any desired line of the input window. The input window's contents are retained even when the program is closed and are available upon the start of the next session.

**\* How do I access the File Window mode?**

There no longer is any distinction between File Window and Standard mode. Each of the various windows in the GUI can be hidden, maximized or minimized as desired, and any layout so constructed can be saved under any specified name. We have already provided a few: with "Window"/ "Load configuration" / "Variable list | File browser", you can access the 2-window layout familiar as File Window mode: Variablelist on the left/ File browser at right; and with the command "Without Plugin window", a 4-window layout without file browser, which most closely resembles the standard imc FAMOS 3.2 appearance.

## 2.14 imc FAMOS Update Info (Version 3.2)

Information presented here is directed at users who are already familiar with earlier versions of imc FAMOS. A brief overview of changes and new developments implemented in this version is offered here.

If your experience is with imc FAMOS 2.0, you should first familiarize yourself with the new developments included in [Version 3.0](#)<sup>117</sup>

If your experience is with imc FAMOS 3.0, you should first familiarize yourself with the new developments included in [Version 3.1](#)<sup>114</sup>

[What's new in imc FAMOS 3.2 ?](#)<sup>112</sup>

[Improved integration with the Windows -Explorer](#)<sup>112</sup>

[Notes on compatibility with earlier imc FAMOS-Versions](#)

## What's new in imc FAMOS 3.2 ?

### General

imc FAMOS 3.2 requires an operating system at least as advanced as Windows95 or Windows NT4.0. As a true "32-bit" program, it features customary improvements on "16-bit" predecessor versions, such as supporting long filenames and the use of Windows Explorer dialogs for opening and saving files. Besides the many improvements in details, the following features are altogether new:

### Curve window

- New display type: Bar meter with slave pointer

### Functions

- New: Moving standard deviation (**MvStDev(...)**, Function Group 9)
- New: Envelope curve as per Interval-Secant method (**Envelope1(...)**, **Envelope2(...)**, Group 5)
- New function: **FileName?(...)**; inquires the name of the file, from which the variable in question was loaded.
- New option for the function **TimeToText(...)**: 4-digit readout of the year
- The standard filter functions (lowpass **FiltLP(...)**, bandpass **FiltBP(...)** etc.) are now always available even if the imc-Filter Design program is not installed.

### Sequence-Editor

- Color-coding of the syntax elements (also in the help window)
- more Undo-stages
- Overwrite-mode

### Waveform-Editor

- Previously, a channel's display was deleted as soon as its variable was redefined (for example, in the process of being re-imported from a file). Now, the display is retained if possible. This makes it possible, for instance, to continuously view a channel in the Waveform Editor, as well as in the curve window, during an automatic scroll through a directory.

### Command line-parameters

- New command line parameters for imc FAMOS , e.g. /D for loading and displaying a measurement file and /S for starting a sequence.

### File-Assistant

- New option: Accelerated readin of compact binary vectors in their original data formats

### Configuration-Manager (XConfig.exe)

- Transfer of settings for imc-programs (such as user-defined function buttons in imc FAMOS) from the Windows system registry to a file and vice-versa. This allows ease of exchange of such settings between separate PC's.
- see also: [Integrating user-defined function buttons into the program update](#)

## Improved Integration with the Windows-Explorer

### Opening and displaying imc measurement files ( \*.dat, \*.raw )

- by double-clicking on a file entry having the indicated extension
- by selecting the entry for the desired file(s) and the menu item "Open" in the Explorer context menu

### Loading measurement files ( \*.\* )

- by Drag&Drop of the file(s) to the imc FAMOS-main window. The files are loaded into imc FAMOS in accord with the current setting for data format.



### Opening Report Generator files ( \*.drb)

- by double-clicking on a file entry having the indicated extension
- by selecting the entry for the desired file(s) and the menu item "Open" in the Explorer context menu
- by Drag&Drop of the file(s) to the Report Generator window

### Printing out Report Generator files ( \*.drb)

- by selecting the entry for the desired file(s) and the menu item "Print" in the Explorer context menu

### Opening Sequence files ( \*.seq)

- by Drag&Drop of the file(s) to the Sequence window

### Displaying Sequence-files ( \*.seq) with the Windows Editor (Notepad)

- by selecting the desired file(s) + the menu item "Open" in the Explorer context menu

### Executing Sequence-file(s) ( \*.seq)

- by selecting the desired file(s) + the menu item "Run" in the Explorer context menu

### Printing out Sequence-file(s) ( \*.seq)

- by selecting the desired file(s) + the menu item "Print" in the Explorer context menu

## Notes on compatibility

### Concerning Kit-Interface

The imc-Kits (16Bit) used till now will not work with this software version. These kits already have been or soon will be adapted to 32 bits

Any kits other than those provided by imc must also be adapted to 32 bits in order to function.

