PROFESSIONAL WORK WITH FLEXPRO® 5.0

VOL. 1

FlexPro

The Power Tool!

Contents

CONTENTS **1**

PREFACE **3**

INTRODUCTION, INSTALLATION AND THE FIRST START **5**

THE AIM 5
SOMETHING ABOUT THE FORMATTING OF TEXT 5
INSTALLATION 6
GETTING STARTED 7
WHAT IS WHAT? 8

1 AT FIRST GLANCE **11**

1.1 DATA IN THE DATA VIEW 11
1.2 QUICK GLANCE AT THE DATA 14
1.3 A SIMPLE DATA INTERPRETATION 17
1.4 A QUICK ANALYSIS 21
1.5 COORDINATES 23
1.6 PRINTING TO PAPER 25

2 WAYS OF IMPORT **27**

2.1 EXERCISES AND MATERIAL 27
2.2 FIRST DATA IMPORT 28
2.3 AUTOMATIC RATHER THAN MANUAL 33
2.4 CHECKING YOUR SUCCESS 37
2.5 DATA FROM EXCEL 41
2.5.1 At the Press of a Button 41
2.5.2 Clipboard 43
2.5.3 Drag & Drop 46

3 FIRST ANALYSIS **47**

3.1 QUICK CONSTRUCTION OF A DIAGRAM 47
3.2 MULTI PURPOSE TOOL CURSOR 50
3.3 LET CURSORS DANCE 51
3.4 PEAKS 54
3.4.1 Manual Detection 56
3.4.2 Half Automatic Detection 59
3.5 SMOOTH PEAKS 60
3.6 FORMULAS TO NUMBERS 64
3.7 A BUSY BEE 64

4 STEPS TO PRESENTATION QUALITY **73**

4.1 AN INITIAL TEST 73
4.2 DIAGRAM OVERVIEW 75
4.3 DIAGRAM PRESENTATION 82
4.3.1 The Diagram Area 83
4.3.2 About Curves 86
4.3.3 About Axes 89
4.4 SET MARKERS 93

4.5 SOME TEXT 95
4.6 TABLE OF VALUES 97

I APPENDIX INDIVIDUAL SETUP 101

I.1 SPECIFY INDIVIDUAL DIRECTORY STRUCTURES 101
I.2 SETTING UP A DATABASE 103

II APPENDIX HELP TO SELF-HELP 107

II.1 CONTEXT HELPS 107
II.2 FLEXPRO 5.0 ONLINE HELP 107

III APPENDIX TOOLBARS AND BUTTONS 111

III.1 INDIVIDUAL SETUP 111
III.2 BUTTON OVERVIEW 112

Preface

The field of data analysis consists of numerous facets. If you think about the sum of demands on an appropriate program, data analysis is without question one of the more sophisticated PC applications. The user can expect a broad spectrum of capability, due to the different fields of operation. Modules for data organization in tables and graphical data presentation, for expanded mathematical- statistical calculation possibilities, for automation of program sequences for daily routines as well as for a long term comprehensive data archive have to be integrated.

FlexPro took up this challenge and set itself a great aim: Data of all kinds can be documented, analyzed and archived perfectly with this software alone. Keeping with this aim numerous functional enhancements are provided and the handling has been made easier again compared to the preceding program version.

So that users of previous versions as well as new users become familiar to using the program as quickly as possible, the software and the associated information material were revised from scratch together. The information material still consists of an individual context sensitive program help system, which provides information, tips, advice and even detailed explanations for every command, every dialog box and button. A search function which allows the use of logical combinations of search terms, guarantees a quick success.

This electronic information material is supplemented by “classical” paper documentation, in two parts. The first part takes the user for a quick tour and an additional tutorial familiarizes the reader with the basic properties and the handling of FlexPro using relatively simple examples. More complex program functions are described in the second part without going into depth. This would be beyond the scope of the printed version and would bring far too many details for the newcomer. He can master these easily by himself after a successful start with FlexPro, using the online help. Overlapping or text similarities with the program online help have been deliberately avoided so that the reader has the opportunity to get two independent explanations with clarifications and can then individually decide which source to use.

Kassel, January 2000 T. W. Beneke and W. W. Schwippert

Introduction, Installation and the First Start

The Aim

As already indicated in the preface the presentation of program functions in a practical context plays a central role in this user manual. Since the single program elements and the description of the commands can be read in full detail in the FlexPro-help system (see appendix II), the first practical experiences with FlexPro will be based on more or less realistic tasks. This procedure has a disadvantage, in that certain aspects of the task procedures are repeated due to the sub projects stand alone nature. On the other hand it is impossible to find complete examples, which cover all functions of a program like FlexPro from data acquisition via data analysis up to data presentation. For this reason all selection/setting options in a dialog box can not be dealt with in one go. For a respective task only one of the selection possibilities usually makes sense. Accordingly only the necessary dialog selection will be demonstrated as an example in these places. The reader can discover the remaining dialog selection options himself in connection with the FlexPro help system, or look for further ideas and alternatives in different textual contexts.

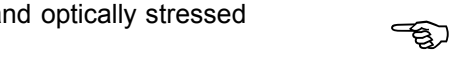
Concerning the content, the first basic part and the more comprehensive second part of this manual are arranged as follows: in the quick start during which the user enters a small dataset manually, diagrams will be created and some simple data-analytical operations will be conducted using FlexPro's default parameters. In the following chapters of the basic part, the setup of the FlexPro Explorer, the data import options, especially the cooperation with Excel and extended manipulations in the fields of data editing, analysis and graphical presentation will be topical, using a supplied measurement dataset. In the supplementary second part more special program capabilities will be demonstrated, during which additional data become important. One of these special aspects deals with the FlexPro-integrated programming language and its use. Although hints are given at several stages of this manual about references to other chapters, it seems advisable especially for a novice, to work through the manual's presentations in the given order. This makes the overall comprehension easier, as the chapters are building up on each other.

Something about the Formatting of Text

Before we start with the installation, the first start and the quick start, some information about the formatting of text should be given. Concerning the handling, FlexPro is characterized by offering several ways to start the program commands. Thus nearly all program commands and dialog boxes can be reached via buttons in toolbars, the menu bar, or the context menu, depending on the user's preferences. So that the numerous buttons are easier to identify (see appendix III), they are positioned visibly next to the text at content relevant places. Mouse clicks directly onto elements, so called FlexPro objects or keyboard shortcuts supplement the entry options. To tread the parallel ways equally where possible, not only one of the available methods is dealt with in this manual, but one or the other method will be used depending on the situation. In this context repetitions can not be avoided.

Secondary aspects, additional information or notes connected with the topic are displayed in form of especially marked notes.

Note: Supplementary information is set against the floating text and optically stressed by an icon at the page margin (as shown here).



Further emphasis should help the reader master certain correlation more easily and quicker. Thus all file names including their extensions can for example be recognized due to capital letters. If we are dealing with program commands and hierarchically structured series of commands, they can be identified at once, as menu names are given in SMALLCAPS and the following commands have the font attribute *italic*. Given in *italic* as well are the names of several other program elements such as title bars, dialog boxes, windows, text boxes, buttons, check boxes, option boxes, as well as all entries, setting- and selection options, the user has to enter manually at the respective position. Programming instructions and commands in example sequences of FlexPro Script appear in classical `Courier` .

Installation

The installation of FlexPro under Windows 95, 98 or NT is carried out with the help of a respective Wizard. This Wizard starts automatically after inserting the CD-ROM.

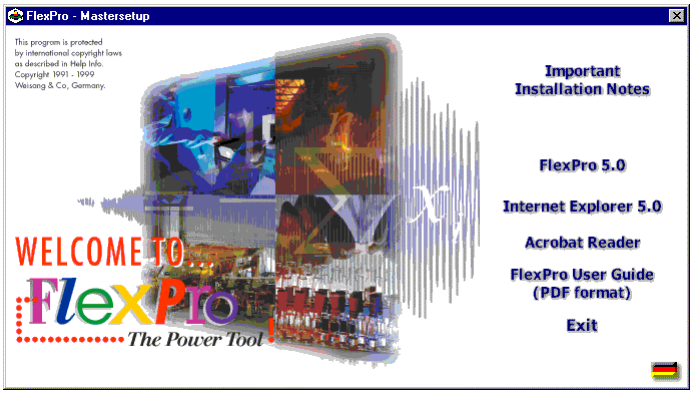


Figure 0.1: Setup dialog (here alternatively for the languages English and German)

Note: If this is not the case, the so called Autoplay function is deactivated on your PC. In this case switch via the desktop or the Windows-Explorer to the root folder of your CD-ROM-drive and start the SETUP.EXE file there.

A dialog box displays automatically, in which apart from other things the desired language can be selected via mouse-click (Fig. 0.1). As the Microsoft Internet Explorer Version 4.02 (and higher) must be installed on your computer to run FlexPro, this software is included on the FlexPro-CD-ROM, and after a mouse-click on the respective areas in the dialog box the installation starts.

Note: FlexPro only needs the Microsoft Internet Explorer for displaying the Online help!

After installing the Microsoft Internet Explorer, click on the field *FlexPro 5.0*, and FlexPro will be installed on your computer. During this the Installation Wizard asks for all the necessary information including personal data of the user and serial number of the software. When all the essential components are installed, you must restart the computer, before you can work with FlexPro. An associated screen prompt indicates this.

Note: The following system requirements must be met for running FlexPro 5.0: Windows 95, 98 or NT as operating system, a 486 processor, 32 MB RAM (64 MB advisable) and free hard disk capacity of 30 MB.

Getting Started

Equipped with this information and after the successful installation, we open FlexPro for the first time and find some toolbars as well as overlapping windows. The *Tip of the Day* known from other programs is activated by default, so that it appears automatically after the first opening of the program in its own window (Fig. 0.2).

Note: All figures displayed in this manual resemble the screen setup with a resolution of 600 * 800 pixel. This quite low resolution was chosen, to keep small screen elements in figures detectable as well. Users, who sensibly work with a higher resolution, will not be able to exactly reproduce the figures in the manual, so that a certain degree of abstraction capability is asked for. The fact that in the following FlexPro windows will often be maximized or windows which are not used at present will be closed, only serves the purpose of arranging the screen setup and the associated figures as clearly as possible. If you want to optimize the working processes, you can - provided that the graphic resolution is fine enough – do without such "detours" of course!

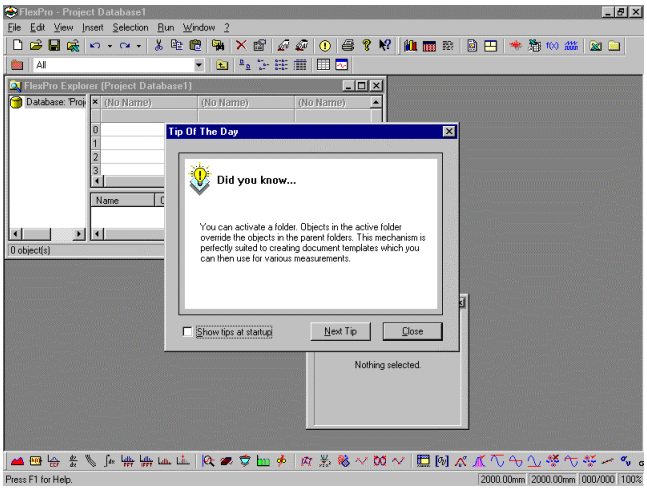


Figure 0.2: Screen content after the first start of the program

We find three self explaining operating elements at the lower edge of the this window, the check box *Show tips at startup* and the two buttons *Next tip* and *Close*.

After reading the tip displayed in the window, we can decide whether or not we would like to be presented with further tips to get into the right mood for the practical work with FlexPro, by clicking on the *Next tip* button. But if you have enough information for the time being, you should specify before closing the dialog box whether FlexPro is supposed to display the useful tips at each program startup, using the check box *Show tips at startup*. If this service is not required, just delete the maker in the associated check box via mouse-click. If you want the useful Tip of the Day to be displayed automatically again every time the program starts, open the ?-menu in the FlexPro menu bar and activate the command *Tip of the Day...*there.

Next Tip

Show tips at startup

Note: In the future we will shorten the description of such or similar ways through the menu hierarchy: the example just mentioned would be shortened to? - *Tip of the Day....*

Clicking on the integrated button or on the one present in the upper right corner of all Windows windows we close the *Tip of the Day* dialog box. Thanks to the default setting of the program the *FlexPro 5.0 Online help* opens directly afterwards and offers information for novice users and transferees (Fig. 0.3). All FlexPro commands and program elements are documented in this program help, so that with the help of the

Close

index and a search function detailed answers can be found to all questions. The *FlexPro 5.0 Online Help* appears automatically in this form, but just once, when starting FlexPro for the first time.

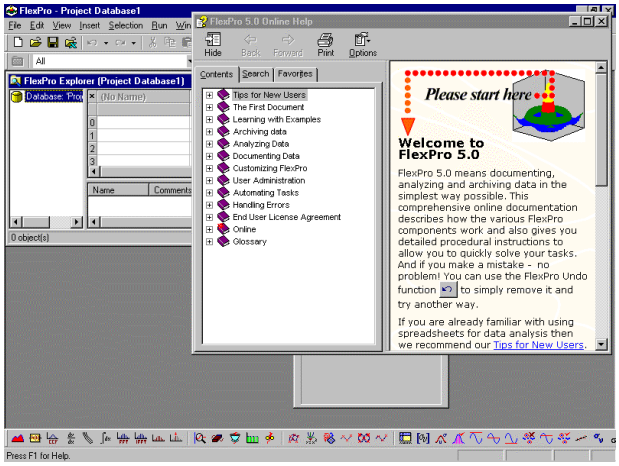


Figure 0.3: FlexPro 5.0 Online Help which opens automatically after the first start of the program

Note: If you want to become familiar with FlexPro's powerful help function, you should turn to the appropriate explanations in the appendix (see appendix II). But if you would like to get started with the practical work with FlexPro as quickly as possible and want to proceed according to the motto "learning by doing", close the help at this point and continue with the rest of this introduction of the program surface. People really in a hurry flick to chapter 1 immediately, that is based on the program status, resulting in closing the help (see Fig. 0.4).

What is What?

Closing the *FlexPro 5.0 Online Help* makes further FlexPro elements visible on screen. As can be gathered from the title bar of the FlexPro window, we are working at the moment with a file named *Project Database1* which was automatically created and opened. The so called FlexPro Explorer as well as a small window named *Preview* can be seen on the worktop apart from a number of toolbars (Fig. 0.4).

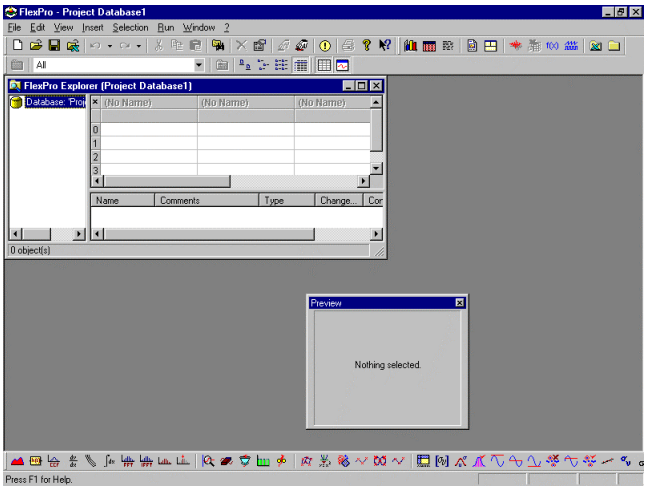


Figure 0.4: Program desktop after closing the Help

The *Preview* window makes the visual identification of the objects present in the database easier (see chap. 1, 2). As our database does not contain any objects at the moment, the preview can't display anything of course, and we can close this window for the time being.

After the *FlexPro Explorer (Project database1)* has been maximized using the Windows button, we turn towards the other elements of the program desktop (Fig. 0.5).

Note: Although most of the users will be familiar with the handling of Windows programs, if they have been doing for example text editing or processing and analysis of data using a PC, we still would like to have a glance at the displayed elements. The exact functionality will be left out here so far.

The menu bar positioned below the title bar shows momentarily eight menus. They bear the names FILE, EDIT, VIEW, INSERT, SELECTION, RUN, WINDOW and ? for the help menu.

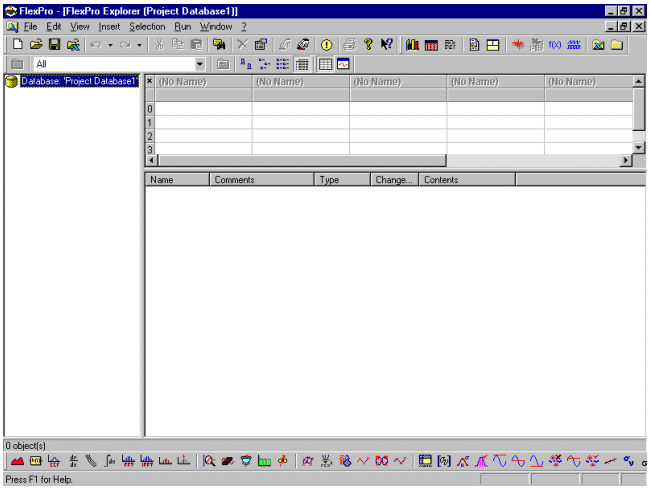


Figure 0.5: The screen filling FlexPro Explorer

Note: FlexPro distinguishes between different screen configurations, the so called workspaces, some of which differ strongly concerning the arrangement of menus and toolbars. This is to make sure that all tools are available which are needed for the tasks just worked on, without filling the work area unnecessarily. As mentioned above, FlexPro often offers several parallel ways to activate commands. To make the assignment between menu commands and associated buttons in the toolbars easier for the user, the icons present in FlexPro 5 are displayed in the menus in front of the associated menu command.

Figure 0.6: Status bar with the first prompt

We find by default a so called status bar at the lower edge of the screen . As long as the mouse pointer is positioned in the empty workspace, in the status bar itself, the menu bar or outside the *Standard* toolbar positioned below the menu bar, the status bar indicates that the user can get help by clicking on <F1> (Fig. 0.6).

And to have finally a look at the structure of the toolbars, we will have a closer look at the toolbar named *Standard* (Fig. 0.7). 18 buttons can be found in total in this toolbar, which are put into different groups, separated by vertical markers. Only a part of them are activated at the present program status. The others appear – detectable due to the

gray or transparent display – still deactivated, since no real *FlexPro*-working session has been started jet.

Figure 0.7: First presentation of the Standard toolbar

If you move the mouse pointer to a button, without clicking on it, a tab with a yellow background displays after a second, the so called Quick Info. This happens no matter whether or not the button was activated. This displayed text gives a helping keyword indicating the function of the respective button. If you like working with the keyboard, you can also learn the associated shortcut from the Quick Info. If it exists, it is given in brackets behind the helping keyword. The Quick Info must have been read after about three seconds, as it disappears automatically afterwards. To inquire about the content again, you have to touch the button once more. The user gets to know a bit more about the respective command, when paying attention to the text in the status bar which displays at the same time as the Quick Info. It gives further information, which is still available even after the Quick Info's disappearance (Fig. 0.8).

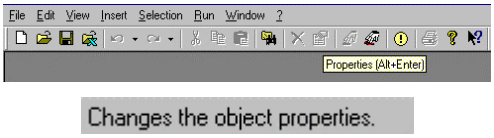


Figure 0.8: Unavailable button plus Quick Info and entry in the Status bar

Note: This context sensitive information display in the status bar can also be watched, when we open a menu via clicking and touch a command with the mouse pointer. In this case too the helping text appears, no matter whether or not the menu command is available. Clicking next to the opened menu closes again and hides the information display.

That is all for the introductory remarks, in the next chapter we want to get started with the practical work with FlexPro, using a dataset entered manually. For a fresh start in the first chapter, we close FlexPro with FILE –*Close* or with the respective button.

1 At first Glance

As a program for data analysis and processing, FlexPro has a wide range of ability. Various data structures can be managed in tables and visually presented in diagrams. Your data is sorted, organized and analyzed using mathematical and statistical methods. All results achieved can be assembled to a graphic whole, to be presented in an attractive and self explaining document. In this FlexPro combines the capabilities of spreadsheet-, graphic-, mathematical/statistical- as well as text/layout programs. In order to automate program functions connected with this broad field for routine processes, the software is also programmable.

To avoid confusion for the impatient user all of the application capabilities have not been presented in one go. So it was decided to give a short impression of the basic functions and dialog elements playing an important role in FlexPro on the following pages using a quite simple dataset. In addition the auxiliaries which will enable the user to quickly master the desired program capabilities and capacities are explained. And naturally some of the substantial new features which differentiate FlexPro 5.0 from its predecessors will be mentioned in the course.

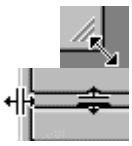
1.1 Data in the Data View

We open FlexPro 5.0 for the second time by clicking on the Windows Start menu, close the window *The Tip of the Day* as well as the empty *Preview* window and find the work area *FlexPro –Project Database1* including the Windows typical buttons in the top right corner of the title bar. Reflections about paths and data organization, elements of the work area etc. should not concern us during this quick introduction (Notes on this are available in the appendix I).

Note: If it really was the first start of the program after installation, the *FlexPro 5.0 Online Help* window displays automatically after closing *The Tip of the Day* and offers its service.

Apart from the obligatory menu bar and toolbar the work area houses the so called FlexPro Explorer. The title *FlexPro Explorer (Project Database1)* gives a hint that all relevant information you come across in a so called FlexPro project are listed in the FlexPro Explorer in form of a database. To get a better view, click with the mouse pointer on the respective button in the upper right corner of the FlexPro Explorer's title bar the database window and display it at screen size this way.

Note: As common in Windows applications, this window can be resized smoothly. For this a margin or the right lower corner of the window is activated and moved until the desired window sized is reached, keeping the mouse button depressed.



Three areas can be differentiated in the FlexPro Explorer which are divided by gray window divisions. When these are touched with the mouse cursor it changes its form into a double arrow, indicating that the size of each area can be adjusted as desired. The left vertically arranged area contains only information about the structure of database's folders and is therefore similar to the hierarchical data structure shown in the Windows Explorer. In the right lower area, the so called list view, the FlexPro objects will be listed later. These are the different elements which a complete FlexPro project consists of. So if we create a dataset or a diagram it will be listed here with an intended name and an icon. As you might have deduced from the category heading of this area, the FlexPro objects listed here can obviously be provided with additional

information, such as a comment, a definition of the type of file, the last date it was changed as well as a summary.

We resize the still empty list view sufficiently so that the area above supplied with scrollbars, the so called data view, shows the table and apart from the table header at least 12 rows (Fig. 1.1).

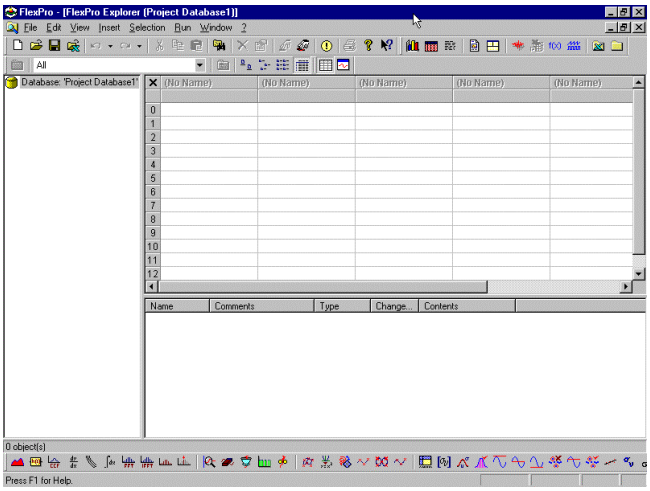


Figure 1.1: Starting situation after customizing the work area

Note: The data view represents a new element of FlexPro 5.0 and serves for data input as well as for the display of datasets. When the mouse cursor is in the data view, it turns into a big crossbar.

We want to use the data view now as a table for data entry. To do so we click on the first cell in the table which is not gray shaded, built by the first column and the first row. It has the row number or row index *0*. This activates the cell which is detectable due to the surrounding frame. It is now ready for data entry. We enter the value “2“, accept it by pressing <ENTER>, to type in the next value. This action changes the header of the data view as we created our first dataset, even though it is quite small. This is why a column heading is automatically displayed in the first gray shaded row of the data view, which in our case bears the neutral entry *Dataset,* which can be changed later (see chap. 2). At the same time the name appears in the so far empty list view of the FlexPro Explorer in connection with the icon for the dataset. Together the icon and the name stand for our first FlexPro object named *Dataset*.

2	1
2	3
5	3
-52	27
-42	21
-36	17
13	6
6	3
-1	2
1	2

Table 1.1: Two small test datasets for the manual entry

The activation frame simultaneously jumps in a vertical direction to the cell with the row index *1*, where further entries are expected. The kind of values which have to be entered using the same schema can be seen in table 1.1.

After finishing the entries in the first column, the selection is moved to the first cell in the second column with the row index *0*, by either positioning the mouse pointer there or by selecting the appropriate cell using the arrow keys. With Entering and accepting the first value „1“ in this column, a new object *Dataset2* is created, and the data of the second column can be entered into the table as before.

After all data has been entered, the data view displays two datasets of the same size with the automatically assigned names *Dataset* and *Dataset2.* Parallel to this two dataset objects with the same names have been entered into the list view positioned below (Fig. 1.2).

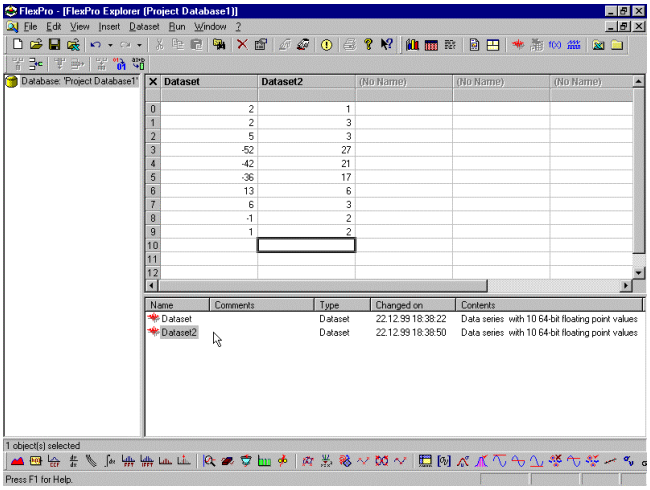


Figure 1.2: Data in the Data view and the created objects in the list view

Note: If we have a closer look on the entries in the *Type* and *Contents* categories of the FlexPro Explorer’s list view, by making the respective entries completely visible broadening the category headings using the mouse, it becomes obvious, that FlexPro not only gave the names *Dataset* or *Dataset2* to the data series just entered, but the program manages each of these data series as a *Type* of *Dataset* consisting of 10

separate 64-Bit floating comma values. The meaning of these entries and how the settings can possibly be changed, will be dealt with later on (see chap. 2).

1.2 Quick Glance at the Data

We can achieve a first visual impression of the two data series at once by using the *Preview* window which we closed at the beginning. For this we leave the data and click on one of the two dataset objects positioned in the list view of the FlexPro Explorer. This displays the toolbar of the FlexPro Explorer, the right button of which is responsible for switching the preview on and off (Fig. 1.3)

Figure 1.3: FlexPro Explorer toolbar

With a click on this button, the preview window provides a graphical presentation of the highlighted dataset object (Fig. 1.4).

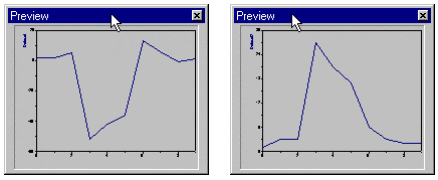


Figure 1.4: Both datasets can be checked individually via the preview

This very simple way of visualizing FlexPro objects, offers no further formatting options, so that we close the *Preview* after the check via the button.

A real specialist for the presentation, analysis and documentation of data is a FlexPro object named *Diagram*. This can easily be activated using for example the context menu of the FlexPro Explorer or the associated button *Insert Diagram* in the *FlexPro Objects* toolbar (Fig. 1.5).

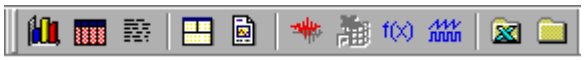


Figure 1.5: FlexPro Objects toolbar

Note: FlexPro often offers several parallel ways of activating commands. This is true for the creation of so called FlexPro objects. To achieve the desired results as quickly as possible in this quick start, only one of the available methods will be introduced or used at a time. Details about the remaining methods can be found in the more detailed follow up chapters or in the program help.

To create a diagram from the two datasets being present via the context menu, we highlight the two datasets *Dataset* and *Dataset2* in the typical Windows-manner using the left mouse button in connection with <CTRL>- or the <SHIFT>-key and right click on the two highlighted dataset objects afterwards.

Note: It is necessary, that the mouse pointer is positioned on the highlighted datasets or to the right of them when clicking on the right mouse button, so that FlexPro will automatically include the datasets which are to be plotted into the preview in the following dialog box (see chap. 2).

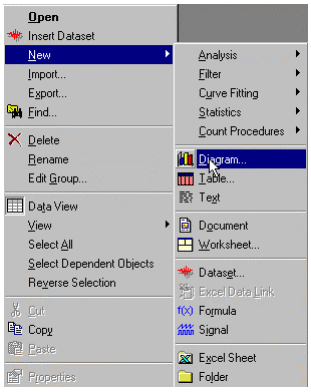


Figure 1.6: Starting the Diagram Wizard via the context menu

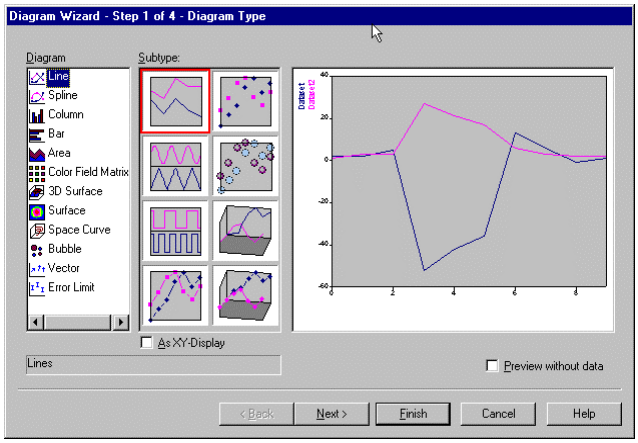


Figure 1.7: First step of the Diagram Wizard (default setting)

In the context menu which opens we select the command *New* and in the following submenu the menu command *Diagram....* (Fig. 1.6). A special tool appears on screen consisting of a series of dialog boxes building up step by step. Such series of dialogs simplify working with different extensive FlexPro function areas and always have the word Wizard as part of their name. Since we want to plot a diagram, we open the *Diagram Wizard* this way (Fig. 1.7).

By default setting in the first dialog box, the data in the preview are presented as *Diagram: Line* and according to *Subtype:* without symbols. We select Symbols as well by clicking on the fourth large button of the left column in the *Subtype:* selection field (Fig. 1.8).

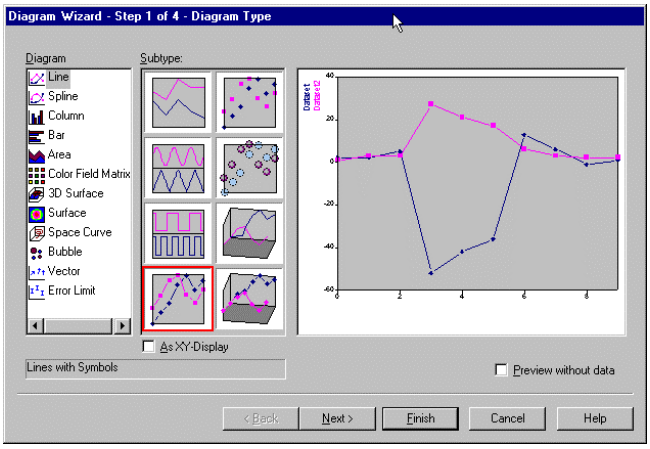


Figure 1.8: First step of the Diagram Wizard with new Subtype

Due to the small number of values, the curves seem a bit edged. To improve this, we choose via mouse click the *Diagram: Spline* and using the second button in the left column of *Subtype* group*:* the presentation type *Spline with Symbols* (Fig. 1.9).

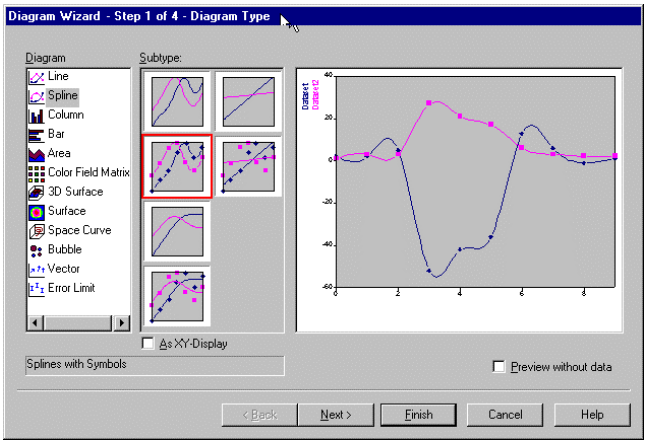


Figure 1.9: Spline-display with symbols

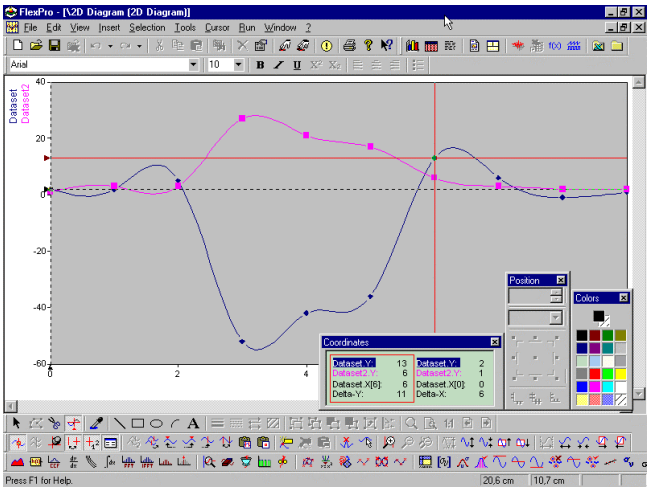


Figure 1.10: The new diagram window after moving automatically opened toolbars

By clicking on the *Finish* button other windows and tools appear on screen. The newly opened full sized window with the title *FlexPro - [2D-Diagram (2D-Diagram)]* contains the diagram object just created, where both curves are displayed with the default axes scaling and labeling. The x-axis label refers to the row number or the row index of the associated table of values in the data view presented earlier (Fig. 1.10).

If you move windows and toolbars accordingly, and switch over to the FlexPro Explorer using the WINDOW menu, a new object appears in the list view as well, symbolizing the diagram just created (Fig. 1.11).

Note: Using the command *Cascade* in the WINDOW menu, the diagram window and the FlexPro Explorer can be made visible at the same time with clever resizing and positioning, in order to switch between the two via mouse click. The full screen size of the individual windows was chosen for the following figures, so that the content of the window can be better understood.

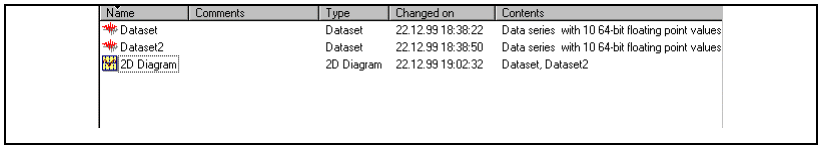


Figure 1.11: The new diagram object in the FlexPro Explorer's list view

Note: Another interesting possibility to feed the diagram wizard at the start up with all information concerning the datasets to be presented, is a respective highlight in the data view. Apart from complete data series, sections can be highlighted here and passed on to the diagram wizard via context menu or button afterwards (see chap. 3).

1.3 A Simple Data Interpretation

We now return to the diagram window using the WINDOW-menu and have a look at the graphical presentation of the data series. The assumption that one might possibly have emerged from the other does not seem far fetched. A simple method of analysis would be to build the quotient of the corresponding data. A steady value as a result would prove the assumption.

Note: Before we start the first small calculation, two principle methods of calculating complete datasets shall get a mention. As already indicated in connection with the diagram wizard, there is a way here to highlighted the desired datasets or sections of them in the data view and start an analysis clicking on a button afterwards. If objects are highlighted in the list view below the data view, the following analyses and calculations always apply to the complete objects. If the sections of the datasets to be analyzed are to be specified visually, the cursors in the diagram window can be used as a tool and analyses of the curve section between the cursors can be carried out. Are there several curves in one diagram window, the desired curve will be suitably positioned using the buttons *Both Cursors on previous curve* and *Both Cursors on next curve*.

What we need now is a small calculation, for which we will again call upon the FlexPro-Explorer. Activate the Explorer by clicking on its list view and then open the context menu– as above – via a right-click, but this time without any of the three FlexPro objects being highlighted. Move the mouse pointer to the command *New* and choose from the menu which opens *Formula.* This opens an empty editor window on the worktop for the entry of the formula, which must not be displayed at screen size for our small formula (Fig. 1.12) (see chap. 3).

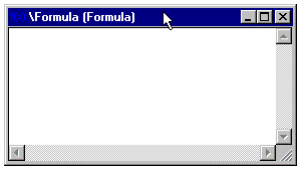


Figure 1.12: Empty Formula window

Note: Is a dataset highlighted when opening the formula window, this window is not empty but contains the name of the dataset object highlighted before. FlexPro assumes here as well that the highlighted object is to be edited in the next step.

In an empty window of the formula editor only the writing cursor is flashing. A click with the right mouse button once again, but this time into the empty formula window, opens the context menu of the formula editor and we select the command *New* here. Activate the command *Operator...* in the drop-down menu which opens (Fig. 1.13).

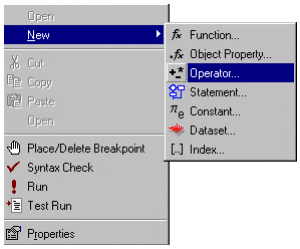


Figure 1.13: Context menu of the formula window

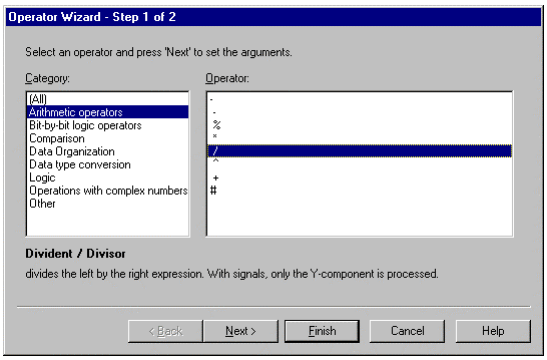
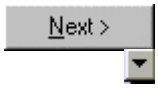


Figure 1.14: Operator Wizard - Step 1 of 2

Another wizard appears on screen, which is in this case the *Operator Wizard,* consisting of two steps. For the intended calculation, we highlight the *Category: Arithmetic operators* and the sign / shown in the right field, to conduct a division (Fig. 1.14).



The button *Next >* gets us to the second step of the Wizard. To determine the *Divident* here, we open the drop-down list by clicking on the arrow pointing downwards, and highlight *Dataset*. We repeat this operation for *Divisor* and highlight *Dataset2* (Fig. 1.15).

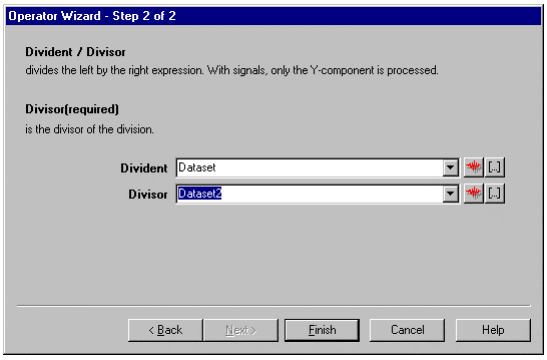


Figure 1.15: Operator Wizard - Step 2 of 2

Click on *Finish* to transfer the calculation into the formula window, where it is displayed in the FlexPro's language (Fig. 1.16). This window is closed with the respective Windows-button, and the new formula object named *Formula* can be found in the list view of the FlexPro-Explorer.

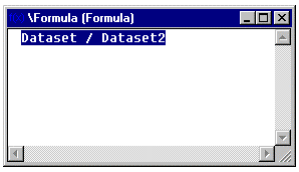


Figure 1.16: Division command in the language of the FlexPro-Formula Editor

Note: Apart from menu commands FlexPro offers for many working processes the fast and practical Drag & Drop. If the FlexPro Explorer and the diagram window are both visible on screen, the formula object highlighted in the FlexPro Explorer e.g. can simply be dragged into the diagram using the mouse. In the following we choose the way via the menu commands, to have a first glance on the dialog boxes and tabs, which we will come across several times in this or a similar form.

For the graphical presentation of the calculation result switch to the diagram window, where a mouse click activates the diagram. Both curves, *Dataset* and *Dataset2* display by default in front of a gray background. Double-click on this area to open a dialog box dealing with the properties of the diagrams (Fig. 1.17).

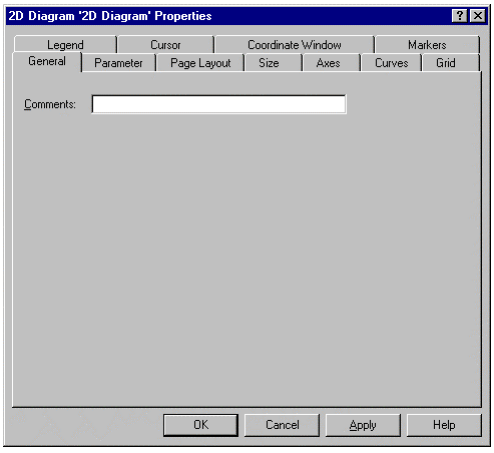


Figure 1.17: Properties dialog box for the 2D-Diagram

For the moment we are interested in the *Curves* tab. Select it via mouse click and click the *Add* button (Fig. 1.18).

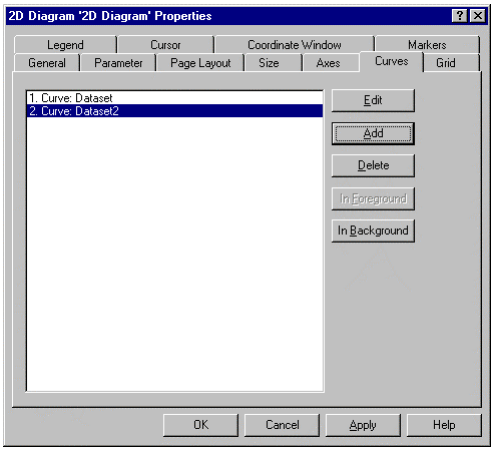


Figure 1.18: The Curves tab

Another dialog box opens, with the *Data* tab already selected. Open the drop-down list *Signal:* here and accept the entry *Formula* by clicking on it (Fig. 1.19).