Please consult the imc-Hotline for any questions or problems which may arise.

### Concerning DLL-Interface

The 16-bit-DLL's used to date can no longer be used and must be adapted to 32 bits. Additionally, changes to the declarations file may be necessary.

Where Windows-system-calls ("user.dll", "kernel.dll" etc.) were used, adaptations of the function declaration will be needed.

Detailed instructions are available in the imc FAMOS-User's Manual, in the chapter "Functions/ External DLL-interface".

Please consult the imc-Hotline for any questions or problems which may arise.

### Concerning network dongle

The network dongle can only be addressed via TCP/IP or IPX. **NetBios** is no longer supported.

### Command-line parameters

The command-line parameter syntax has been changed. Whereas operations to be performed immediately upon starting imc FAMOS could, up till now, be specified in the calling command-line without any option key, such operations must now be prefaced by the "/E" option key.

#### Example:

imc FAMOS 3.1:

```
c:\imc\imc FAMOS.exe sequ startup.seq
```

imc FAMOS 3.2:

```
c:\imc\bin\imc FAMOS.exe /E "sequ startup.seq"
```

or better yet:

```
c:\imc\bin\imc FAMOS.exe /S startup.seq
```

### **Integrating user-defined function buttons into the program update**

If the update is installed in the same directory as the previous imc FAMOS version, then all valid settings, including user-defined function buttons, will automatically be incorporated into the new system.

If, however, a different directory is set for the update's installation, then proceed as follows to have the user-defined function buttons incorporated into the new version:

- close all imc-programs
- start the program "XConfig.Exe" in the subdirectory /BIN
- press the soft key "Load from file.."
- select the entry in the filetype-list "imc FAMOS (16Bit) function buttons"
- load the file "imc FAMOS\_ub.ini" which is in the "old" imc FAMOS-installation directory. The contents of the file will be converted and incorporated into the System Registry.

### **Printing from the Sequence Editor**

Specifying separate fonts for the monitor display and for the printout is no longer possible. The header and the footer will also appear in the set font.

### **Filenames of the executable files**

The filenames for the Report-Generator (now "Report.Exe") and the File Assistant (now "MakeFas.Exe") are new. Normally, these executable files are located in the subdirectory "/Bin" of the base directory specified for installation. Keep this in mind if you want to create or update a shortcut for an imc program on the Windows Desktop.

### **The functions Smo3(..) and Smo5(..)**

The filter coefficients for both functions have been slightly altered, in order to bring the transient response into line with the function Smo(..). The fundamental filtering effect, however, is not affected.

## **2.15 imc FAMOS Update Info (Version 3.1)**

This file is intended for those of you who have worked with previous versions of imc FAMOS. It explains some of the changes and new features in this version of imc FAMOS.

If you have previously worked with imc FAMOS 2.0, we recommend taking a look at the new features implemented in [imc FAMOS 3.0](#)

### **What's new in imc FAMOS 3.1 ?**

#### **Report Generator**

- Completely overhauled
- New object types, e.g. Tables, Polygons, Arrows, Ellipses...
- New properties for existing object types, e.g. texts with frames, background textures, Alignment left/ right/ center
- Extended editing commands, e.g. Copy, Paste As..., Align objects, Undo functions
- Drag & drop compatibility with curve windows, imc FAMOS variables list and Waveform Editor
- New remote control kit, e.g. transfer data to table column-wise, row-wise or cell-by-cell
- OLE container

#### **File Window Mode**

- New File Window display mode for fast and easy navigation through data directories with version comparison. Complete integration of imc LOOK functions.

#### **Curve Window**

- Color map display mode
- Extended remote control kit, e.g. set markers and measurement cursors
- Individual printer settings independent from Windows settings
- Non-equidistant z-axis scaling in waterfall display mode
- Improved display mode for stacked curve windows containing digital data. The space requirements have been reduced so that more room is available for analog data in curve windows containing analog and digital data.
- New dialog for configuring curve windows. Selection of events and segments to be displayed as well as their arrangement. Options for period comparison of several waveforms.