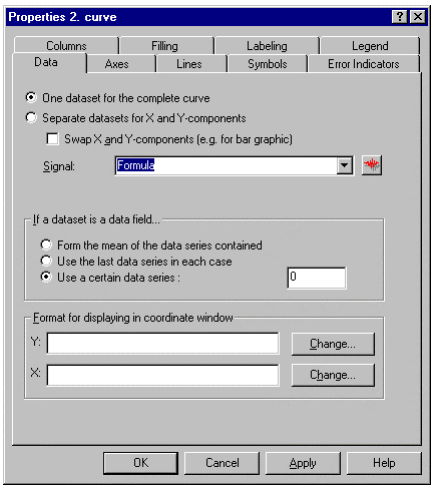


Figure 1.19: The Data tab

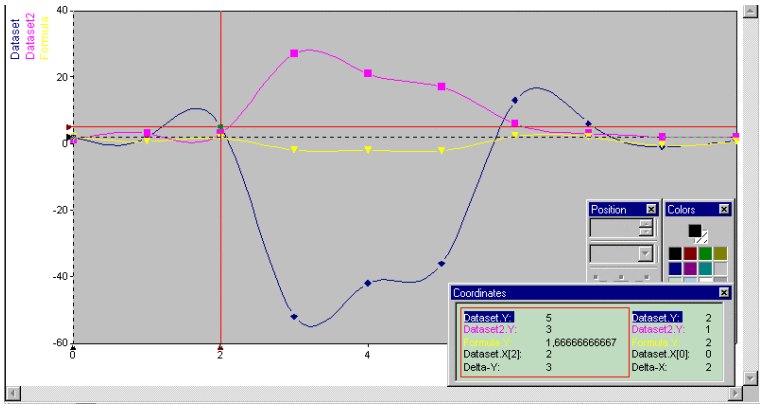
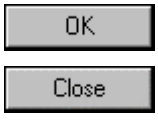


Figure 1.20: The calculated third curve in the diagram window

Clicking *OK* transfers the formula into the graph for graphical presentation as indicated in line *3. Curve: Formula* on the *Curve* tab. Click *Close* to admire our formula result in a suitable layout in the diagram window. And the curve running nearly in parallel to the x-axis indicates that the two datasets are really closely related (Fig. 1.20).



Note: If one of the curves, for example *Formula* is supposed to appear in the diagram with its own, suitably scaled y-axis, FlexPro makes this possible: After switching of the cursors, highlight the present y-axis in the diagram with a mouse click and then drag it e.g. to the empty space to the left of the diagram. After that we highlight the curve *Formula* and drag it onto the new axis. FlexPro carries out an automatic scaling of the new axis, so that it orientates on the value range of *Formula* afterwards. The curve *Formula* is plotted again as well. We give the practical trial a miss at this point and have a first glance at FlexPro's analysis tools instead.

1.4 A Quick Analysis

We turn our attention towards the *Window Function* toolbar displayed at the lower edge of the diagram window (Fig. 1.21).

Figure 1.21: Window Function toolbar

Note: The most important requirement for making the impressive number of buttons available, is that the cursors are visible in the diagram window. If this is not the case, they are brought onto screen using the fourth button *Activate Cursors* in the *Tools* toolbar (see chap. 3). If the cursors are activated, FlexPro automatically suggests the data range enclosed by them for the analysis. Alternatively to starting them via the diagram window, analyses can also be started via the FlexPro Explorer. If columns or areas of cells are highlighted for this, the following analysis refers to the highlighted area. If complete curves are to be calculated, click onto the respective datasets in the list view , thus activate these objects as well as the buttons in the *Window Function* toolbar and conduct an analysis of the highlighted datasets via a mouse click. Thus the FlexPro Explorer offers a short cut for the following sequence done via menu commands: If both datasets are highlighted and then the *Insert Correlation* button in the *Window Function* toolbar is activated, only small alterations in the associated tabs are necessary to finish the new object *Correlation.* To view the dialog boxes and the tabs we go for the more detailed version here.

In the *Window Function* toolbar we click on the third button from the left, to conduct a correlation analysis. A corresponding dialog box opens, in which the *Options* tab is opened first by FlexPro due to the default setting (Fig. 1.22).

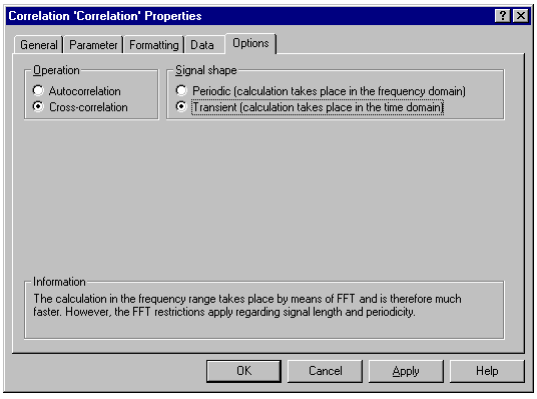


Figure 1.22: Settings in the Options tab

Since we want to compare two datasets, we activate the option *Cross-correlation*. Additionally *Transient* is activated, as our curves do not present periodical oscillations. We switch to the *Data* tab now and enter *Dataset* and *Dataset2* in the two text boxes *First signal* or *Second signal* according to the already proven pattern (Fig. 1.23).

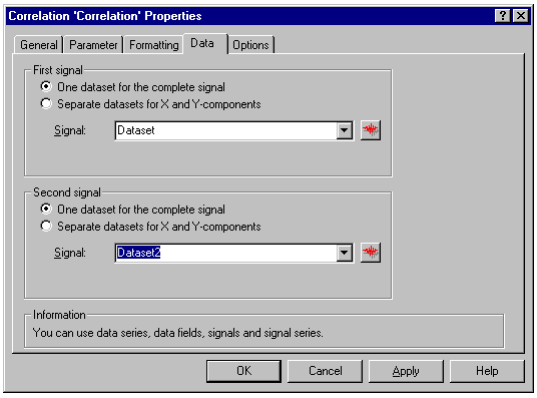


Figure 1.23: Selection in the Data tab

The appearance of the diagram does not change with the final *OK*, but after switching to the FlexPro Explorer the new analysis object *Correlation* is displayed here (Fig. 1.24).

OK

Name	Comments	Type	Changed on	Contents
Dataset		Dataset	22.12.99 18:38:22	Data series with 10 64-bit floating point values
Dataset2		Dataset	22.12.99 18:38:50	Data series with 10 64-bit floating point values
2D Diagram		2D Diagram	22.12.99 19:28:37	Dataset, Dataset2, Formula
Formula		Formula	22.12.99 19:22:28	Data series with 10 64-bit floating point values
Correlation		Correlation	22.12.99 19:44:31	

Figure 1.24:The analysis object Correlation in the FlexPro Explorer's list view

In order not overload our previous diagram, we quickly create a new diagram for the graphical presentation of the correlation result. For this we highlight the *Correlation* object in the FlexPro Explorer as described above, and create the new diagram with the mouse button and the context menu.

The default settings in the first step of the Diagram Wizard are what we require – apart from the fact that symbols will be added here as well. Therefore the dialog box can be closed with *Finish* at this point already after clicking on the respective *Subtype*. The peak of the line diagram in the new window *FlexPro – [/2D-Diagram2 (2D-Diagram)]* suggests quite a close correlation of the two datasets (Fig. 1.25).

Finish

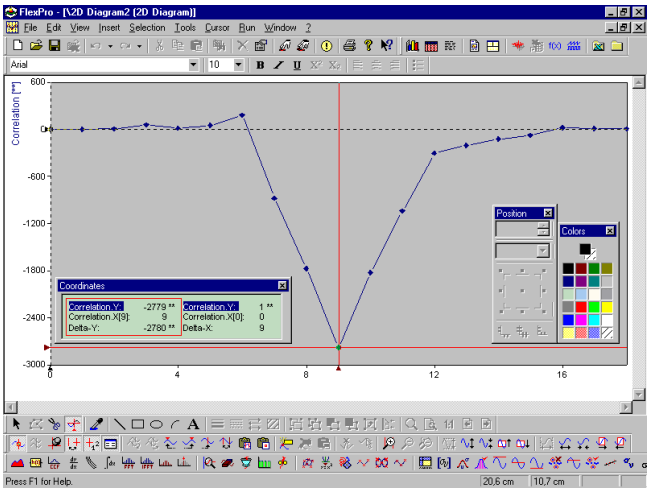


Figure 1.25: The Correlation result in a separate diagram window

1.5 Coordinates

In the new diagram window as well, further toolbars were automatically activated at the bottom of the screen, which are in close connection to the as well automatically activated cursor tools (Fig. 1.26).

Figure 1.26: Tools and Cursor toolbars in the diagram window

The cross-hair cursor, consisting of complete lines is also visible. Its vertical component meets exactly the minimum of the curve in this case. The associated values can be gathered from the displayed *Coordinates* window. If you move the vertical part of the cross-hair cursor to the right or the left, by moving the mouse cursor closely towards it until the mouse cursor changes into a small horizontal double arrow, and keeping the mouse button depressed, the cursor can be moved to the right or the left. Doing so it jumps from symbol to symbol and the corresponding values are displayed simultaneously in the *Coordinates* window.

Note: How the cursor parameter and the curve properties can be altered, will be described later (see chap. 3).

We position the mouse pointer exactly at the y-axis and recognize due to its transformation into a horizontal double arrow, that another cross-hair cursor is hidden here which we activate via mouse-click. The data registered by it can also be read in the *Coordinates* window, where they are marked – according to the appearance of the cursor lines – with a dashed frame (Fig. 1.27).

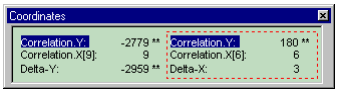


Figure 1.27: Data display in the Coordinates window

Note: How the two cross-hair cursors and the registered values can be used, will be dealt with at a later stage (see chap. 3).

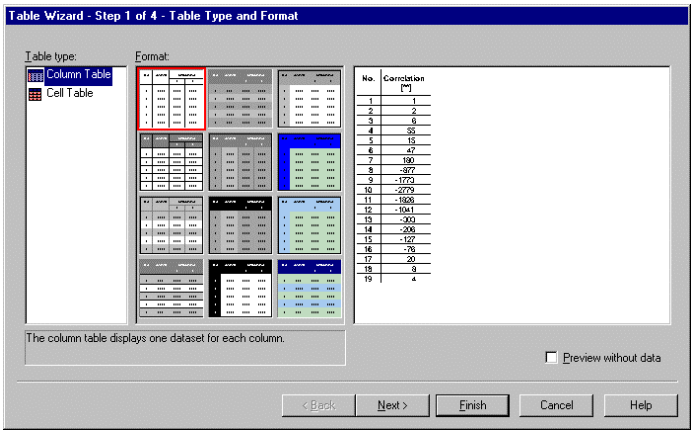


Figure 1.28: Settings in the Table Wizard – Step 1 of 4 – Table Type and Format

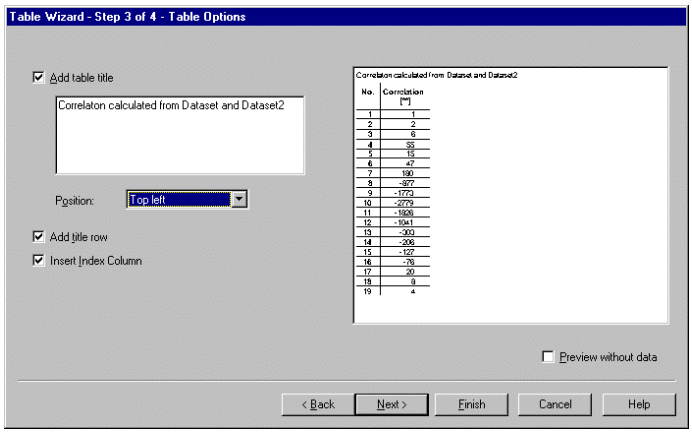


Figure 1.29: Settings in the Table Wizard – Step 3 of 4 – Table Options

What is now missing is a short table list of the correlation values calculated before. Following the FlexPro philosophy we learned about so far, it is easy to imagine that a new type of object has to be created for this. We switch to the FlexPro Explorer once more and highlight via a left mouse-click the *Correlation* object. The following right-click onto the highlighted object leads us again via the context menu and the NEW – *Table...* command to a specialized wizard, as the *Table Wizard – Step 1 of 4 - Table Type and Format* opens (Fig. 1.28).

The default *Table type: Column Table* and the default selection of *Format:* seems to be suitable for our purposes according to the preview, so that we can use the *Next >* button twice, to activate as the only modification in the *Table Wizard – Step 3 of 4 – Table Options* via the check box *Add table title* the associated text box.

We enter here now „Correlation calculated from Dataset and Dataset2“ and select *Top left* in the drop-down list *Position:* whereupon the table title appears in the preview (Fig. 1.29). We give the other setting options a miss, and select the *Finish* button. Our table of values presents itself in a new window named *FlexPro – [\Table (Column Table)]* and additionally the new table object can be found in the FlexPro Explorer.

To set a slightly larger font, double click with the left mouse button on the table title. This action surrounds it by a dashed frame and opens the properties dialog box for the *Column Table* (Fig. 1.30).

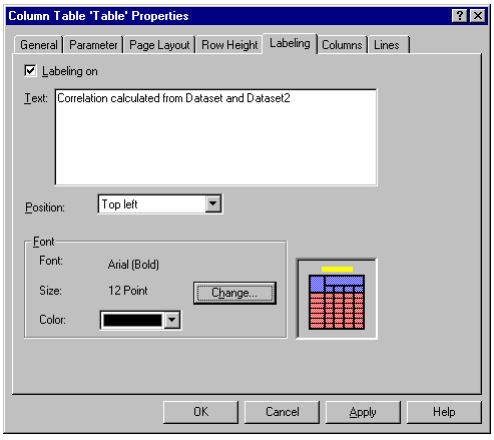
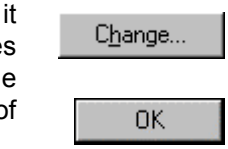


Figure 1.30: The Properties dialog box for the Column Table

In the opened *Labeling* tab we start with the *Change*... button in the *Font* group, set it to *Arial, 12, Bold* and give the *OK* afterwards for the *Font* group and the Properties dialog box for the *Column Table*. After checking the altered table, we can close all the windows apart from the FlexPro Explorer, where we can finally find an assembly of seven automatically named FlexPro objects in the list view (Fig. 1.31).



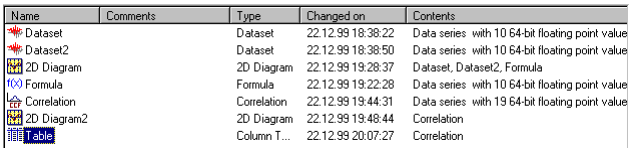


Figure 1.31: Parts of an presentation in the FlexPro Explorer's list view

1.6 Printing to Paper

What is missing now is a written documentation in form of a print out. This aim can be reached quickly thanks to the prepared parts, after creating a respective FlexPro object. Using the known context menu method we select – without highlighting present objects beforehand – in the FlexPro Explorer NEW – *Document*, whereupon the window *FlexPro – [\Document (Document)]* including a symbolized, still empty page displays. At the same time the *Document* appears in the list view of the FlexPro Explorer as the eighths object (Fig. 1.32).

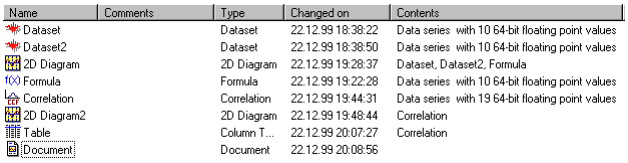


Figure 1.32: The Document object in the FlexPro Explorer's list view

We assume that the objects *2D-Diagram*, *2D-Diagram2* and *Table* are supposed to appear in the planed printout. For this they must be transferred to the *FlexPro – [\Document (Document)]* window and as such into the *Document* object. The easiest way is the Drag & Drop method, if the FlexPro Explorer and the document window are simultaneously visible on screen, which can be achieved using the command *Tile vertically* in the WINDOW-menu. We click in the list view of the FlexPro Explorer on one of the objects to be transferred with the left mouse button or with the left mouse button plus depressed <CTRL>-key and keep the mouse button depressed. Now the object is dragged to the document window and the mouse button released. Each of the objects copied this way appears in the document window with a surrounding frame, which has handlebars for the positioning and sizing.

To finish the document only the desired three objects have to be transferred, sized and arranged on the page as desired (Fig. 1.33).

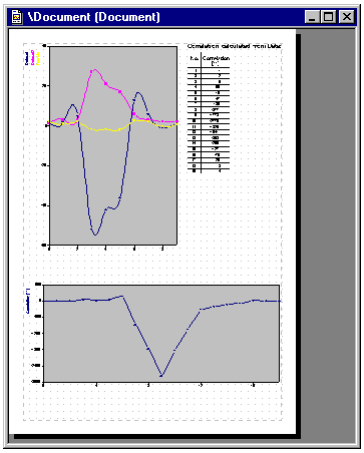


Figure 1.33: A possible arrangement in the document window after positioning and sizing

At the end of our quick start into FlexPro's functionality we select the *View Page* command in the FILE–menu when the document window is active, and can see the result in a full sized preview (Fig. 1.34).

By clicking on the *Print...* button we get our first result as a hardcopy if necessary.

This explanation should be sufficient for a quick start. In the following chapters we will get into FlexPro's program functions in more detail. In the first step the import of data will naturally be the main topic. After saving our project or the complete FlexPro database under a suitable name using *Save Database As...* in the FILE-menu and finally closing it, we start the next chapter again with an empty FlexPro database.

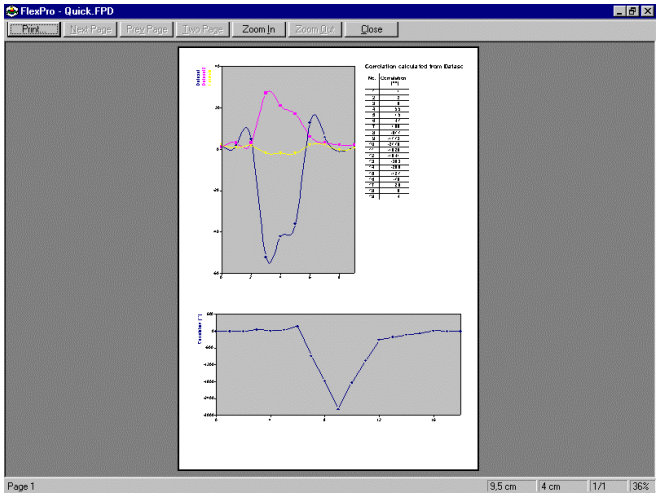


Figure 1.34: Preview of the printed result to be expected

2 Ways of Import

Having learned about the important working principles and elements of FlexPro now in the previous run through, we will now use larger datasets, to work more intensively with FlexPro's spectrum of capabilities. FlexPro takes into account that large columns of data are not usually typed into the data view manually. FlexPro therefore provides a number of tools for a quick, efficient and safe import of data from external formats.

Note: Settings in the field of the register structure are necessary to reproduce the working steps and the associated figures in the following chapter on your own PC. And the still empty FlexPro database which opens automatically at the start should be saved as ANALYSIS1.FDP using FILE – *Save database as...*, so that interim results can be saved by the click of a button and found again under this name. Details about the advised procedure for this operations are listed in appendix I.

2.1 Exercises and Material

To gather a detailed impression of the capabilities of FlexPro, it would seem sensible to proceed by examples and – as pedagogic scientist would put it – didactically based upon each other. Using this more playful approach makes the understanding of the course material much easier compared to the abstracted run through single functions.

The following chapters show a sufficient degree of reality as the user finds a quite large „Starter-Dataset“ among the examples provided by FlexPro, whose "change" into a publishable document is described in this tutorial. We just have to imagine, that we have to edit and refurbish this dataset with FlexPro 5.0 in presentation quality, which can represent a company, a research department, a project or similar with this material outside in an professional way. An example of these activities can be viewed in figure 2.1.

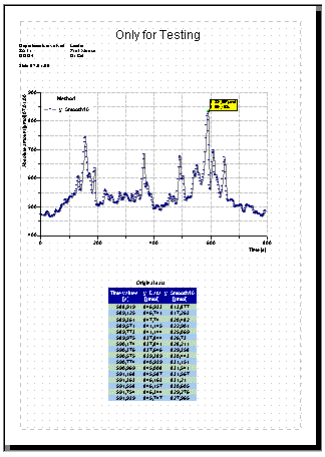


Figure 2.1: Aim: Document with text, diagram, marking of points and table

The problem we have to tackle, is that the imagined data material to be processed (it does not matter whether the data originated from a signal analysis, a chromatographic test, a spectroscopic survey, an interference determination or any other kind) - was gained from an external source and is overlapped by small disturbances due to the data technical collection conditions. The data material in this original form is not presentable in its current condition. In addition there might be questions about certain reference values of the curve. Finally the revised curve and the results of the analysis

can be worked together for a printable document, perhaps a special wish from a pestering boss.

Required input data is usually found under a network address specified beforehand, on a certain file server of the responsible “Measurement Institution” or as it is the case with us for the simulation in the folder FLEXPRO\EXAMPLES\TUTORIAL with the Hard drive specified during the installation (see appendix I). To work under realistic conditions, we can assume that the gained data are saved in an external format. Many of the common data capture systems are able to save data for export under formats, which can be read and imported by other data processing and data analysis programs. These include especially *.TXT-files in ASCII-format, but also more and more *.XLS-files, the file format of MS-Excel. The adaptation to the Excel-format is plausible as many datasets are worked on or have been worked on with Excel, before requiring a specialist program like FlexPro. In the current tutorial this fact has been accounted for by dealing with the topics Excel-Data import and interactions with Excel. To be prepared for both you will find two example files in the path mentioned above, which have the same content but different data formats, namely MEASUREMENT1.TXT and MEASUREMENT1.XLS. We will work with both formats, to get to know about the import of ASCII-files as well as the cooperation between FlexPro and Excel. Basic analysis and presentation functions will be used afterwards.