#### **Waveform Editor**

- Printer support
- Drag & drop - compatible with Report Generator
- New context menus

#### **Sequence Editor**

- Printing of sequences
- New context menus

#### **imc FAMOS Functions**

- Moving averages (rms, minimum, maximum, sum, average)
- New editing functions for waveforms (cut, paste, value queries...) using sample index instead of x-coordinate
- Various functions for handling multi-event waveforms
- A, B, C frequency evaluation in accordance with DIN IEC 651 (sound level measurements)
- Data reduction using imc's Transitional Recording algorithm
- Row-by-row reading and writing of ASCII files
- Time or x-correct addition, subtraction, division, multiplication of waveforms
- Time or x-correct joining/ merging of waveforms
- Functions getting variable names from imc FAMOS variables list
- Pop-up message dialogs with live buttons (e.g. "Yes", "No" )
- Many functions now compatible with XY-waveforms, e.g. differentiation, integration,
- Flat-top windows for FFT function
- [Complete overview of the new functions](#) 

#### **Various**

- Command history of operations box is now available after restarting imc FAMOS
- Context menu for operations box
- Context menu for variables list expanded
- Variables list: new keyboard short-cut - entering letter goes to variables starting with that letter
- Improved dialog for renaming/ overwriting variables when reloading them. New option <Overwrite All>.
- ASCII saves with dialog also for XY and complex waveforms.
- Tool tips provided (time-delayed pop-up help messages) for tool bars and function buttons

### **New Functions in imc FAMOS 3.1**

Function	Description
----------	-------------

<b>Waveform Editing</b>	
CutIndex	Copies a section of a waveform as indicated by sample indices
ValueIndex	Gets waveform values at location indicated by sample index
SetIndex	Sets new values in waveform at positions indicated by sample indices
ReplIndex	Replaces a section of a waveform at position indicated by starting index
<b>Handling of Multi-Event Waveforms</b>	
EventNew	Creates a new multi-event waveform
EventNum?	Inquires number of events in a waveform
EventAppend	Adds an event to a multi-event waveform
EventDel	Deletes an event from a multi-event waveform
EventGet	Copies an event from a multi-event waveform
EventProp?	Gets properties of an event from a multi-event waveform
EventProp	Sets properties of an event from a multi-event waveform
EventJoin	Joins events together and eliminates multi-event property
EventSet	Replaces an event in a multi-event waveform
<b>Moving Averages, etc.</b>	
MvRMS	Moving RMS with arithmetic mean
ExpoRMS	Moving RMS with exponential mean
MvMin	Moving minimum
MvMax	Moving maximum
MvMean	Moving average
MvSum	Moving sum
<b>Time or x-Correct Combination</b>	
Add	Time or x-correct addition
Sub	Time or x-correct subtraction
Mult	Time or x-correct multiplication
Div	Time or x-correct division

Append	Time or x-correct joining/ merging of two waveforms
<b>Reading and Writing of ASCII Files</b>	
FileOpenASCII	Opens an ASCII file for row-wise (line-by-line) reading or writing
FileLineWrite	Writes a line to an ASCII file
FileLineRead	Reads a line from an ASCII file
<b>Various</b>	
ABCRating	Frequency analysis in accordance with IEC DIN 651 (sound level measurements)
TransRec	Data reduction using imc's Transitional Recording algorithm
Sum	Sum of all y-values of a waveform
atan2	Arctangent, angle in Cartesian plane
VarExist?	Checks whether a variable is currently available in imc FAMOS
VarGetInit	Gets contents of imc FAMOS variables list
VarGetName?	Gets names of variables in variables list
SetBoxPos	Sets positions for a dialog box
BoxMessage	Creates pop-up box for text output with icons and buttons

## 2.16 imc FAMOS Update Info (Version 3.0)

This information is especially for those who have worked with previous versions of imc FAMOS (2.0), providing a brief overview of changes and new features.

[New features and enhancements](#) <sup>117</sup>

[New functions and commands](#) <sup>120</sup>

[Remarks about compatability](#)

### New Features and Enhancements (V3.0)

#### Interface

- The size and position of the interface elements (variable list, function box..) can be changed individually.
- Drag&Drop function is available. For example, variables can be dragged from the variable list and dropped in a curve window.
- Tool bar for fast access to frequently used menu functions.
- Enhanced Control menu to switch quickly between application and curve windows.