2.2 First Data Import

For the start we will use the normal case, that the externally created data has been saved as a text file, the universal ASCII-format. As with many Windows applications, FlexPro too offers several parallel ways of importing such data.

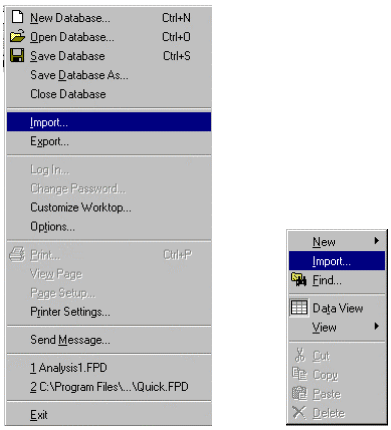


Figure 2.2: The data import is initiated via the file- or context menu

Data in external formats are imported by FlexPro in form of so called objects (see chap. 1). As the datasets – for example in a text file – are usually distributed over several columns, every column or every dataset is a separate object. To start a first import we either select the menu command FILE – *Import...*, or we move the mouse cursor to the list view of the FlexPro Explorer, open with a right-click the context menu and select the *Import...* command there (Fig. 2.2).

Note: Apart from text data (*.TXT), binary data (*.*) can be imported with the specialized Wizard. Data formats supported by FlexPro 5.0 include among others audio files (*.WAV), BMC NextView Files (*.BUF; *.BFS; *.BFX; *.LFX), DAGO/DIAdem-Header Files (*.DAT), FlexPro 3.0-Project/Measurements (*.DAT), FlexPro Control/DASYLab Files (*.DDF), Gould Oscilloscope Files (*.DAT), Graftec WR recorder files (*.DAT; *.LMD), Nicolet TEAM data files or recinfo files (*.*), Nicolet

Waveform files (*.WFT), Signalys Files (*.VH; *.K*), Tektronix DPO 3D Image Files (*.IMH), Tektronix TDS Waveform Files (*.WFM), Yokogava DL Scopecorder files (*.HDR), Yokogava ORP/ORM® recorder files (*.DAT) and also Excel Workbooks (*.XLS) which are subject of the last paragraphs of this chapter. Naturally the range of import filters is constantly monitored and the choice is expanded.

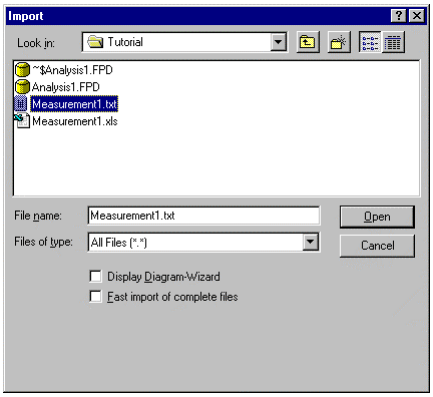


Figure 2.3: Settings in the Import dialog box

The *Import* dialog box whose structure bears a strong resemblance with the usual Windows dialog *Open,* opens both ways. We check whether according to our request the folder C:\PROGRAM FILES\FLEXPRO 5.0\EXAMPLES\TUTORIAL is really opened, adjust it if necessary via the list box *Look in:* and keep the default *Files of Type: All Files (*.*)*. The list offers apart from others the two data files MEASUREMENT1.TXT and MEASUREMENT1.XLS to choose from.

☞ *Note:* If you already know that the import of ASCII-files is not your actual topic and if you are waiting impatiently for the exercises on the import of Excel-files, you can skip the following paragraphs for the time being and start again with chapter 2.5. The paragraphs about the import of text files can be worked over separately at any time if necessary.

Click on MEASUREMENT.TXT and leave the check boxes *Display Diagram Wizard* and *Fast import of complete files* unchecked according to default setting (Fig. 2.3).

Open

Clicking on the *Open* button makes the Import Wizard appear automatically on the workspace, consisting of four successive dialogs. First of all we have to feed the first part named *Text Data Import Wizard – Step 1 of 4 – File* with information. The *Content*: drop-down list allows a glance onto the data structure. We find two datasets named „x“ and „Sum“. In the area *Method* we can choose from the alternatives *Manual* and *Automatic*. At first we go step by step by choosing *Manual* to get to know all the possibilities of the Import Wizard (Fig. 2.4).

☞ *Note:* Moving with the vertical scroll bar to the lower end of the list box, shows that a maximum of 100 data points are displayed here. Of course all data will be taken into account during a later data import!

☞ Browse...

Note: Should a file not be in the presumed path in a different context later, a search by clicking on the *Browse...* button helps. The *Choose text file* dialog opens, which is quite similar to the usual dialog boxes of Windows applications for opening a file. Important: If the respective dialog is supposed to open, the data path can not be finished off with a backslash „\“ as for example in the entry *C:\Program Files\FlexPro 5.0\Examples\Tutorial* !

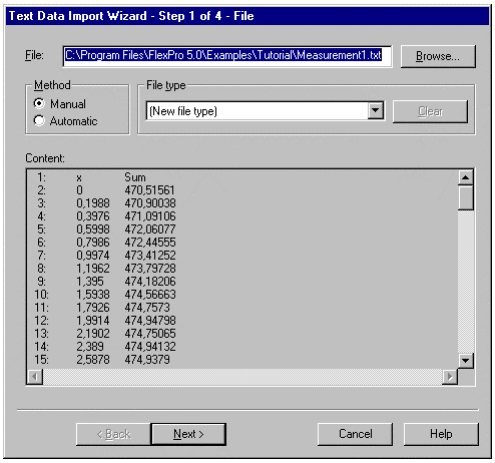


Figure 2.4: Settings in the Text Data Import Wizard – Step 1 of 4 - File

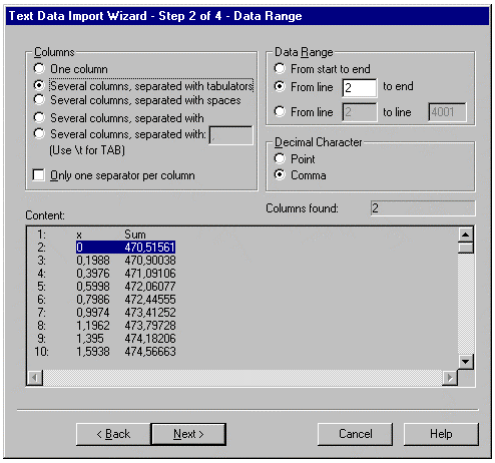


Figure 2.5: Selection in the Text Data Import Wizard – Step 2 of 4 Data Range

As there is no necessity for us, to change anything in this dialog box, we can stop it here and then click on the button *Next >* and open the *Text Data Import Wizard – Step 2 of 4 – Data Range* dialog. The data to be imported can be correctly identified with the settings in here (Fig. 2.5).

There is no need to mention all the details at this point, since the commands are self descriptive. We can recognize that FlexPro 5.0 thinks as well. Thus it is shown correctly in the option group *Several columns, separated with tabulators* in the group *Columns*, that the file contains several rows of data, the corresponding entries of which are separated from each other by tabulators. We can gather from the entries under *Data section*, that it starts with line *2* and ends with line 4001. This is correct as well, since the first line only contains names and no values. Since we would like to import everything, we can keep the option *From line 2* up *to end* which is activated by default. For our task this selection would have the same effect as the activation of the option *From line 2* up *to 4001*, the associated text boxes of which allow for a bi-directional limitation of the value range to be imported. The program also suggests on its own accord the right solution in the group *Decimal Character* which is *Comma*.

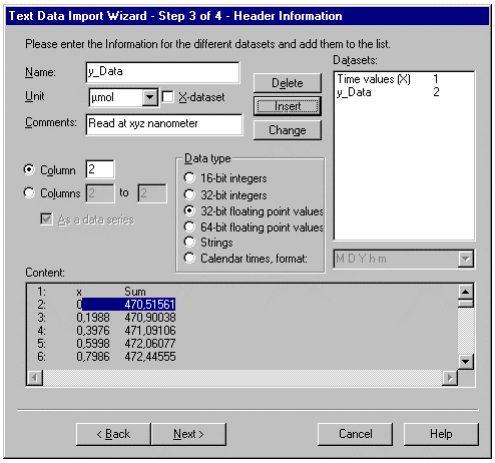


Figure 2.6: Text Data Import Wizard – Step 3 of 4 – Header Information

In the end we can check that the result *Columns found: 2* is correct. After this we click the button *Next >* again to get to the *Text Data Import Wizard – Step 3 of 4 Header Information* dialog (Fig. 2.6).

Next >

Here the entries next to the inactive text box C*olumns* reminds us that the dataset to be imported consist of two rows of values. The entry *1* in the text box *Column* makes clear that we have to give information about the first dataset of the file. We change the default *Data type* given with *64-Bit floating point values* to *32-Bit floating point values*, as this accuracy is more than enough for our example datasets. Since the first column in our file contains x-values we have to activate or check the *X-dataset* check box. The first column is now set as x-dataset for all datasets to be imported – in our case for the column *Sum*. We enter *Time values* as a *Name:* and *s* for seconds as a *Unit*, directly via the keyboard or by selecting them from the drop-down list. As *Comments:* might be given as well, we enter *Measurement times for the first sample series*. Click on the button *Insert* to add column *1* to the *Datasets:* list. That way we have specified it for import. This can be seen by the entry *Time values(X) 1* in the list. At the same time the entry of the text box next to the radio button *Column* changes automatically to *2*, a hint that we have to define the details for the second column now. Enter *y_Data* as a *Name:* and the desired *µmol* as a *Unit* has to be entered via the keyboard this time, as this unit is not on offer in the list. As *Comments: Read at xyz nanometer* should do. As FlexPro takes over the arranged settings of the *Data type* on its own, the actual default setting with *32-bit floating point values* is exactly what we want. Click on the button *Insert* to add column 2 as the y- dataset *y_Data 2* to be imported to the *Datasets:* list as well.

Insert

Note: Highlighted entries and their parameters in the list *Datasets:* can be deleted or edited afterwards using the buttons *Delete* and *Change*.

Delete
Change

Clicking on the *Next >* button again, brings us to the last page of the *Text Data Import Wizard – Step 4 of 4 – Import Options* dialog. All decisions made in the previous steps can be checked again in the list box *Abstract:* (Fig. 2.7).

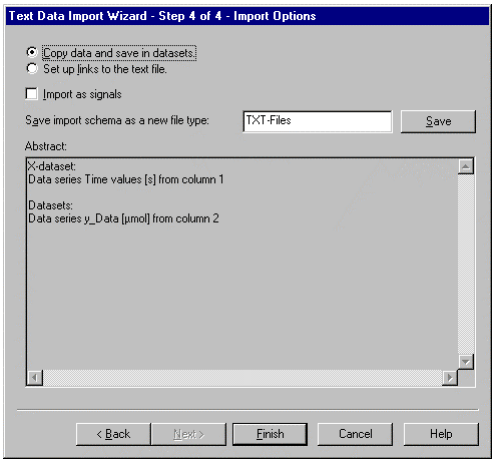


Figure 2.7: Settings in the Text Data Import Wizard – Step 4 of 4 – Import Options

< Back

If a mistake can be seen in the final input data display then, every step of the Wizard can be retraced again via the button < *Back*, to change the respective entries. There are another three options or check boxes in this last step of the wizard which are of special importance. FlexPro saves a separate copy of the selected data in the project database when choosing *Copy data and save in datasets.* Selecting *Set up links to the text file* on the other hand means that the data are treated as an import object, which means FlexPro only sets up a link, and the data will be automatically read and processed from the source file in our case MEASUREMENT1.TXT, if necessary. There is a draw back to an import object. The slow data access speed, which is due to the data conversion taking place slows down the data transfer. And of course the source file must not be moved or deleted, as the data can not be read anymore afterwards. The advantage is that the actual stock of data from the text file is always available. The check box *Import as signals* is new. It takes care of a fixed link between x-values and the corresponding y-values.

Note: FlexPro interprets the term signal as a combination of an x- and y-component of the same length. This presents the simplest case of an aggregate data structure.

Finish

We select *Copy data and save in datasets*, leave *Import as signals* unchecked, click on the button *Finish* and the two datasets *Time values* and *y_Data* can be found in the list view of the FlexPro Explorer almost immediately. During this the *Text Data Import Wizard* closes automatically. The essential properties of the imported data are listed once more under the rubrics *Name*, *Comments*, *Type*, *Changed on* and *Contents*.

Note: If these details can not be read completely due to the default formatting of the respective table, the column widths can be changed any way via the mouse by moving the vertical column divisions between the column headings. This table can be reduced in size for the benefit of the so called data view positioned above, using the same method.

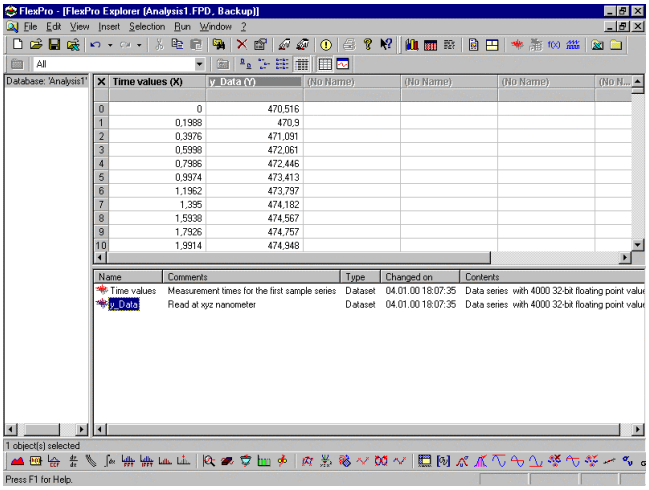


Figure 2.8: Imported data plus information in the FlexPro Explorer

It can be seen that all the 4000 data points of our source file have been imported and that the data series *Time values* contains the x-values (Fig. 2.8). Both imported datasets with suitable labels in the column title automatically appear at the same time in the data view. The functionality of this data view will be presented in detail in one of the following chapter.

2.3 Automatic rather than Manual

Before having a closer look at the datasets to be imported, we want to view the new FlexPro-functions, which allow for a fair degree of automation during the repeated import of standardized external formats. That these possibilities are available was already discernible in the previous paragraph, as we selected in the first step of the Text Data Import Wizard the option *Manual* first rather than *Automatic.*

To test the automatic procedure now as well, we again select FILE - *Import*, highlight the file MEASUREMENT1.TXT in the *Import* dialog, start the *Text Data Import Wizard* as before with *Open*, but this time activate the *Method automatic* in the *Text Data Import Wizard – Step 1 of 4 – File* dialog box.

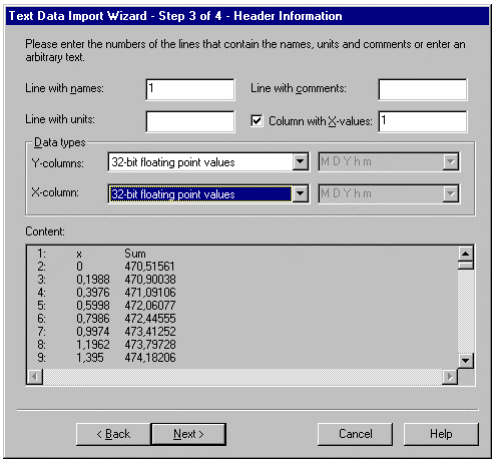


Figure 2.9: Text Data Import Wizard – Step 3 of 4 – Header Information, after selecting the automatic method

This obviously does not lead to any changes to the Wizard, so that we can leave this step of the *Text Data Import Wizard* with *Next >*. And there are no differences in the second dialog window of the *Text Data Import Wizard –Step 2 of 4 – Data Range* dialog in comparison to the manual method concerning the setting of the data range. So clicking on *Next >* again we go on to the next step *Text Data Import Wizard– Step 3 of 4 – Header Information*. We are asked here to enter the numbers of the table rows containing the names, units and comments. Additionally we have to tell FlexPro via a check box whether the file contains x-values and in which column they can be found (Fig. 2.9).

We enter a *1* for *Line with names:*, since the names of the datasets can be found in the first line of our file. This piece of information can also be gained via the *Content:* field if needed. We tell FlexPro via the check box *Column with X-values*, that x-values are present. The textbox next to it gets the entry *1*, as the x-values in our file format can always be found in the this column.

Leave the text boxes *Line with comments:* and *Line with units:* empty. To finish it off we make sure again, that the *Data type 32-Bit-floaing point values* is always used for *Y-columns* and *X-column* and leave this step of the Wizard with *Next >*.

Note: With the appropriate structure of the file to be imported, the position of comments and units can be specified using the text boxes *Line with units:* and *Line with comments:*. Alternatively fixed texts can be entered here. If a dimension is positioned behind the name – marked by the usual square brackets - FlexPro automatically treats this additional information correctly during the import. FlexPro takes care of clear details automatically as well, by adding numbers if necessary to the text typed by the user.

In the last step of the *Text Data Import Wizard- Step 4 of 4- Import Options* we select as before *Copy data and save in datasets*, leave *Import as signals* unchecked. The text box to the right of *Save Import schema as a new file type* allows saving the details given before under a significant name. That way FlexPro can use these settings for future imports of files with the same name extension - which is in our case for TXT-files.

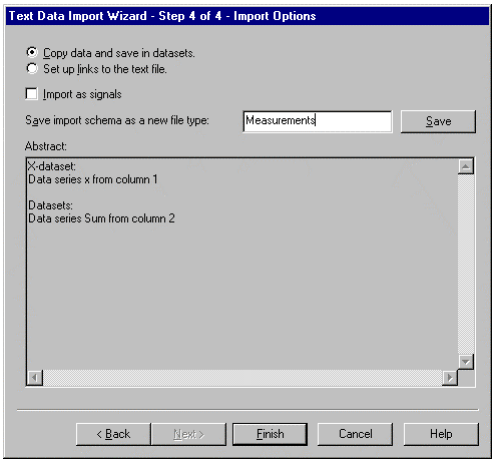


Figure 2.10: Saving an import schema in the Text Data Import Wizard

As it is an import schema for measurement values, we enter the name *Measurements* for an easy identification and click the *Save* button afterwards (Fig. 2.10).

Note: This automatic import function shows its special strength with simply structured files, which contain for example one dataset or a name per column.

Finish

Closing the wizard with *Finish*, makes two further datasets named *X* and *Sum* appear in the list and data view. The data import and the automatic extraction of the dataset names seem to have worked as desired (Fig. 2.11).

The main reason for this exercise becomes really clear, if we open FILE– *Import* or *Import...*via the context menu of the FlexPro Explorer again, select in the *Files of type:* drop-down list of the *Import* dialog the import schema *Measurements (*.txt)* just created and highlight MEASUREMENT1.TXT.

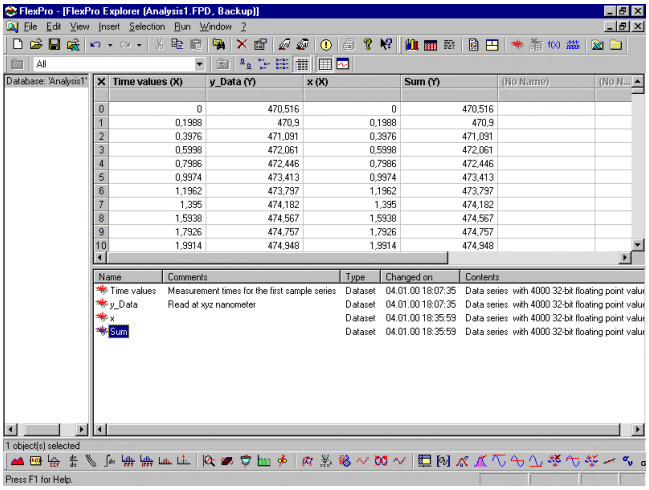


Figure 2.11: Imported Datasets with the correct name in the FlexPro Explorer

Make sure that only the check box *Set up a new folder for each file* is activated and then click on the button *Open*. We find the two newly imported datasets *x* and *Sum* now in the folder named *Measurement1* newly created, without the necessity of following all the individual steps in the *Text Data Import Wizard* (Fig. 2.12).

Open

Note: If you have user specific import schemes, the appropriate files can be dragged directly from the Windows-Explorer to the list view of the FlexPro Explorer via Drag & Drop. FlexPro recognizes the data format by the file extensions and transfers the data, without the necessity of opening a menu. This method works with all importable file formats.

Note: If you select *All Files (*.*)* in the list *Files of type:* of the *Import* dialog despite an import scheme being present, and then the file MEASUREMENT1.TXT, FlexPro automatically opens the dialog *Choose Import Format* using *Open.* Here all suitable import schemes for the appropriate filename extension - in our case *.TXT , are on offer (Fig. 2.13). The same is true if different import schemes are present for several data formats with the same name extension, e.g. *.TXT. Again FlexPro offers a list so that the user can select the desired import scheme using the specified name.

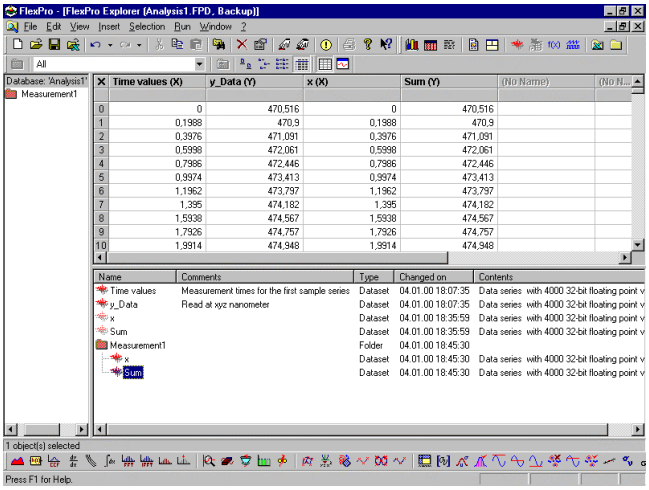


Figure 2.12: Automatically imported datasets in the new folder

Cancel

As we do not want to import our datasets again using this method, we close the dialog box with *Cancel*.

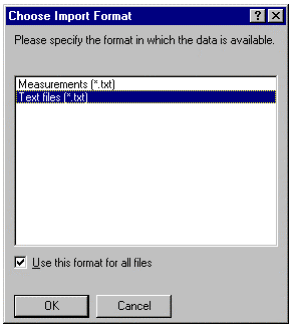


Figure 2.13: Selecting an Import scheme in the Choose Import Format dialog box. The import scheme which starts the Text Data Import Wizard is highlighted

Note: The user has the possibility to save import schemes with the manual as well as with the automatic import method.

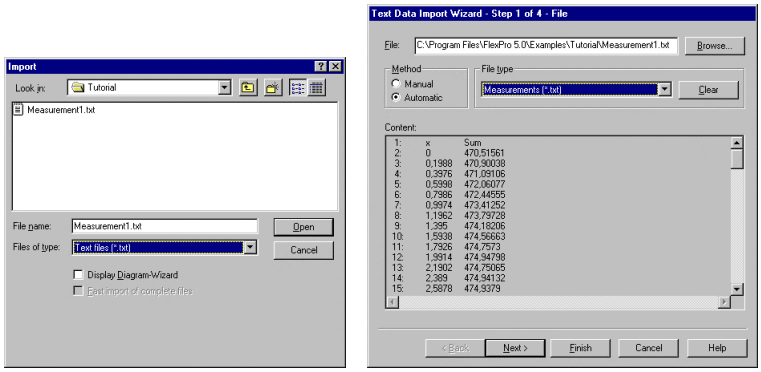


Figure 2.14: Steps to delete the import scheme Measurement (.txt)*

If you do not need customized import schemes anymore, they can be deleted in the first step of the *Text Data Import Wizard* by selecting and highlighting it in the *File type* drop-down list (see Fig. 2.4) and then clicking on the now activated *Clear* button. But when import schemes exists, the *Text Data Import Wizard* only starts, if FlexPro's default import scheme is selected in the drop-down list *Files of type:* - which can be

Clear

recognized due to the name *Text files (*.txt)* Otherwise the described automatic jumps into action and by passes the *Text Data Import Wizard* (Fig. 2.14). If you want to try this, return to the FlexPro Explorer after closing all dialog boxes (see Fig. 2.12).

2.4 Checking your Success

Even though the list view as well as the data view of the FlexPro Explorer indicate that the data import went according to plan, we still may want to have a look at some other possibilities, to convince ourselves of the structure of our datasets and thus of the success of the data import. One way of making complete datasets visible very quickly, is using the so called *Preview* display. This is a built-in window, to give a quick overview of existing objects or single data series.

The preview window opens with VIEW – *Preview,* the corresponding button in the toolbar of the FlexPro Explorer or with the respective command of the context menu for the toolbars. Here the message *Nothing selected* sometimes indicates that you can only see something, if an object or dataset was highlighted before hand in the FlexPro Explorer (Fig. 2.15).

Figure 2.15: Empty Preview window

In this case we click on the entry *Time values* in the list view of the FlexPro Explorer. This action highlights it and a straight line of 45° appears in the preview window. Obviously x-values are plotted versus x-values. By clicking on *y_Data* the real measurement values appear as a curve (Fig. 2.16). The preview window is relatively small though, so that it only provides a rough representation. Here it is less useful to judge the details of axis scaling and axis labeling. That is why the content of this window can not be edited and serves only as an orientation for a possibly forgetful user.

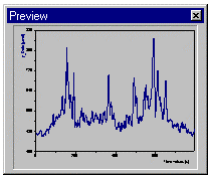


Figure 2.16: Dataset in the preview window

Figure 2.17: Prompt when several objects are highlighted

Note: If more than one of the so far existing datasets in the list view of the FlexPro Explorer are highlighted according to Windows-conventions with the combination of left mouse button and <CTRL> or <SHIFT>, a hint displays in the preview window, indicating that only one object or dataset at a time can be displayed (Fig. 2.17).

After acknowledging the preview, we close it, to present in short some other possibilities, with the help of which you can convince yourself of the datasets' structure.

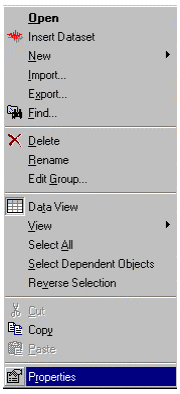


Figure 2.18: Expanded context menu in the list view of the FlexPro Explorer

A context menu opens as mentioned several times before when right clicking in the list view of the FlexPro Explorer without having highlighted an object at the same time. Menu options include among others the command *Import...*. But right clicking on the name of a dataset, e.g. *Y-Data*, does not only highlight the name of the dataset, but also opens an expanded context menu that offers a significantly wider selection of commands (Fig. 2.18).

The user working with Windows will be familiar with many of these commands. As an example we click here on *Properties* and thus open the properties dialog of the dataset *Y-Data* highlighted before. An alternative option to open the *Properties* of objects, is clicking on the respective object, for example again the dataset *Y-Data*, but this time with the left mouse button. Keeping an eye on the opened *Standard* toolbar shows that the number of activated buttons increased by clicking on the object. Among others the *Properties* button presents itself activated now, for which the shortcut key <ALT>+<ENTER> can be used as well.

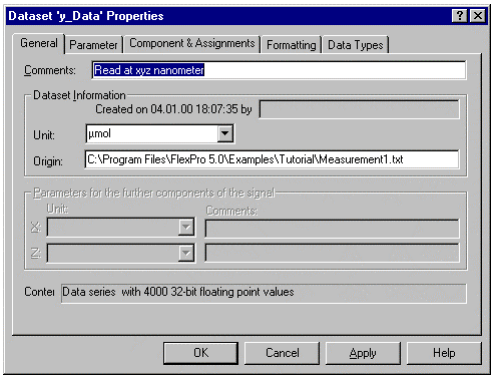


Figure 2.19: The General tab of the Y-Data Properties dialog

Independent of the way it was opened, the first tab of the five available tabs in the dialog named *General* displays first of all (Fig. 2.19). We come across some of the information again, we entered in cooperation with the *Text Data Import Wizard*, such as the entries for *Comments:*, *Unit:* and *Origin:*, which in addition can be edited here.

Note: If you would like to change the name of the dataset given in the dialog's title bar, use the command known from Windows, *Rename* in the expanded context menu of the FlexPro Explorer mentioned before.

We now switch to the fifth tab named *Data Types*. In the text box *Data* the data format selected before is displayed properly (Fig. 2.20). If you would like to change it afterwards, do it with the help of the drop-down list.

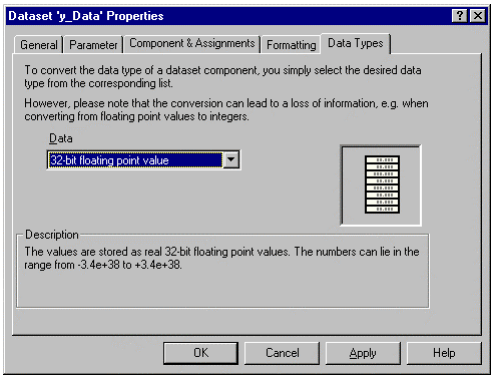


Figure 2.20: Information in the Data Types tab

In the middle tab *Component & Assignments* all existing datasets can be set as *Dataset for X-component:* or if present as *Dataset for Z-component* . For this the drop-down list *Component:* and the lists *Dataset for X-component:* and *Dataset for Z-component:,* or the button *Choose Object* positioned next to it and the *Choose Object* dialog box which opens can be used.

Note: We ignore the tabs *Parameter* and *Formatting* here. See the program online help for further information.

After this small excursus we close the properties dialog of *y-Data* for safety reasons with *Cancel*, so that changes which might be made by mistake do not have any effect. We could open and edit the properties dialog box of *Time values* the same way, which we wont since we don't want to stretch this part of the exercise unnecessarily.

A double click with the mouse on the name of the dataset or object in the list view of the FlexPro Explorer proves to be an even easier and quicker way to check the imported data structure. To stick to the example we double click on the *y_Data* object whereupon the title of the associated column *y_Data (Y)* in the data view is highlighted. This brings to our attention the possibility of taking a closer look at the datasets in this window. If, e.g. we keep the mouse pointer at the column heading in the data view for a moment, FlexPro displays a Quick Info, providing all the essential information about the dataset. Those details are summarized here in compact form, which we had made visible before using the command *Properties* (Fig. 2.21).

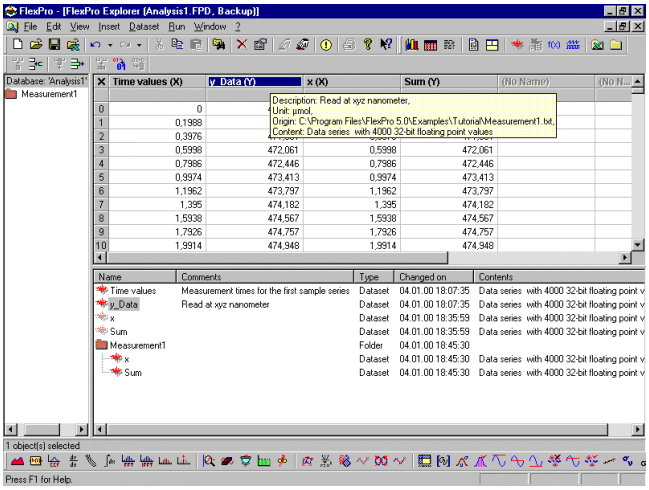


Figure 2.21: Description of the dataset after selecting a column title

Scrollbars in the data view lead one step further, allowing to flick through the whole table in x- as well as in y- direction. This way we can quickly check that the imported datasets each stretch from row 0 to row 3999. Therefore all 4000 rows of our ASCII-file were correctly imported.

Double clicking on a table cell or a value in the data view or clicking once and pressing <F2> afterwards provides an insertion cursor in the cell so that changes are possible. The editing procedure is always finished off using the <ENTER>-key or with a mouse click outside the edited cell. Alternatively single data can also be changed by activating the command *Edit Value* in the context menu of the data view or in the menu DATASET – *Edit Value* (Fig. 2.22).

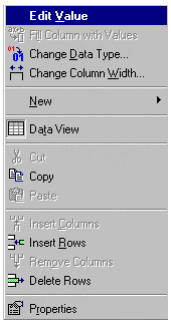


Figure 2.22: Context menu of the data view

The other commands in this context menu are mostly self descriptive and can be found to a large extend in the toolbar *Dataset*. Which commands are available for inserting or deleting rows or columns depends entirely on the highlighted area in the data view. If a single cell or row alternatively a block of cells or rows is selected, these can be deleted with *Delete Rows*. If *Insert Rows* is selected however, FlexPro inserts a number of new cells above the mark, which fit the height of the mark.

Before we turn towards the import of Excel files, we want to free the contents of our FlexPro database from the old data. If everything was done so far in the given order, then the FlexPro Explorer should be opened at the moment, in which the datasets *Time values* and *y_Data*, *x* and *Sum* and the folder *Measurement1* including the datasets *x* and *Sum* are entered. To keep an overview during the following exercises, we delete all datasets with the exception of *Time values* and *y_Data* by highlighting

them and using the command *Delete* in the Standard toolbar or the context menu of the list view afterwards.

2.5 Data from Excel

The Microsoft program Excel, originally developed as spreadsheet program, is very popular as far as the everyday organization and filing of data is concerned. A program like FlexPro 5.0 can use its capabilities of data analysis and data presentation easily and quickly, it is therefore important, to present features, which make an easy data transfer from Excel possible. Thus we have the task to import values or ranges of values from the external application Excel directly into the FlexPro Explorer, where they should appear as FlexPro compatible datasets or objects again.

2.5.1 At the Press of a Button

The quickest way of making Excel files available for FlexPro, can be started via the fourth button *Import Excel Workbook* in the *Standard* toolbar. It too opens the already described *Import* dialog box, but this time *Excel Workbooks (*.xls)* is already selected in the drop-down list *Files of type:* and accordingly only XLS files are on offer.

Note: If you have time for some additional mouse clicks, you get to the *Import* dialog box via FILE– *Import...* or using the context menu of the FlexPro Explorer's list view as well. In this case the selection *Files of type: Excel Workbooks (*:XLS)* has to be done manually via the associated drop-down list.

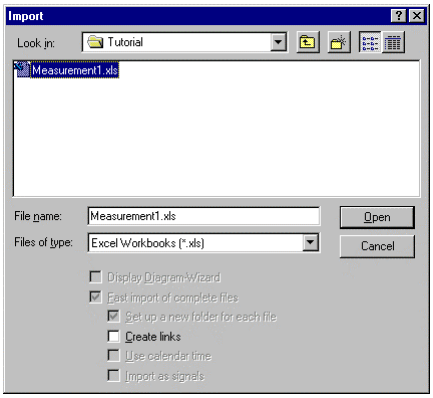


Figure 2.23: First step to import an Excel Workbook

We select the file MEASUREMENT1.XLS and keep the check box *Create links* deactivated, to copy the whole table to FlexPro during the import (Fig. 2.23). Clicking on the button *Open* closes the dialog and a new object named *ExcelWorkbook* appears in the FlexPro Explorer's list view. A subfolder named *ExcelWorkbook* is added to our existing database folder *Analysis1*, displayed in the left panel of the FlexPro Explorer at the same time.

Note: This method of import can only be used, if Excel or the file MEASUREMENT1.XLS are closed.

A double click on the new object *ExcelWorkbook* in the FlexPro Explorer opens a section of the Excel workbook instead of the data view visible before. It includes the name of a part of the Excel workbook, *Tabelle1 (Sheet1)* in our figure. In addition Excel's specific toolbars are available without any further selection (Fig. 2.24).

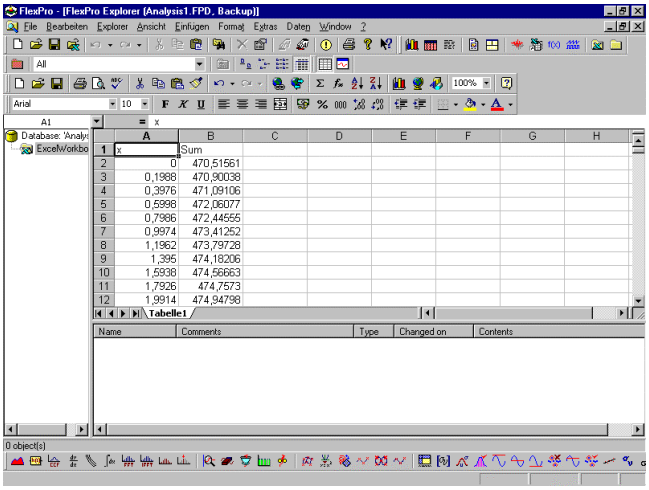


Figure 2.24:Double-click on the Excel workbook object opens the Excel desktop

To be able to use both data series in FlexPro this way, highlight the complete Excel columns *A* and *B* by clicking on the column headings while keeping <SHIFT> pressed. In the Excel Workbook position the mouse cursor exactly at the edge of the highlighted column block, so that the Excel typical cross changes into an arrow. Now click the left mouse button first and then additionally the <CTRL>, to start a copy process instead of a movement. If the mouse button and the <CRTL>-keys stay depressed, the arrow cursor gets a small plus sign, a sure sign that the following data will be copied. We drag both columns to the list view of the FlexPro Explorer while keeping the buttons depressed and release the mouse and the <CTRL>-key there.

When releasing the mouse button the *Set Up Excel Data Links* dialog box displays which asks for some additional information about the planed action. As before we want to create *One data series for each column*. Furthermore, we let FlexPro know via the activation of the check box *The following column holds the X values:* and the entry *1* in the associated textbox, where to find the x values. Finally we make finding the name of our datasets easier by activating the check box *The first line contains the names and units of the columns* (Fig. 2.25).

Note: Is the unit given in the usual square brackets in a text line at the beginning of the Excel workbook, this dimension will be automatically taken over correctly during the import, which can be checked in the Quick Info about the data columns in the data view (see Fig. 2.21).

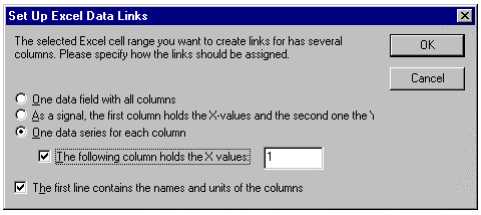


Figure 2.25: Set Up Excel Data Links Dialog box

With *OK* two objects of the *Type Excel Data Link*, appear in the FlexPro Explorer's list view, which bear – according to our entries - the correct names *x* and *Sum*. That everything went as desired shows the *Preview* if necessary (Fig. 2.26).

Note: Since we created a link this time, the screen redraw takes noticeably longer, as all the values have to be extracted from the Excel workbook before their presentation.

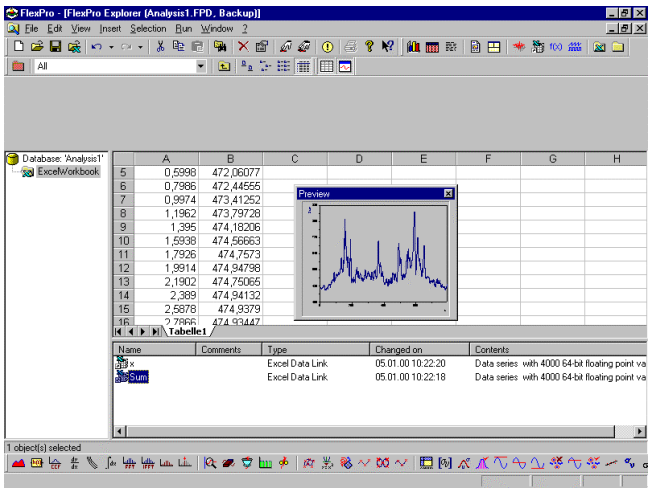


Figure 2.26: Excel Data Link in the Preview

We close the *Preview*, and a mouse click on the *Database: 'Analysis1'* in the left pane of the FlexPro-Explorer almost reestablishes the usual set up of the work area with the data view and the divided FlexPro-Explorer. But the space taken up by program specific toolbars when the Excel worktop was open, is still occupied by a broad gray bar (see Fig. 2.26). Right-clicking on this gray area makes the *Switch Off Toolbar Placeholder* button visible, and a click on this button reestablishes the usual screen set up completely.

Switch Off Toolbar Placeholder

2.5.2 Clipboard

If you want to import Excel data, you should have Excel, so that Excel data can of course be transferred to FlexPro using the classical way via the Windows clipboard. To try this open Excel following the known procedure. In our FlexPro-path C:\PROGRAM FILES\FLEXPRO 5.0\EXAMPLES\TUTORIAL or in any customized but known path is apart from the text file MEASUREMENT1.TXT an Excel file containing the same data named MEASUREMENT1.XLS. The two files only have a different format.

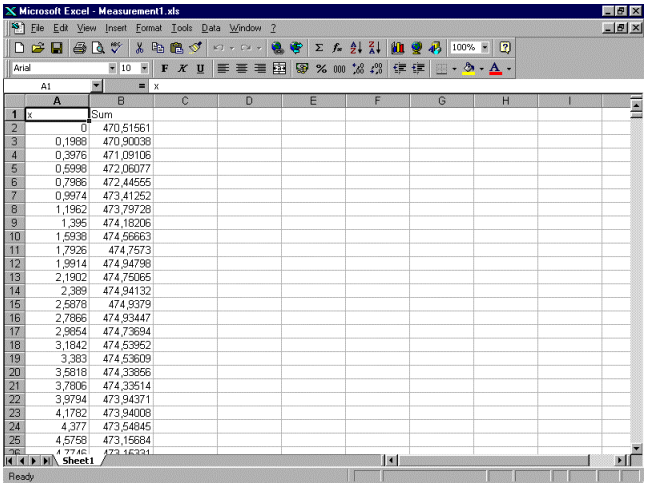


Figure 2.27: Data in Excel

MEASUREMENT1.XLS is now opened in Excel and we find our already familiar datasets *x* and *Sum* in an Excel sheet in the columns *A* and *B*.

Maximize the Excel display on screen using the Windows button (Fig. 2.27). As we want to import all data, highlight and copy both Excel columns *A* and *B* to the clipboard using the respective button or the short cut keys <CTRL>+<C>. Using the FlexPro button in the Windows-taskbar or the task manager we return to FlexPro and click once into the list view of the FlexPro Explorer, outside the data view, to specify the destination area for the copied data.

<CTRL>+<V>, the button *Paste*, the menu command EDIT- *Paste* or the command *Paste* in the context menu of the FlexPro Explorer open the *Paste Text Data* dialog box (Fig. 2.28). It differs only slightly from the *Set Up Excel Data Link* dialog box used in the previous paragraph.

There are three possibilities available to transfer data to the FlexPro Explorer. If we want to import the datasets as separate objects as done before using the *Text Data Import Wizard*, we have to select the third option *One data series for each column* here. Select the check box below *The following column contains the X values:* and keep the default *1* in the associated text box in our case unchanged. The check box *The first line contains the names and optionally the units of the columns* stays activated, and the check box *Set up a new folder for the data* will be activated, since this time we want to create a new folder for our imported data.