#### File Format

- Any number of waveforms, texts and data groups can be saved together in one file.
- Files can also contain a comment.

### **Variables**

- Variable names with up to 255 characters.
- Additional characteristics, such as comment, set colors, set scaling.
- Waveform length allowed from 0.
- Waveforms with integer number formats.
- New data types:

xy-data

data groups

- Access to samples in a waveform using their index.

### **Sequences**

- Convenient Sequence Editor to create and test sequences.
- Conditions ( IF, WHILE) with complex conditions  
( Compare <, > .. )
- Wildcards "\*" and "?" in the commands LOAD, DELETE, SHOW.
- Sequences with parameters can be nested.
- New functions for entering and generating texts, values and file names during execution of sequences.

### **Formulas**

- Samples in waveform addressable by index:  
Example: Wave[100] = Wave[99] + Wave[98].
- Data groups as function parameters are enhanced, the function is executed for all channels contained. For example, the maximum of several waveforms can be determined by calling the function only once.

### **User Defined Function Buttons**

- The function buttons in the main window can be assigned any commands and texts.
- A short help message can be defined for each button.

### **Formula Assistant**

- Supports the user in creating formulas and in defining the parameters of functions. Parameters can be defined for each function and each command using a dialog.

### **Data Editor**

- Display and change waveforms with any lengths in tables.
- Display modes for correctly timed comparison of waveforms.
- Scroll linking to the curve window - synchronous display of a section of a waveform in the curve window and in the Data Editor.

### **DLL Interface**

- Functions from separate Windows-DLLs (function libraries) can be used in imc FAMOS.

### **DDE Interface**

- Transfer waveforms and texts from imc FAMOS to other applications (Client-Poke, Server-Request).

### **Sound Kit**

- Function library included for converting waveforms to the Windows wave format and playing back the waveforms via the Windows sound output.

### **File Assistant**

- Additional program for defining any file formats. Files in such formats can be read into imc FAMOS easily.

## Functions

- Approximately 50 new functions and commands (see [New functions and commands](#)<sup>120</sup>).
- Search for characteristics in the waveform.
- Standard filter (in connection with the imc-Filter Design Package).
- Read and write complex measurement value files.
- Fourier transformation, spectrum and correlation of waveforms with up to 500000 values.

## Report Generator

- Set printer independent of Control panel.
- Set page format (Landscape/Portrait) in the Print Layout.
- Displayable grids.
- Tool bar.
- Curve images adjustable to the position of the coordinate system.

## Curve Window

- **Legends:**

Legends optional and can be parameterized above or next to the coordinate system, with line test and comment.

- **Markers:**

Set and change markers (text and arrow) in the curve window. Font, color and form of markers adjustable with several options and useful standards. The markers belong to the configuration of the curve window as graphic information.

- **Axes Labelling:**

Ticks must no longer be placed at the end of the axes. This allows gentle scrolling, as well as precise zooming with simultaneous labelling of the axes (splitting in steps of 1, 2 and 5). Each predefined section can be displayed. The **power of ten** for the numerical display can be predefined.

- **Navigator:**

The displayed range can be shifted, enlarged or reduced in all directions using the tool box.

- **Duplicate windows:**

Curve windows can be duplicated. This allows the same data to be observed and compared in different ways.

- **Drag & Drop:**

Shift axes and coordinate systems in a curve window using Drag & Drop. Data of one axis or a coordinate system can be copied using Drag & Drop to another curve window or the variable list in imc FAMOS.

- **Further data in window:**

An alternative dialog **for** constructing a curve window. Clear distinction between coordinate systems, axes, lines and data. Completely operable using Drag & Drop.

- **Scrolling, increasing:**

Toggle between scrolling mode, increasing and set display in the curve window for online measurement.

- **Scroll linking:**

Curve windows can be linked below each other, so that a line marks the same x-coordinate in each window. Scrolling in one window allows the next window to follow. Can be linked to the Data Editor.

- **Axes, set and automatic:**

All automatically scaled axes can be frozen using a menu (reverse function of Rezoom, where all axes are set to automatic scaling). The x-axes can be scaled automatically.

- **Single value window:**

Single values in imc FAMOS are displayed in a conventional curve window set to numerical value display. This allows the numerical format to be defined freely; comparison of several single values in one window is also possible. Individual font in each window.