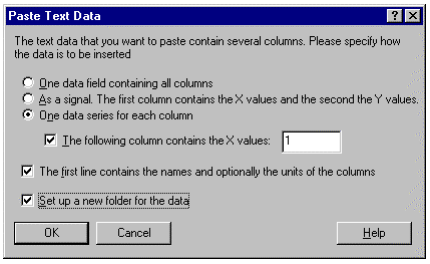


Figure 2.28: Settings in the Paste Text Data dialog box

After pressing *OK* it can take some time depending on the processor capacity until the new folder named *Text Data* appears in the left pane of the FlexPro Explorer as well as in the list view. A double-click on this new object opens the folder and the two known objects or datasets *x* and *Sum* appear separately in the list view. The two freshly imported datasets *x* and *Sum are listed* in the data view as well, which allows for checking the import results at once. Of course the *Preview* window can be used alternatively again, which should be closed afterwards. We close the folder again with a final click on the *Database: 'Analysis1'* in the left pane of the FlexPro Explorer.

If you worked your way through the previous paragraphs as described, you should now have four objects in the list view of the FlexPro Explorer sorted as follows: *Time values*, *y_Data*, *ExcelWorkbook* and *Text Data*.

Right-clicking on the *Text Data* folder or the two included datasets, opens the expanded context menu again among others with the commands *Rename* and *Properties*. The same settings or adjustments as described before can then be made here.

Data from the clipboard can also be imported to the data view directly and made visible this way. To try this we click with the mouse pointer in row zero of the first still empty table column in the data view which still has the default name *(No name)*. After copying the two Excel columns to the clipboard again, we paste them with one of the numerous *Paste* commands directly into this cell of the data view. That the result of this procedure differs from the one tried before is apparent due to the slightly different naming of the column title. This time the first row of the column heading gets the common title *TextDataset* which stretches over the two new columns, while the

columns themselves are named *0* and *1* so that after this import procedure the correct names of the two columns, in our case *x* and *Sum*, can only be found in the table row carrying the index *0.* We can gather from the associated line in list view of the FlexPro Explorer that the object just imported has the name *TextDataset*, and that its content is a *Data field with strings*.

The principle contrast to the result of the imports carried out earlier can be easily seen. This is when highlighting the *TextDataset* in the FlexPro Explorer and opening the *Preview* window with VIEW– *Preview* or the respective button in the FlexPro Explorer's toolbar shows this time we are not presented with a diagram but with a formatted table of values (Fig. 2.29).

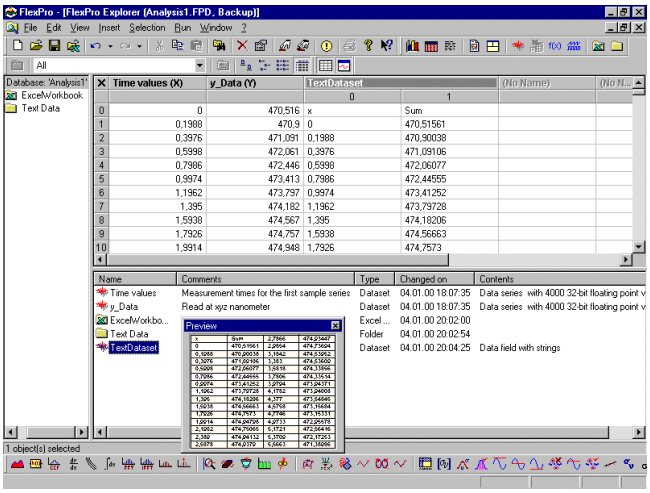


Figure 2.29: Directly imported TextDataset in the data view and Preview

Note: If instead of a table cell a row heading was highlighted in the data view before pasting the content of the clipboard, the *Paste Text Data* dialog box opens (see Fig. 2.28), and after clicking on the respective options or check boxes the two datasets named *x* and *Sum* become visible in the data view and the FlexPro Explorer. After trying this command they can be deleted again.

Note: The requirement for the way of importing Excel data just described is that Excel provides its data in a text format via the clipboard. The same goes for the Drag & Drop-operations, which will get a short mention in the following section.

Note: Even if you didn't delete the spare data series or create new folders, despite the advice given before, there will be no double data names and the connected danger of mixing them up during import. During the import procedure FlexPro automatically adds incremental numbers to the names of all double datasets until a specific name is given. During a new import of *x* and *Sum* for example, the objects would automatically get the names *x2* and *Sum2*.

2.5.3 Drag & Drop

The import of Excel data can be done very conveniently using the Drag & Drop-method. But first we have to close the *Preview* again, delete all objects in the list view of the FlexPro Explorer with the exception of *Time values* and *y_Data* and return to Excel using the task bar, the Windows task manager or the short cut key <ALT>+<TAB>. The two columns should still be highlighted. Please do it now, if they are not. As already demonstrated in chapter 2.5.1 position the mouse cursor in the Excel workbook exactly to the edge of the highlighted column block. This action transfers the typical Excel cross into an ordinary arrow. Now click the left mouse button first and then the <CTRL>-key as well, to start copying instead of moving. The arrow cursor has a small plus sign now, an unmistakable sign that the data will be copied. As Excel is opened to full size, we move the mouse pointer to the FlexPro button in the task bar. FlexPro opens after a short pause and we move the cursor with its plus sign to the list view of the FlexPro Explorer and release the mouse button and <CTRL>-key.

Again the *Paste Text Data* dialog box opens here. We keep *One data series for each column* activated, give information about the position of the x values, but give *Set up a new folder for the data* a miss and end the dialog box with *OK*. And again we get the result that we are now familiar with, which means the entry of the two datasets or objects *x* and *Sum*. In addition both Excel columns appear in the data view according to our settings as separately imported rows of data with the correct column title or heading.

For the following finger exercise we delete the two new FlexPro objects using one of the already mentioned procedures and close all windows and applications which might be open including Excel so that only the FlexPro Explorer's list view including the two datasets *Time values* and *y_Data* as well as the numeric presentation of these two datasets in the data view remain on the worktop (see Fig. 2.8).

Note: So far we imported the two datasets, to stick to FlexPro's terminology, in principle as a so called signal, as we had two separate columns highlighted where the first column always corresponded to the x-values and the second to the y-values. Datasets however can posses different data structures and as such data organization. In short, simple data structures can consist of scalar values like a date or a measurement value, of one dimensional rows of data or columns and of two dimensional data fields or adjacent columns with the same number of values. In contrast to this we find behind complex or aggregated data structures the already examined signals, which consist of a x- and an y-component each or a x- and y-data series as well as signal series with one x- and several y-components or –data series. A bit more restricted are signal series with an individual x-component as for example calendar details. Signal series with a z-component, where the number of z-values corresponds to the number of y- data series, or signal series with individual x- and z-component or space curves like a three dimensional trajectory are more extensive. The components can have any data type with the exception of strings. For more information about this refer to the program help once more.

That's the end of the explanation for getting to know about the basic import options. In the next step we want to visualize and edit data for the first time beyond the *Preview*.

Note: If you had enough for now and would like to continue later, you should save your project once with FILE – *Save Database As* or the associated button. When leaving FlexPro and continuing with work later the present configuration of the database in this form appears on screen, if you start with FILE – *Open Database* or the alternative button.

3 First Analysis

To make our present data visible and edit them in the next step beyond the *Preview* for the first time, we first of all have to create a suitable surrounding. For data editing and analysis the worksheet was the tool of choice in the previous FlexPro versions. This quite multi functional device was and is especially designed for working on screen and not as the so called document e.g. for paperwork only. Thus e.g. pre FlexPro 5.0 cursor could only be used in the worksheet window while they were not available in the so called diagram window. This concept changed entirely with FlexPro 5.0, and apart from small differences which can be neglected all analysis functions which so far were restricted to the worksheet can now be used directly in the diagram window as well. Since there is hardly any difference between the way of data presentation on screen and the tools in a worksheet and in a diagram, our first analysis attempts will be conducted using the diagram window as an example. The diagram is exactly the element which can be directly transferred into a document for presentation. Some special aspects of the worksheet will follow (see chap. 3.7).

3.1 Quick Construction of a Diagram

First of all we have to create a diagram. A wizard helps here as well, this time named *Diagram Wizard*. To call upon this wizard, first left click on the column title of our data series *y_Data* visible in the data view or highlight the object *y_Data* in the FlexPro Explorer's list view with the left mouse button. Again there are several alternative procedures to open the wizard. This can be done via the menu command INSERT – *Diagram...* and via opening the simple or the expanded context menu in the list view of the FlexPro Explorer and selecting NEW – *Diagram...* afterwards (Fig. 3.1).

It is more elegant to click on the button *Insert Diagram* which takes up position one in the *FlexPro Objects* toolbar.

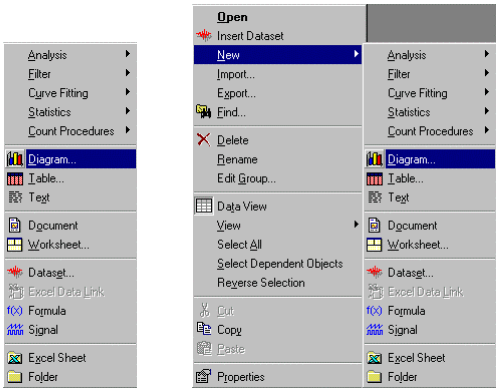


Figure 3.1: The Insert menu and New context menu each with the command Diagram

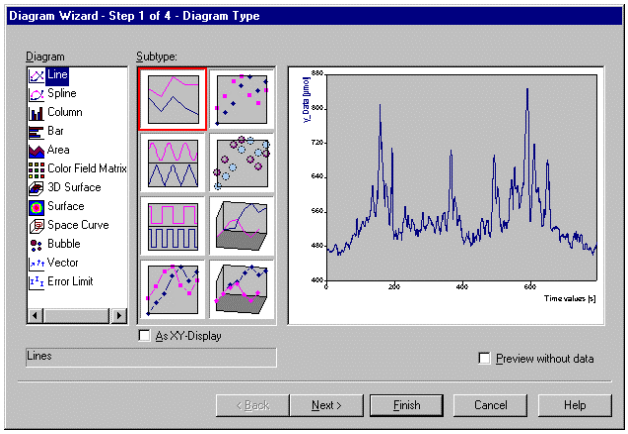


Figure 3.2: Diagram Wizard – Step 1 of 4 – Diagram Type

Clicking on the button opens the *Diagram Wizard – Step 1 of 4 -Diagram Type* (Fig. 3.2). We don't want to concentrate with the fine details of the graphic presentation abilities here (see chap. 4), but use the diagram only for a first extensive overview and for first analysis purposes.

So we do not go into detail with the tabs offered by the wizard at this point, but accept the default *Subtype:* for the time being and click *Finish*, which opens a new window with the title *FlexPro - [\2D-Diagram (2D-Diagram)*].

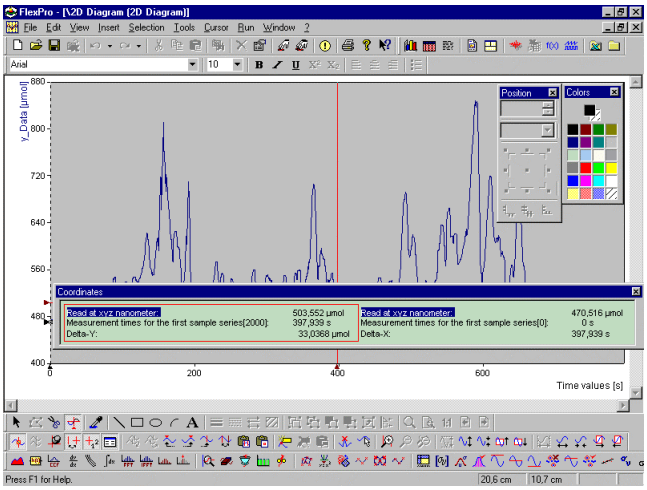


Figure 3.3: The diagram window after opening it automatically

Large conversions take place on the work area at the same time. So the window *Position* and the palette *Color* display automatically. And the menu bar changes as well, as there are now the menus TOOLS and CURSOR to the right of SELECTION to choose from (Fig. 3.3). In addition, the toolbar *Cursor* appears on the lower edge of the screen, and the commands of the *Analysis* and *Cursor* toolbars are all available. Two cross-hair cursors in form of slashed and drawn lines appear in the diagram window itself. And additionally a window named *Coordinates* displays which obviously contains the parameters of two defined points of the curve (Fig. 3.3).

Note: The axis labels generated automatically from the name of the dataset and *Unit* only appear in this form, if *Unit: X* is filled with *s* in the area *Parameter for the further components of the signal* of the *'y_Data' Properties* dialog box. FlexPro asked for the respective entry during the data import and saved it at a suitable position (see

chap. 2). How this name can be altered or adjusted in a graph afterwards, will be a topic later on (see chap. 4).

Note: During the standard installation FlexPro is setup in a way, that the screen position of all windows is arranged again automatically when opening it the next time. This default setting can be activated or deactivated by clicking on WINDOW – *AutoSave Window Positions*. The activation of this command on the other hand takes care of returning to the optimal configuration. Is the window position displayed in the following figures to be restored, the command will be used here now. As with all Windows applications you can switch the active window using the entries at the bottom of the menu WINDOW (Fig. 3.4). Clicking on the desired window title makes the respective window active.

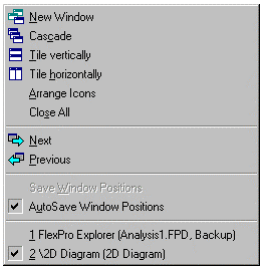


Figure 3.4: Entries in the Window menu

Note: The default generated name of the diagram can be changed as desired using the context menu available via the FlexPro Explorer, which we give a miss here.

We close the elements *Position* and *Colors*, to maximize the space and make sure that the toolbars *Window Function* and *Tools* are present on screen via the context menu of the toolbars (see appendix III) (Fig. 3.5).

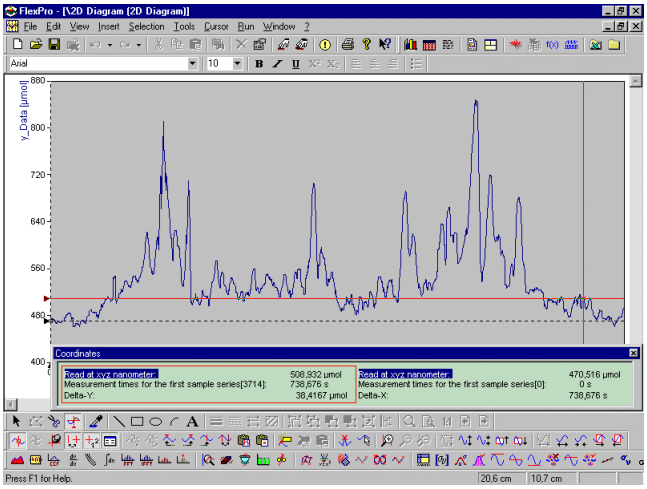


Figure 3.5: After switching off Colors and Position

It can be seen at first glance that the dataset *y_Data* was plotted versus the x-data series *Time values*. As mentioned before, all other settings concerning the axis, additional attributes and other changes will be made at a later stage (see chap. 4).

Note: The decisive key for the activation of FlexPro analysis tools is in the fourth button in the *Tools* toolbar with the Quick Info *Activate Cursors*. FlexPro displays the cursors and the buttons in the mentioned toolbars become available after clicking on it. Furthermore the activation of the buttons in the *Window Function* toolbar takes place as soon as you click with the mouse button into the list view of the FlexPro Explorer.

For the time being we can get rid of the coordinate window by moving it with the mouse using the standard Windows interface to the lower right corner of the screen. The more elegant method is to let this window momentarily and if necessary in future completely disappear by clicking on or by deactivating the sixth button named *Coordinate Window* in the *Cursor* toolbar. The button can be clicked on again if necessary and the coordinate window reappears at its last position.

3.2 Multi Purpose Tool Cursor

Apart from the curve itself the two active cursors can be found in the diagram. They can be positioned in 2D- and 3D-diagrams via the mouse or the keyboard and take over a number of tasks. Thus they measure curves, extract measurement values and measurement value differences, mark and edit values and help with enlargements of sections or with tracing of the dataset. Some settings can be made concerning the cursors. The associated commands are available in the CURSOR menu or in the *Cursor* toolbar as well as in the *Cursor* tab of the *2D-Diagram Properties* dialog box. The latter can be opened via three ways: You either right click in the diagram and activate the command *Properties* in the context menu which opens, or it is done using the menu command VIEW – *Properties*, or by simply clicking on the button *Properties* in the *Standard* toolbar.

We open the CURSOR menu and make sure that the commands *Link Cursor*, *Cross-Hair Cursor* and *Two Cursors* are activated, which is detectable due to the button symbols appearing depressed in front of the respective menu command (Fig. 3.6).

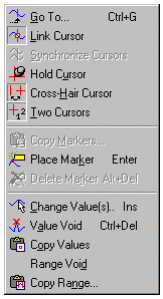


Figure 3.6: Cursor menu

These settings make sure that two cursors are displayed, which are not only displayed as a vertical line but as a cross-hair and stay connected with the curve. That means that they can not be moved to positions within the diagram, which do not correspond to a point in the curve.

Note: The same settings can be achieved via the respective buttons in the toolbar. The commands *Cross-hair* and *Two cursors* can be activated via the *Cursor* tab of the *2D-Diagram Properties* dialog box as well, but not the cursor link, as this has to be done for the two cursors separately.

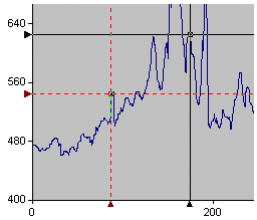
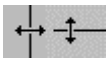


Figure 3.7: The lines of the cross-hair cursor are indicated by triangles

While the vertical cursor is only movable in the x-direction, the cross-hair cursor can be positioned in a vertical direction as well. Other than that we have to consider that the so called leading cursor is presented with a solid line, whereas dashed lines make up the original cursor. Both can be used to measure coordinates. When calculating the difference the original cursor marks the starting point, while the leading cursor presents the measuring tool (Fig. 3.7).



Note: To further simplify finding the cursors a small triangle at the x- and y-axis is attached to each extension of the vertical and horizontal cursor lines (see Fig. 3.7). And that the user realizes at once that he picked the cursor with the mouse to move it, the mouse pointer changes in close proximity and depending on the respective cursor line into a horizontal or vertical double arrow.

3.3 Let Cursors Dance

Whether free or linked to a curve, in principle cursors can be maneuvered in a diagram the same way. The moving space of the linked cursors is restricted to the points of the curve though. This means on the other hand, that the vertical and horizontal lines of the cross-hair cursor are only independent or can be positioned freely, if the cursor is not linked to the curve. Moving the vertical cursor component in the linked state results automatically in the positioning of the horizontal component along the curve accordingly. As you have to be familiar with the important tool cursor, to use respective analysis functions effectively, the single entries and navigation possibilities via mouse and keyboard are summarized again in the following table (Tab. 3.1).

Table 3.2: Cursor navigation

Mouse actions	
Aim	**Method**
Move a cross-hair or line cursor horizontally.	Drag vertical line to the desired position.
Move both cross-hair or line cursors horizontally at the same time.	Drag vertical line in combination with the <CTRL>-key to the desired position.
Move cross-hair cursor vertically.	Drag vertical line to the desired position.
Move both cross-hair cursors vertically at the same time.	Drag first vertical line in combination with the <CTRL>-key to the desired position.
Move both cross-hair or line cursors freely.	Drag the rectangular framed by the cross-hairs or the vertical band defined by the line cursors to the desired position in combination with the <CTRL>-key.
Move a linked cursor to a specific point of the curve.	Click on the desired point and the mouse pointer displays as an arrow. If this is impossible because the point lays e.g. at a cursor line, the <SHIFT>-key has to be kept depressed. FlexPro searches for

	points using different methods (read following note).
Move a free cursor to a specific point of the diagram pane.	Click on the desired position, if necessary in combination with the <SHIFT>-key.
Key combination	
Key	**Function**
<TAB>	Changes between original and leading cursor.
<F6>	Changes to the following diagram.
<SHIFT>+<F6>	Changes to the previous diagram.
<RIGHT>	Moves the linked cursor to the following point, or the free cursor to the right by one pixel.
<LEFT>	Moves the linked cursor to the previous point, or the free cursor to the left by one pixel.
<CTRL>+<RIGHT>	Moves the linked cursor by ten points, or the free cursor by ten pixel to the right.
<CTRL>+<LEFT>	Moves the linked cursor by ten points, or the free cursor by ten pixel to the left.
<ALT>+<RIGHT>	Moves the linked cursor by hundred points, or the free cursor by a quarter of an image to the right.
<ALT>+<LEFT>	Moves the linked cursor by hundred points, or the free cursor by a quarter of an image to the left.
<CTRL>+<ALT>+<RIGHT>	Moves the linked cursor to the following extreme value.
<CTRL>+<ALT>+<LEFT>	Moves the linked cursor to the previous extreme value.
<UP>	Moves the free cursor by one pixel to the top.
<DOWN>	Moves the free cursor by one pixel to the bottom.
<CTRL>+<UP>	Moves the free cursor by ten pixel to the top.
<CTRL>+<DOWN>	Moves the free cursor by ten pixel to the bottom.
<ALT>+<UP>	Moves the free cursor by a quarter of an image to the top.

<ALT>+<DOWN>	Moves the free cursor by a quarter of an image to the bottom.
<PAGE DOWN>	Changes to the following curve, in 3D-diagrams to the next Z-pane.
<PAGE UP>	Changes to the previous curve, in 3D-diagrams to the previous Z-pane.
<CTRL>+<G>	Set cursor to a new point (via index- or value-entry).
<Num Lock +>	Zoom between the cursors.
<CTRL>+<DEL>	Set value underneath cursor void.
<ALT>+<DEL>	Delete marker
<CTRL>+<ALT>+<DOWN>	Change value down
<INSERT>	Change value
<ENTER>	Set marker
<Num Lock ->	Zoom out
<CTRL>+<ALT>+<UP>	Change value up
<CTRL>+<PAGE UP>	Switch the active cursor to the previous curve.
<CTRL>+<PAGE DOWN>	Switch the active cursor to the following curve.