- **Line type:**  
Dotted or dashed lines in 12 variations, even with thick lines.
- **Colors:**  
Additional colors available for main and secondary grids, legends and the coordinate system. The standard is a slightly 3-D coordinate system. The color setups can be saved in a file and restored when needed.
- **Font:**  
Selectable font for plotting the curve window on the screen.
- **Flicker-free:**  
Can be set to be completely flicker-free. This allows even complex curve window to be brought quickly into the foreground, when new plotting is otherwise not necessary.
- **XY-Data:**  
Data type xy (amplitude and time track) can be displayed directly, without constructing an xy-display.
- **Overview window:**  
Can be printed and used like a standard curve window.
- **Reference waveform:**  
Curve window may contain a reference waveform, which is used to remote control the curve window with the help of the kit functions Cv\*(). This waveform can also be deleted from the curve window, i.e. it must not be displayed as the first curve in the window. This allows a completely different combination of data to be displayed in the curve window at any time.
- **Waterfall:**  
The z-axis can be scaled like the x-axis. The length of the z-axis is defined on the screen in percent of the length of the x-axis.
- **Data management:**  
Waveforms with more than 64kBytes can be the RAM. Options are available to restrict the demands of the system memory. If necessary, data can be stored on the hard disk.
- **Context menu:**  
A context menu appears by clicking on a curve window with the right mouse button. The Navigator, Communicator and the enhanced dialog for constructing the curve window are directly accessible using this menu.
- **Floating help:**

Navigator, Communicator and the enhanced dialog for constructing the curve window have an adjustable context help, activated by letting go of the mouse button over the object.

## New Functions and Commands (V3.0)

### Set Characteristics in Waveforms

SetDisplayY, DisplayY?	Set y-scaling for the display in the curve window
SetColor, Color?	Set color for the display in the curve window
SetUnit, Unit?	Set/request unit in a waveform
SetComm, Comm?	Set comment for a waveform, text or data group
RGB	Forms a color value from color portions



SetDataFormat,DataFormat?	Set data format of waveform
---------------------------	-----------------------------

### Input and Output Dialog

BoxOutput	Display text and /or a number in an output window
BoxText?	Dialog to request a text
BoxValue	Dialog to request a number
DlgFileName	Dialog to enter a file name

### DDE Functions

DDEInq	Request a text, single value or waveform from another application
DDESend	Send a command by DDE to another application
DDESet	Transfer variables by DDE to another application
DDESepar	Define separator for the DDE text format

### File Functions

Group of functions for reading and writing in imc FAMOS format and for reading user-defined file formats.

FileClose	Close an open file
FileComm?	Request file comment of a file in imc FAMOS format
FileErrCode?	Get error code of the last executed file function
FileErrText?	Get error text of the last executed file function
FileObjFind	Search in an open file
FileObjName?	Determine name of data object in an open file
FileObjNum?	Determine number of data objects in an open file
FileObjRead	Read a data object from an open file
FileObjType?	Determine type of data object in an open file
FileObjWrite	Write a data object to an open imc FAMOS file
FileOpenDSF	Open a file in imc FAMOS format
FileOpenFAS	Open a file in a user-defined format
FileResetAll	Close all open files
FileSetComm	Set file comment in an open imc FAMOS file
FASLOAD	Command to read a user-defined file format

**Filter Functions**

(Only in connection with the imc Filter Design Package)

FiltBP	Band-pass filter
FiltBS	Band-stop filter
FiltHP	High-pass filter
FiltLP	Low-pass filter

**Functions for Managing Data Groups**

GrJoin	Concatenation of channels in a group
GrChanFind	Search for a channel with a specified name in a data group
GrChanAppend	Add a new channel to a group
GrChanDel	Delete channel from data group
GrChanName?	Request name of channel in data group
GrChanNum?	Request number of channels in data group
GrNew	Create an empty data group

**Analysis Functions**

SIClip	Clip slope of waveform
SearchLevel	Search for predefined level and rise conditions in a waveform

**Data Types**

IsCplx	Inquiry whether waveform is complex
IsXY	Inquiry whether waveform is 2-component xy-waveform
CmpX	x- component of an xy-waveform
CmpY	y- component of an xy-waveform
Xydt	A waveform is resampled with a set sampling rate
Xyof	An xy-waveform is formed from x- and y-components

**Text Functions**

TReplace	A selected string is replaced by another
TxWhere	Determine position of string in a text

SvToChar	Creates a text with any character
CharToSv	Determine the ASCII code of the first character in a text

**Time Functions**

Time?	Request trigger time of waveform
TimeAdd	Add seconds to time value
TimeJoin	Form time value from components
TimeDiff	Form difference from two time values
TimeToText	Convert time value to text
TimeSystem?	Request current system time
TimeSplit	Request a time components from time data in imc FAMOS time format

**Remarks about Compatibility (V3.0)**

**imc FAMOS**

- In general, reduced MUSYCS waveforms are read in differently than other waveforms; xy-waveforms are created. By setting the appropriate options in the "Load File" dialog, the old response can be forced (separate time track and amplitude waveforms).
- Some Functions ( e.g. All0() ) are not cancelled by errors as often, since waveforms with the lengths 0 and 1 are allowed.
- Various key combinations are available for opening sequence files, etc.

**Functions FFT and Red2**

The functions FFT, SPEC, ACF and CCF now process waveforms with a length of up to 524288 samples. As a result, the function RED2 also processes waveforms of up to this maximum length. The limit in earlier versions was set at 16384 samples. A sequence in the form

wave = Ramp( 0,1,100000) Length 100000 values

wave = Red2( wave )

fft\_wave = FFT( wave)

now creates waveforms <wave> with the length 131072 and <fft\_wave> with the length 65537. In imc FAMOS 2.0, the waveform <wave> would have been limited by the function RED2 to 16384 values; the result of FFT would have the length 8193.

The precision of analysis for longer waveforms is increased, and the memory requirements and computing time is also increased. If necessary, adjust the length of the waveform to be analyzed using the RED function.

**Transfer to imc FAMOS**

Transfers data to imc FAMOS from FRAME (version 1.xx), MUSYCS (version 2.xx) or SEARCH (version 1.xx):

Once imc FAMOS 3.0 has been installed in the directory used by other imc applications (e.g. c:\imc ), and one of these versions (Frame, Search) is being used, this directory can be used for further processing. A new famtrans.exe replaces that file in imc FAMOS 2.0, whereby it can also be transferred to imc FAMOS 3.0.

If imc FAMOS 3.0 is installed in another directory, the new famtrans.exe must be copied from the imc FAMOS 3.0 directory to the imc FAMOS 2.0 directory. Start imc FAMOS 3.0 manually before transferring to imc FAMOS 2.0.

**The option "Fast load" in the "Load File"/"Options" dialog must be switched off in imc FAMOS 3.0.**

### Kit Interface

The internal kit interface is enhanced. "Old" imc FAMOS 2.0 kits do not function. The standard kits will be updated.

Users who have written their own kits should contact the imc Hotline.

### Curve Window

- Lines for the small grid are drawn in dots.
- The font for axes labelling can be set by the user. This may lead to a difference in the appearance of the curve window (position and size of axes).
- Preferences: the **diameter of the symbols** is no longer given in pixels, rather in millimeters.
- **Colors**: new colors have been added and must be considered when changing colors, e.g. the background color of a coordinate system and grid lines. The default setting for colors (standard in colors dialog) is now different.
- Curve configurations (CCV-files) saved in imc FAMOS 2.0 can possibly lead to a more precise scaling of the x-axis, if this was displayed in absolute time.
- When executing some operations (e.g. Navigator), **flicker-free display** is activated, even if it was previously switched off.
- Double-clicking in the inner part of the coordinate system no longer results in **scrolling** the curves. Use the Navigator toolbox (click with the right mouse button in the window) to move in the curve window. This toolbox offers several options for scrolling, zooming and changing the visible section.
- Newly saved curve configurations contain exactly the same status of the curve window (symbol, full screen). These are also restored when a configuration is loaded.
- Approximately 150 waveforms can be displayed in a window.
- There is no keyboard interface in zoom and measurement cursor mode.