In connection with the presentation of the cursor functions we want to have a quick glance at the most important settings in the *Cursor* tab in the *Properties* dialog box of the *2D-Diagram* object which can e.g. be opened using the command *Properties* in the context menu of the diagram (Fig. 3.8). An alternative is the menu command VIEW – *Properties* or the associated shortcut <ALT>+<ENTER>.

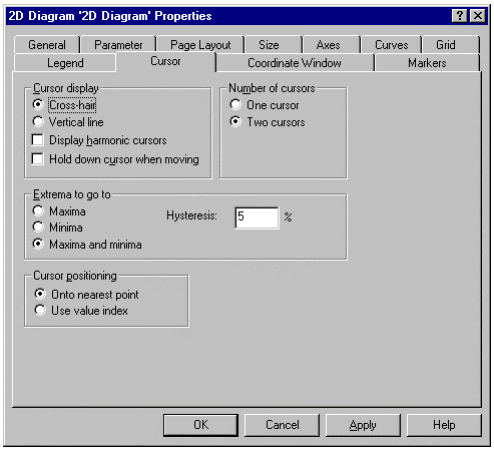


Figure 3.8: Cursor tab in the Properties dialog box of the 2D-Diagram object

The area *Cursor display* of the *Cursor* tab contains apart from the already mentioned set possibilities *Cross-hair* cursor and *Vertical line* two further check boxes. *Display harmonic cursors* is suitable for measuring and clarification of upper waves in a signal

spectrum. FlexPro draws a maximum of 10 further equidistant vertical cursor lines in the diagram window, the distances of which correspond to the multiple of the respective x-cursor position, if this checkbox is activated. This is easily made visible, if after activating the check box and closing the dialog box the leading cursor or the original cursor are moved close to the origin of the diagram (Fig. 3.9). If you were curious enough to try this, it is sensible to deactivate the harmonic cursor again afterwards, since this tool is of no use in our example.

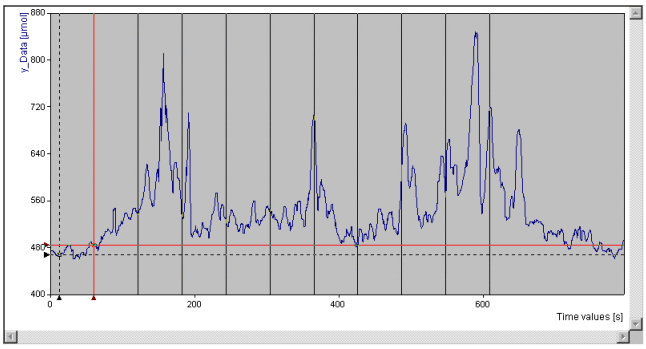


Figure 3.9: Harmonic Cursor

If *Hold down cursor when moving* is activated, the curve in the diagram can be moved underneath the fixed cursor using the keyboard's arrow keys. At the same time the cursor can still be positioned via the mouse. This check box should be deactivated after a test as well.

Note: To place a linked cursor at a certain point of the curve, click on the desired point in the diagram. FlexPro searches for that point of the curve, which is closest to the chosen position. The method according to which this is done, can be set in the *Cursor* tab as well.

There are two alternatives in the area *Cursor positioning*: *Onto nearest point* and *Use value index*. After clicking on the first pane, FlexPro searches the whole curve for that point, which has the smallest distance to the chosen position. This method is very computing intensive though, so that it should be replaced by the second method as soon as large datasets are involved. Here only the horizontal component of the chosen position is taken into account and from this the index of the point to be chosen is directly calculated. As there is no need to search the dataset, this method proves to be very fast. But it only works for equidistantly recorded signals, that means the values were recorded at certain times such that they always have the same distance to the time before and after. As our datasets have at present a workable size, we can decide for the more extensive cursor positioning *Onto nearest point* with a clear conscience.

Note: In contrast to the worksheet window the option to synchronize multiple pairs of cursors in different diagrams is not available in a diagram window.

Note: The options in the field *Extrema to go to* in this tab, which have not been mentioned yet, will be used in praxis in the next paragraph.

With this knowledge of the way the cursors work, we want to start examining some characteristics of our measured curve *y_Data* in the next step. For this close the dialog box which might still be open.

3.4 Peaks

We want to gather the first basic information about our curve. Seven peaks in total awake our interest, two of which stick out extremely. For a closer examination they

have to be displayed magnified. The thing to do first is to spread the flattened curve, so that it is easier to decide whether the peaks have really only one maximum or whether they contain several maxima. If the latter is the case, then this becomes clear in the display of our actual diagram, while scrutinizing the highest peak.

Whether this assumption proves right, can be quickly checked. For this we dissolve the cursor link of the active cursor using the respective button – it should be the leading cursor recognizable by the solid line – and place it on the curve via a left mouse click to the right of this peak. It should not be in too close proximity of the peak.

After this change the active cursor using the <TAB>-key or the associated button, and dissolve the cursor link for this one as well. This time it should be the original cursor, recognizable by the dashed line, which is placed on the curve with a left click again to the left of the peak in a similar distance.

Note: If you press the <CRTL>-key when clicking within the diagram, you position the inactive cursor.

Our peak is now framed between the original and the leading cursor and after clicking on the button *Spread X-range Between Cursors* in the toolbar *Cursor* at the bottom of the FlexPro-workspace, the enclosed area is zoomed-in. This changes the scaling of the x-axis as well. The starting value and the final value of the zoomed-in view correspond to the x-positions of the cursors. It is now quite obvious that this projected peak possesses two peaks or maxima, separated by a saddle (Fig. 3.10).

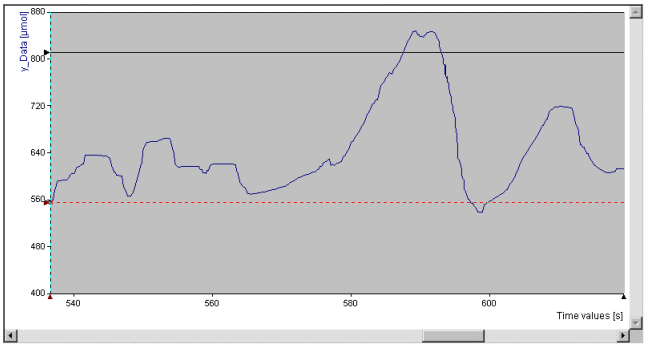


Figure 3.10: Zoomed section

Note: If the <CTRL>-key is pressed after placing the cursor, before the spreading, and the original cursor is selected and moved via the mouse, the two cursors can be moved at the same time with the set distance as an x-axis interval so to speak.

Note: As after this enlargement of the section the whole dataset is no longer visible in the diagram, a horizontal scroll bar appears at the bottom edge of the window. With it all coordinates can be reached in the zoomed display.

Having tried this, we transfer our curve to the original situation, by clicking on the button *Restore Original Image Section* in the *Cursor* toolbar.

Note: In this case we could have used the previous button *Restore Previous Image Section* in the *Cursor* toolbar, since only one zooming step was conducted and thus steps in between which could be undone separately are missing.

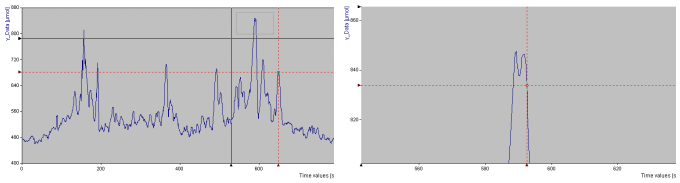


Figure 3.11: Drawing a marking frame leads to a magnified section

There is an alternative, quicker and therefore more practical method to zoom to the peak we are interested in. For this we draw a rectangular section or marking frame around the structure to be magnified, using the mouse. We set a starting point with a left click and keep the mouse button pressed, to zoom using this method. We now stretch the marking frame until the structure to be magnified is enclosed in the selection frame building up. With the release of the mouse button we get the zoomed-in view of the peak and recognize the two maxima here as well (Fig. 3.11).

3.4.1 Manual Detection

These two maxima in close proximity will be measured now. In this context we want to test two methods quickly as well. At first we want to measure the two maxima of this peak by hand. The cross-hair display disturbs the overview slightly, and by deactivating CURSOR – *Cross-Hair Cursor*, using the *Cursor* tab of the *2D-Diagram Properties* dialog box or using the button in the *Cursor* toolbar meant for this, we select the vertical form. In addition the link between the two cursors and the curve is restored. We try placing a cursor each on the two maxima of the peak using the arrow keys and find that it might prove difficult to hit the exact value with this method, unless it is spread further beforehand. We can accept a little help in form of the coordinate window which keeps appearing, though.

Note: It is very practical, that FlexPro's cursor functions are by default set so that after clicking into the diagram the cursors automatically jump to local extrema which are in close proximity to the clicked diagram area. We are going to learn about this functionality and the settings which are possible in this context in more detail later on in this chapter.

If the coordinate window is not visible, open the context menu for the toolbars and click on *Coordinates* or click on the *Coordinate Window* button in the *Cursor* toolbar. The window named *Coordinates* displays in both cases again (Fig. 3.12).

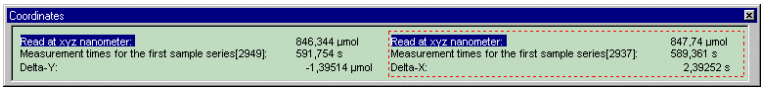


Figure 3.12: The Coordinate Window

Note: If the coordinate window is opened using the command INSERT – *Coordinate Window*, the coordinates do not appear as a separate window, but they display integrated into the diagram pane like a drawing object with sizing handles so that the coordinates can be printed with the diagram. In addition the cursors are deactivated, to make the drawing commands available and enable the placing of the coordinate window. If the position is what you imagined, the cursors must be activated again manually. All the values displayed in this window from now on are dynamical, which means that they always correspond to the actual cursor positions. If in contrast to this a specific content of the coordinate window is supposed to be frozen as a „photo“ and placed in the diagram static, you have to use the command *Copy* in the context menu of the coordinate window. It transfers the content of the coordinate window to the clipboard, so that *Paste* is possible via the context menu of the diagram. Before the

inserted image of the coordinate window can be scaled or moved, the cursors have to be deactivated manually, which automatically activates the drawing commands. Coordinate windows no longer needed can be marked – when the cursor is deactivated – via mouse click and then be deleted using for example the <DEL>-key.

We move the coordinate window in the maximized diagram to an empty space of the diagram window if possible. Now select the vertical leading cursor detectable due to the solid line, with the mouse pointer and move this to the second maximum of our peak. During this keep an eye on the display in the coordinate window. The left list with a solid line gives here the x- but not the y-values of the selected points in the diagram when moving the cursor. We obviously have to link both cursors to the curve again. If we move the cursor of the second maximum with these settings, we can continue doing so due to the display which now appears until the largest y-value is found. If we change over to the original cursor by selecting the dashed line with the mouse pointer and repeat the game, we find the left maximal value of the first peak manually, too. The coordinate details for the position of the original cursor are highlighted by a dashed frame in the coordinate window. Parallel to this FlexPro calculates the difference of the x- and y-values and displays them in the window as well (Fig. 3.14).

Note: You always have to make sure that the dashed original cursor is on the left side of the leading cursor, as the signs of the difference values will be incorrect otherwise.

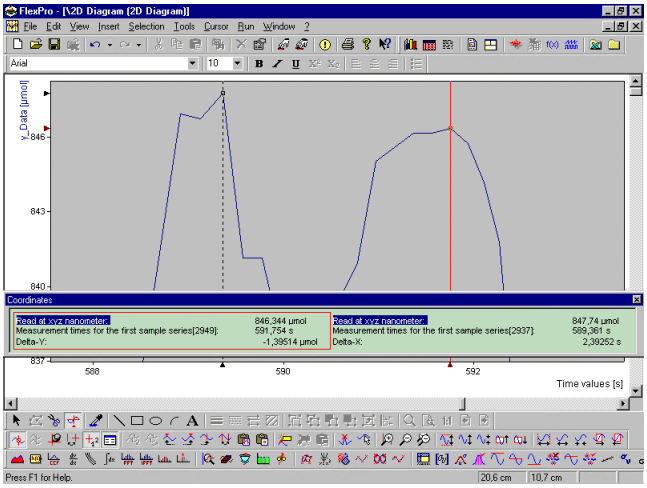


Figure 3.13: Reading coordinates with the original and the leading cursor

Note: To change between the areas for the cursors in the coordinate window and thus between the presently active cursor, select the simplest way via the <TAB>-key or the button *Switch Cursor* in the *Cursor* toolbar (see appendix III). If you try switching the active cursor by clicking on the other cursor line, the associated frame in the coordinate windows changes only after the respective cursor was moved.

Among the entries in the coordinate window are additional values, which can be used for our purposes. These are the integers given in square brackets, which are always displayed after the x-axis comments *Measurement times for the first sample series*. After the manual setting the two values should be in the interval between 2930 and 2960. These values correspond to the index entries in the data view and therefore to the row numbers given there (see e.g. Fig. 2.8). This way we directly gather information on which position of the table in the data view the values are roughly situated, e.g. if you did not have sufficient spreading for an exact determination. Switching to the data view of the FlexPro Explorer doesn't get us directly to the data range in which the cursors can be found, but we only have to move to the row or index

numbers shown in the coordinate window using the scrollbar, to check whether we found the "real" maximum under the original cursor in our manual example.

Note: Should the data view of the FlexPro Explorer be closed, a slightly changed variant can be used. For this double click on the row containing the comments for the x- or y-axis in the coordinate window or right click on the comments of the associated dataset and select the command *Open dataset* in the context menu which opens. A window with the data of the desired dataset plotted versus the index opens now. If we for example go for the dataset *y_Data*, the window's title bar gets the name *\y_Data (Dataset)*.

Note: This kind of data viewing via the coordinate window is successful via the area of the original as well as the leading cursor.

Note: To get a better overview during the inspection of the data via the data view or the data window, we maximize both and the diagram window. As with all Windows applications we can switch between the windows if necessary using WINDOW – *1*, *2*, *3* up to *n*.

We will stick to the data view of the FlexPro Explorer. According to its details the first maximum found with the original cursor must have the index *2937* and the second, determined with the leading cursor the index *2949*. To create our own dataset for this peak we highlight with the <SHIFT> and the left mouse button in the data view only the cells of the *y_Data*, which correspond to the index *2930* to *2960*, copy these with the respective command from the context menu of the highlighted area in the data view and insert them into the list view of the FlexPro Explorer.

Note: The highlighted area can alternatively be dragged from the data view to the list view of the FlexPro Explorer via Drag & Drop, by catching the edge of the marker with the mouse pointer.

This results in the dataset *y_DataSection* consisting of *31 32-bit floating point values*, the comments of which are obviously copied from the *y_Data* (Fig. 3.14). Additionally the respective values appear in the rows 0 to 30 under the column heading *y_DataSection* in the data view

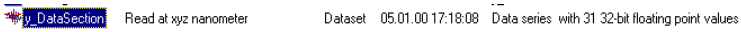


Figure 3.14: Section of y_Data as a new dataset in the list view of the FlexPro Explorer

We highlight the object and open the *Diagram Wizard* with the respective button. The preview in the first step indicates already, that we can edit sections of datasets with this simple technique as well.

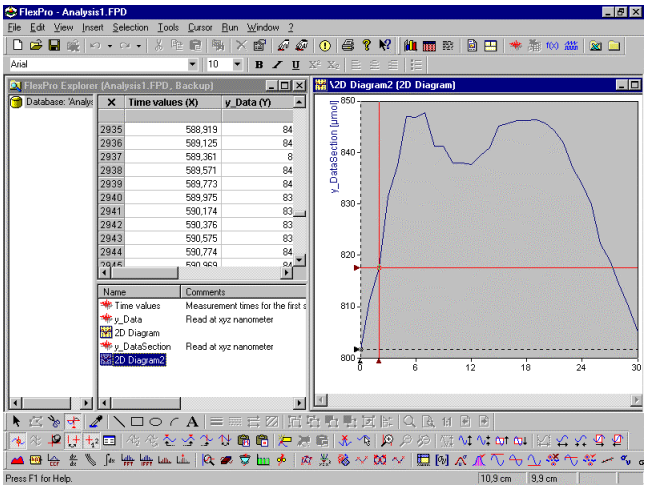


Figure 3.15: Diagram created from the data section

Note: If after highlighting the command NEW – *Diagram...* is selected from the context menu of the data view instead of *Copy,* FlexPro starts the *Diagram Wizard* at once and the graphic presentation of the dataset section takes place with *Finish* without the creation of a new dataset.

Whatever the method, a new diagram object is created in the end, which – as it is the second diagram in our case – automatically bears the name *2D Diagram2* (Fig. 3.15). We delete *y_DataSection* and *2D Diagram2* after this small excursion and return to the analysis of our peak. For this we switch to the diagram window and restore the original image section via button.

3.4.2 Half Automatic Detection

Of course every user will endeavor to automate the detection of peak values or similar manipulations of data series as far as possible. What first comes to mind is the requirement for intensive programming algorithms, for which FlexPro provides tools as well. In the semi automatic area, half way through so to speak, are the functions of the buttons *Cursor on Previous Peak Value* and *Cursor on Next Peak Value* in the *Cursor* toolbar.

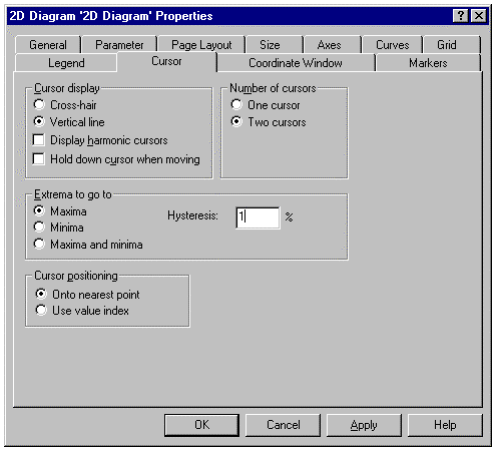


Figure 3.16: Changed settings in the Cursor tab

Before starting this method we have to set one element. For this we open the *Cursor* tab in the *Properties* dialog of the *2D-Diagram* once again. In the area *Extrema to go*

to we select *Maxima* this time since these are of interest in our present example. With this setting we tell FlexPro to search only for local maxima. We define the *Hysteresis* via the respective text box to be *1%* (Fig. 3.16). With this we specify which extrema are detected. The rule here is that the hysteresis has to be made smaller, if the cursor jumps extreme values, here maxima, during the semi automatic identification process, that should have actually been detected. Our signal now seems to be overlaid by some unspecific disturbances. If during the first test run now every tiny hump is detected, the hysteresis has to be enlarged accordingly.

To accept the changed settings, click *OK*. Working with one cursor is enough for the detection of local maxima. So we place the leading cursor at the beginning of the dataset and let it jump from maximum to maximum using the two buttons *Cursor on Previous Peak Value* and *Cursor on Next Peak Value*, during which the relevant data can be read in the coordinate window. Concerning the largest peak with the two maxima to be examined, we get the confirmation that a maximum each can be found at the index or row numbers *2937* and *2949*. This result coincides with the results gained with the more laborious methods discussed earlier. In contrast FlexPro comes up with the same result after a view steps using the semi automatic method – quite an inspiring result.

3.5 Smooth Peaks

Looking at the two quite unsymmetrical and in comparison to the whole peak very small maxima in close proximity doesn't make them look like a real measurement result. These maxima could rather be due to methodical disturbances. We accept this assumption without further examination and would like to get rid of the potential disturbances quickly and easily in the next step by smoothing the curve. Since we do not want to use complex mathematical algorithms which FlexPro provides in form of special analysis objects as well, the method of the floating mean value is a possibility. For each y-value in the dataset its mean is arithmetically found with a certain number of neighboring y-values at both sides, with FlexPro treating all datasets equally, which means data series, data field, signal or signal series. Since values are missing for the calculation of the mean at the start and the end of each dataset, values corresponding to the first or last y-value in the dataset are temporally introduced during the smoothing process. So in the end the smoothed curve contains the same number of data points as the original curve and can be calculated using a relatively simple formula.

Note: The Online help offers as a reference a complete list and detailed explanations about the numerous analysis objects and functions contained in FlexPro 5.0. To carry out the smoothing described in the following the analysis object *Insert signal smoothing* in the *Window Function* toolbar can be used alternatively.

To prepare for the smoothing, switch from the diagram window to the FlexPro Explorer. Orientation is again easier when displaying the diagram window partially enlarged using the respective Windows button, so that both windows become visible overlapping or next to each other. By switching to the FlexPro Explorer, all unnecessary toolbars are properly hidden. In exchange, the buttons in the *FlexPro Objects* toolbar are now available, and we click on the button *Insert Formula* here. Alternatively the menu command INSERT- *Formula* or the command NEW – *Formula* in the context menu of the FlexPro Explorer are on offer (Fig. 3.17).

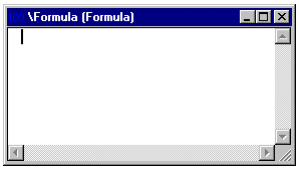


Figure 3.17: The Formula Editor is expecting an entry

The window of the *Formula Editor* named *f(x)\Formula (Formula)* opens which can be placed freely. And a formula object with its own icon named *Formula* appears in the FlexPro Explorer's list view. The menu FORMULA, appears in the menu bar and the toolbar *Formula* becomes visible on the desktop. We select the button *Insert Function*, which can alternatively be found in the context menu of the *Formula Editor* with NEW – *Function...* . The wizard *Function Wizard – Step 1 of 2* shows up in both cases on the worktop.