### Curves: Axes Scaling

- Axes setups: **free ticks** are allowed. These must no longer be located on the ends of the axes.
- There is now only **125 rounding** in the curve window. Use free ticks (no longer on ends of axes) for closer ranges, then a pleasant labelling and a large curve.
- The algorithm used to calculate the number of ticks on the axes has been improved by the setting "**Ticks automatic**". The result may be a different number of ticks for a curve window of the same size.
- **The fixed default for the number of ticks** is strictly observed on the screen. Overlapping is now possible.
- After **Zoom/Unzoom**, any possible free ticks are set on the axes. See Preferences (Zoom and Unzoom options).
- The options "**Entire first curve**" and "All curves" are no longer available for x-axes. Only the option "Automatic" is available, which works just like for the y-axes.
- **Automatic adjustment**: this is no longer available as option in the kv\*()- functions or the display dialog. Now axes with fixed scaling keep their fixed scaling, automatic scaling remains automatic.
- **Unzoom** sets all axes to automatic scaling, and "Fix axes" sets all axes to a fixed scaling, allowing tasks to be executed more comfortably and clearly.
- **Automatic labelling** of axes: all data belonging to this axis are included in the min/max calculation.
- **Display in absolute time** is now timed correctly for each waveform. In imc FAMOS 2, only the absolute time of the first waveform was used for the scaling of the x-axis, but all other waveforms in the window were timed relatively correctly in the window. Now the correct absolute time of the data must be assigned to the other waveforms using imc FAMOS functions (group of time functions) or the Properties dialog.

### **Curves: "More curves" Dialog**

- The waveform selected first can be deleted.
- Polar plots are selected by choosing the entire complex waveform, and no longer by combining the components. If necessary, the first curve can be deleted.

### **Curves: Measurement Value Window**

The measurement value window no longer has a system menu. A menu containing various commands appears by clicking on the free area in the measurement value window (not on the lists!).

### **Curves: System Menu**

- The entry Release memory is no longer available in the curve window system menu. The maximum available memory can be set in imc FAMOS (Options: Data Manager).
- There is also no remarks about copyright in the curve window system menu. This information, as well as the version number is found in imc FAMOS, Options Data Manager.
- Switching to other curve windows and other windows in the application is possible.

### **Curves: Waterfall and 3D Display**

- The scaling of the z-axis is located in a separate menu option and is set like the x-axis (Scales/z-axis).
- The 3D- options are selectable only in waterfall display.
- In waterfall display, double-click on the z-axis scaling to prompt a dialog for parameterization of the z-axis. The dialog for the 3D-options can only be reached using the menu.
- Pixel intervals in the z-direction are no longer available in waterfall display; the information about the length of the z-axis is available for the screen (relative to the length of the x-axis).

### **Curves: Single Values**

The separate single value window for display in the curve window by selecting "Last value as number" no longer exists. This mode is selected automatically when a single value from imc FAMOS is displayed.

### **Curves: Overview Window**

This is now a normal curve window connected with a zoomed curve window. All setups are now possible in this window. The section is no longer visible, instead a vertical reference line.

### **Curves-Kit**

- CvXAxis(): in display in absolute time (xmin, xmax), possibly a different construction of curve window.
- CvTitle(): texts are no longer cut off at the lengths 8 and 120.
- CvVar(): if no window exists for the old waveform, no error is generated.
- CvXAxis(), CvYAxis(): the option "Automatic adjustment" is no longer available. Axes with fixed scaling remain fixed, automatic scaling remains automatic.
- CvYAxis(..) each polar plot uses only one index, where as earlier, each components had to be specified individually, and each polar plot used 2 indexes.

### **Print Layout**

- The standard printer is no longer used, the printer is set separately in the Print Layout.
- The format of the Layout (A4, landscape/portrait) is noted in new Layout files and restored when loading the files.
- The position of curve objects is now determined by the position of the coordinate system.

In previous versions, the frame for the curve image, including scaling and labelling was determined, which made exact alignment of several curve objects difficult. An option is available to stop this problem.

### **File Format**

imc FAMOS 3.0 saves waveforms in an extended file format. Files can be loaded in imc FAMOS 2.0 format without any restrictions. Programs from other manufacturers, which read imc FAMOS files directly, must be modified.

### **Mathematic Calculation**

All internal calculations are now executed in a real 8byte format (double); previous versions used a real 4byte format (float). Due to increased accuracy, the results of complex calculations in imc FAMOS 3.0 may differ slightly from those in earlier versions.

To quicken numerical operations, imc FAMOS 3 uses a special internal process, which uses undocumented properties of the operational system.

If problems arise relating to calculation of real numbers, the following entry in the imclib.ini file can be extended. Execution of most calculations only becomes slower.

```
[curves]  
NoFastMath=1
```

This entry can be used under Windows NT without any loss of time; however, under Windows 95 and Windows 3.1 this has disadvantages for calculation.

If you have problems or questions, please contact our Customer Support/Hotline:

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