In the *Category:* list box mark the topic *Filtering and Smoothing*, whereupon all available mathematical rules are displayed in the *Function:* list. They are in our case *IIRBandFilter*, *IIRFilter* and *Smooth*. Of course we select *Smooth* for the smoothing and a message appears below the two entry boxes, which gives information about the parameters needed in the function and which action it performs (Fig. 3.18).

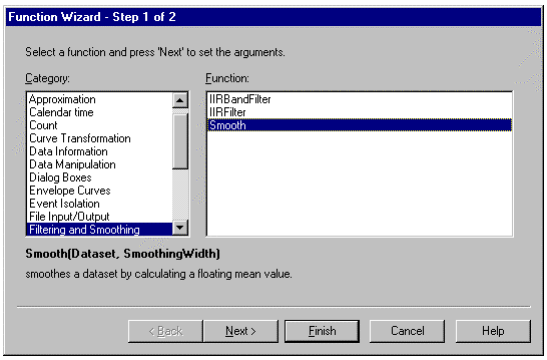


Figure 3.18: Settings in the Function Wizard – Step 1 of 2

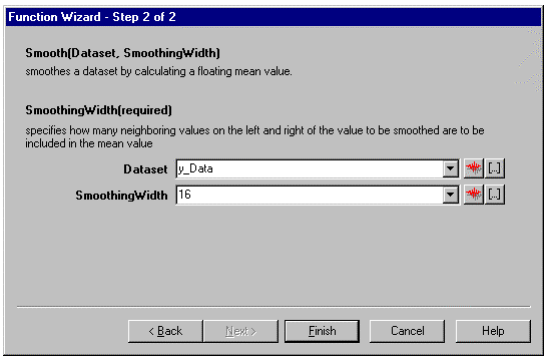


Figure 3.19: Settings in the Function Wizard – Step 2 of 2

After clicking *Next >* we get to *Function Wizard – Step 2 of 2*. We have to specify the arguments of the function here (Fig. 3.19). For *Dataset* we select *y_Data*, which we simply accept by clicking on it after opening the drop-down list. After placing the cursor in the text box *SmoothingWidth*, we enter *16* here, close the dialog with *Finish*, and the result can be viewed in the *Formula Editor* as a command line for the calculation of new data (Fig. 3.20). The smooth settings are done now and the *Formula Editor* can be closed using the Windows button. In the next step we want to have a look at the smoothed variety of *y_Data* in the diagram window.

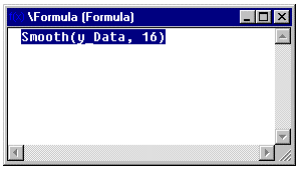


Figure 3.20: The Formula Editor with the selected command line

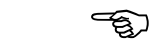
Before creating the respective, we have to adjust a few things. Right-click on the new formula object in the FlexPro Explorer's list view and select the command *Rename* in the context menu which opens. We replace *Formula* with *y_Smooth16* and finish the entry with <ENTER> or by clicking with the mouse pointer at any position in the FlexPro Explorer.

Note: An object name selected in the FlexPro Explorer's list view can be edited – as it is common in the Windows-Explorer – after clicking <F2>.

The next step leads us to the *Properties* dialog box once again. Right-clicking on the new formula object *y_Smooth16* and an appropriate click in the well known context menu opens the *Properties* dialog of the formula object *Formula 'y_Smooth16'*. In the *General* tab we can specify all the correct units and comments, so that everything matches the original curve *y_Data*. We type *Measured at xyz nanometer (smooth)* for *Comments:* and again *µmol* as a *Unit:* in the *Dataset Information*.

We tell FlexPro in the *Component & Assignments* tab via the suitable selection in the *Component:* drop-down list, that *y_Smooth16* is a y-data series as well, to which the x-values from *Time values* belong. We make this clear via *Dataset for X-component*: drop-down list. The rest is of no interest at this time and we close the dialog with *OK*.

Note: In a number of dialog boxes the *Apply* button is available as well as the *OK* button. It applies all the settings changed before, without closing the dialog box. So if it becomes apparent when clicking *Apply* that the settings will not get the desired result, you can select something else avoiding any annoying steps in between.



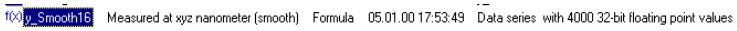


Figure 3.21: Changed comment concerning the Formula object

We can guess from the extended details about the formula object given in the list view of the FlexPro Explorer that the settings were applied correctly (Fig. 3.21). Now we need to insert the smoothed curve into the existing diagram.

At first we want to visually compare to what extent the smoothing procedure has affected the curve and especially the large peak with its two maxima. As a preparation check again – as mentioned above – that the diagram window and the window of the FlexPro Explorer are arranged so that the object *y_Smooth16* can be dragged easily to the existing diagram *y_Data* using the Drag & Drop-method described earlier. It will display there as a second curve after releasing the mouse.

Note: It is helpful here to switch off the coordinate window using the associated button in the *Cursor* toolbar, it might be annoying because there is a lower screen resolution active.

According to the default setting, the smoothed curve is displayed in a different color. Maximize the diagram window to view all the details (Fig. 3.22).

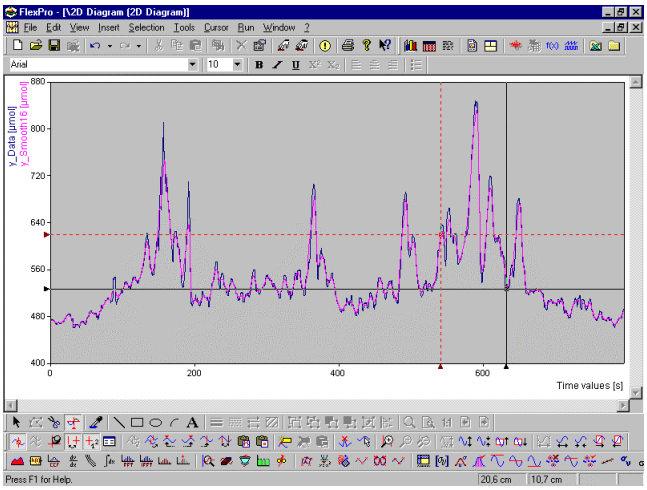


Figure 3.22: Original curve with smoothing result overlaid

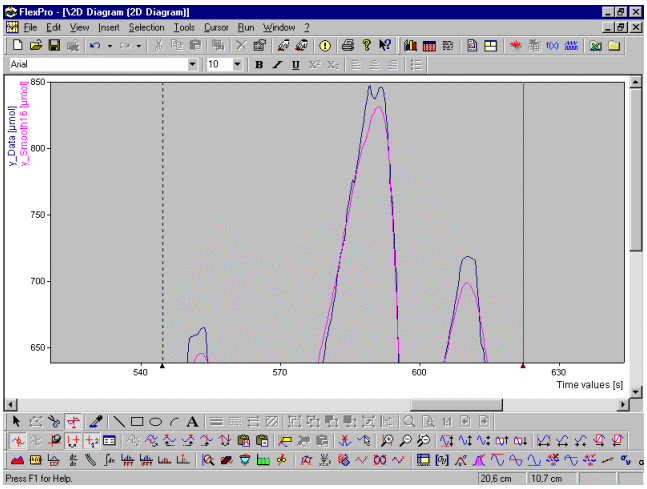


Figure 3.23: The smoothed peak, stretched in x- and y-direction shows only one maximum

As the curve *y_Data* is not overlaid completely by the new curve, it seems that the curve calculated via the function does not completely correspond to the original curve, which was expected. To examine this we activate the cursors – if necessary – and this time use the buttons *Stretch Curve Horizontally* and *Stretch Curve Vertically* in the *Cursor* toolbar. Each click on either button stretches the curve by 10 % and the ratio between the complete curve and the displayed section is visible at the scroll bars. After using these buttons several times and adjusting the image section accordingly with the scroll bars, it becomes clear that the smoothed curve shows only one maximum at the point examined before (Fig. 3.23). We finally switch to the FlexPro Explorer.

Although these two curves display absolutely equally in this plot, they are completely different concerning their data basis. Our original dataset *y_Data* provides the one

curve, whereas the smoothed curve is based on a calculation which creates the values only temporally for display. We have not yet got a dataset in the classical sense for *y_Smooth16*. To create it, is our next aim. For this we switch to the FlexPro Explorer using the WINDOW menu.

3.6 Formulas to Numbers

f(x)y_Smooth16 is in contrast to the dataset *y_Data* a formula object which creates the curve in the diagram window via an actual calculation. Such formulas as well as OLE (Object Linking & Embedding)-datasets, analysis- or other import-objects (see chap. 2) can be easily turned into substantial datasets. To try this in our example, highlight *y_Smooth16* with the right mouse button and select the *Evaluate* command in the context menu which opens. The object is no longer of the *Type Formula* after the click but a *Dataset* – detectable in the FlexPro Explorer's list view due to the respective dataset icon instead of the prefix *f(x)* (Fig. 3.24, refer to Fig. 3.21).

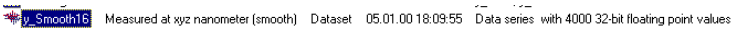
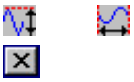


Figure 3.24: Detectable due to changed prefix and type: Evaluated formula

We switch back to the diagram window, display both curves completely using the buttons *Show Curve At Full Height* and *Show Curve In Full Width* and find no differences in comparison to the previous display of the formula object.



We can now appreciate the interim result. For the next step close the diagram window and save the database *Analysis1.FPD* with FILE – *Save Database As* for further or later usage. With this we learned about FlexPro's basic analysis tools and presentation capabilities. Further analytical examinations can follow now, or we can prepare the existing result for documentation. Before we can carry on with this, we turn our attention towards another topic in FlexPro the so called Worksheet, which offers some additional analytical methods due its specific properties. Other than that is it quite similar to the diagram window. If you are impatient and would like to continue with presentation of the documentation please move on to the next chapter.

3.7 A Busy Bee

In a worksheet objects like diagrams, tables or text can be transferred to specified panes adjusted to the screen size beforehand and then be edited using the cursors or be examined for specific identification numbers and parameters. If there are several of these panes in one worksheet, they can be maximized separately, which of course simplifies working on screen.

Note: If a document is used instead of a worksheet, with some small exceptions nothing changes. Thus the following descriptions can be used for working with documents to a great extent as well.

The worksheet window is created with the help of a wizard, just like the diagram window. We highlight the dataset *y_Data* in the list view of the FlexPro Explorer with the right mouse button and select NEW – *Worksheet...* in the context menu which opens.

Alternatively highlighting the dataset with the left mouse button followed by the command INSERT – *Worksheet...* or clicking on the respective button in the *FlexPro Objects* toolbar have the same result. The so called wizard named *Worksheet Wizard – Step 1 of 2* opens in all cases and asks for information on the desired setup of the sheet to be created. The wizard shows eight numbered buttons which symbolize possible arrangements of the different worksheet areas to make your choice easier

(Fig. 3.25). Objects like diagrams, tables or text can be displayed in every single one of these panes.

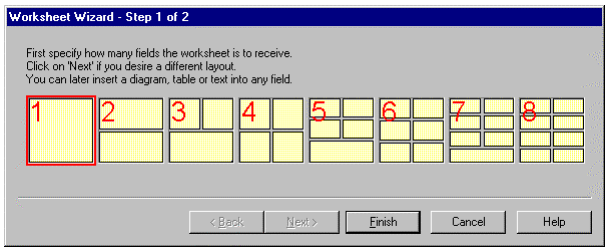


Figure 3.25: Worksheet Wizard – Step 1 of 2

As it will be mostly a case of editing plotted data, a single pane in the first step is sufficient. We accept the default single pane number *1*. In this case the button *Next >* stays deactivated, and we can finish our interaction with the wizard now with the *Finish* button.

Note: If more than one pane is selected in the *Worksheet Wizard – Step 1 of 2* the button *Next >* becomes available. It leads to the *Worksheet Wizard – Step 2 of 2*, where the details about the pane setup can be specified.

A new window named *FlexPro – [\Worksheet (Worksheet)]* displays on screen in which the already known curve *y_Data* is shown.

Note: The created worksheet is empty if no dataset such as *y_Data* was selected beforehand. To insert the dataset *y_Data* from the FlexPro Explorer in such a case drag it via Drag & Drop to the worksheet window. This is activated automatically shortly afterwards and we release the mouse button. A combination of the mouse- and the <CTRL>-key is not necessary for this action since a link is automatically created for plotting the dataset in the worksheet. Using <CTRL> leads to the same result though!

With WINDOW – *Cascade* we make sure, that the FlexPro Explorer and the worksheet can be viewed at the same time and find the *Worksheet* as a new object in the list view of the FlexPro Explorer (Fig. 3.26).

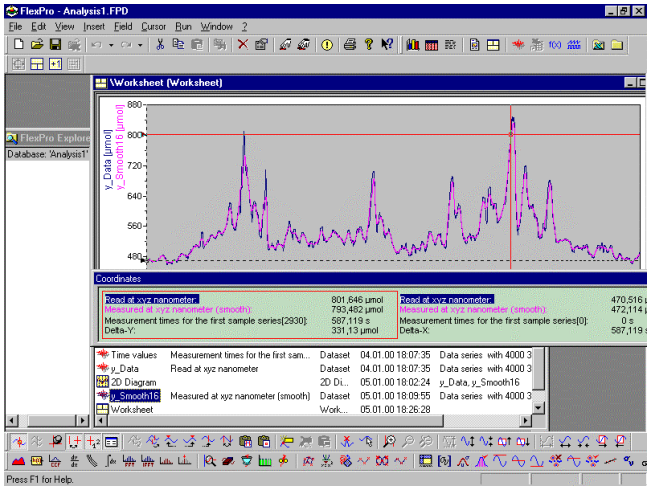


Figure 3.26: FlexPro Explorer with the worksheet filled in and activated buttons

As it is not possible to highlight several datasets with the left mouse button in connection with <CTRL>, to transfer them together into the worksheet, we have to do

this manually, so that the dataset *y_Smooth16* appears in the worksheet as well, e.g. using the Drag & Drop-method just described.

Note: If several objects should be transferred to the worksheet together, it is advisable to highlight them in the list view of the FlexPro Explorer using the <CTRL>-key and activate the *Worksheet Wizard* afterwards. The necessary number of panes is then offered automatically in the first step of the wizard. After selecting the desired panes arrangement, all highlighted objects appear in their individual panes in the finished worksheet.

Note: In the background FlexPro analysis the data during this procedure and recognizes due to the structure that a 2D-Diagram would be an appropriate presentation. In the next step a 2D-Diagram is imbedded into the empty pane of the worksheet, and the desired curve is added to this diagram. The name of the selected dataset is given as a link on the *Data* tab of this curve afterwards.

Switching to the worksheet window changes the content of the menu bar, where the menus FIELD and CURSOR took over the position SELECTION (Fig. 3.27). The *Worksheet*, *Cursor* and *Window Function* toolbars are displayed and the coordinate window as well as the cursors are available. Some buttons of the newly displayed toolbars are still deactivated.

Figure 3.27: The menu bar when the worksheet is the active window

Note: The title of the worksheet or the worksheet window *\Worksheet (Worksheet)* can be changed using the context menu available via the FlexPro Explorer. Alternatively it is possible – just like the Windows Explorer – to edit an object name highlighted in the FlexPro Explorer after clicking <F2>.

We maximize the worksheet and switch off the coordinate window for a detailed view (Fig. 3.28). For the visualization FlexPro picked a 2D-Diagram here and plotted the two curves *y_Data* and *y_Smooth16* into the single pane of the worksheet. Looking at the diagram, we find that the designation of the y-values and the x-values of the dataset *Time values* is correct. The *Name* of our x-dataset and its *Unit*, which were typed into the properties dialog box of the dataset *Time values* during the import (see chap. 2) appear as the label of the x-axis. The y-axis is labeled with the names and the associated units of the two y-datasets. A separate y-axis label is automatically displayed for each dataset in a color matching the color of the curve to avoid confusion as far as possible.

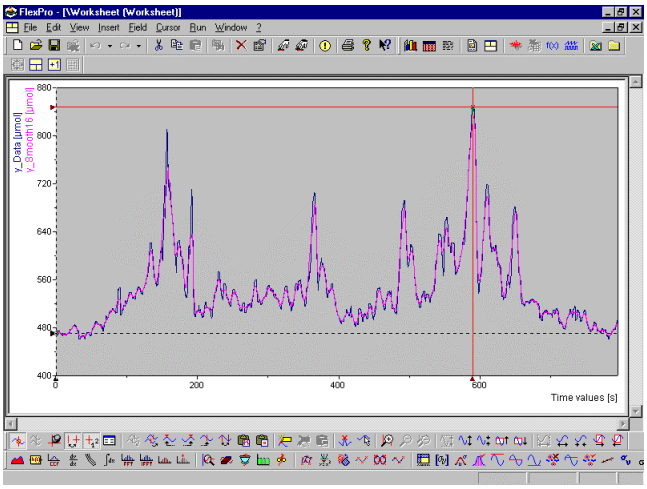


Figure 3.28: Worksheet at full size

We will now arrange the worksheet for more clarity during the remainder of this chapter. For this right-click in its free area, to activate the command *Window Layout...* in the context menu (Fig. 3.29). Alternatively this can be arranged using the menu command FIELD – *Window Layout* or with the respective button in the *Worksheet* toolbar.

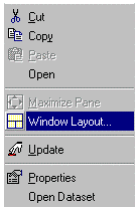


Figure 3.29: Context menu with the command Window Layout

The already known *Worksheet Wizard – Step 1 of 2* opens, we click on the pane arrangement *2* this time and the button *Next >* afterwards. We get to the *Worksheet Wizard – Step 2 of 2*, which obviously offers further possibilities for the pane arrangement (Fig. 3.30).

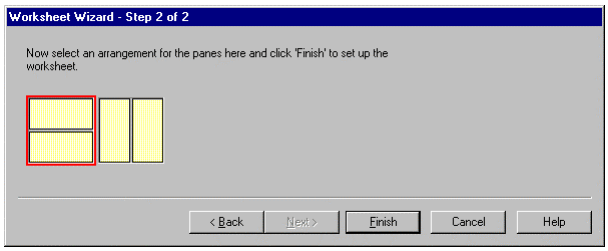


Figure 3.30: Worksheet Wizard – Step 2 of 2

The limited possibilities of arranging the two panes is obvious. We accept the default setting with *Finish* and see the result directly in the worksheet (Fig. 3.31).

Note: It is important to understand that all components in a worksheet – as well as in documents – are called visualization objects. They serve the purpose of visual display of data and calculations in worksheets and documents. FlexPro offers 2D-Diagrams, 3D-Diagrams, column tables, cell tables and text.

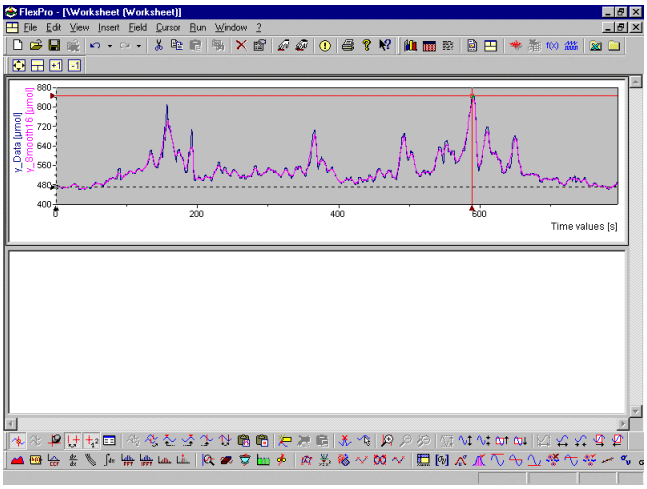


Figure 3.31: Changed worksheet with two panes arranged on top of each other

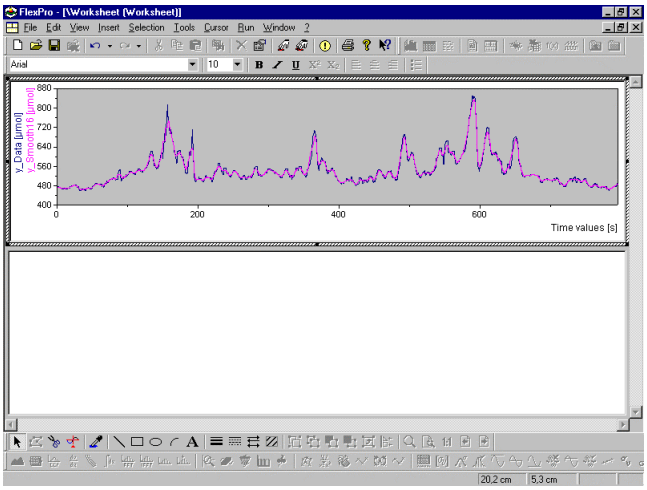
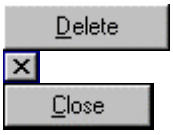


Figure 3.32: Workspace when the visualization object is active

Finally we want to delete the overlaid smoothed curve *y_Smooth16* from the upper pane or the visualization object, to make both curves completely visible at the same time. To edit a single worksheet pane, double-click on it. This provides it with a hatched boundary. The *Worksheet*, *Cursor* and *FlexPro Objects* toolbars are hidden or mainly deactivated at the same time. We also find newcomers in the menu bar, the menus SELECTION and TOOLS (Fig. 3.32).

The object, i. e. the upper pane of the worksheet, will be edited quickly, by activating the command *Properties* in the respective context menu with a right-click. The dialog box which opens bears the title *2D-Diagram '2D-Diagram' Properties* and consists of eleven tabs in total. We will not examine all of them here.



We only activate the tab *Curves* (Fig. 3.33), then check whether the entry *2.Curve: \y_Smooth16,Time values* is highlighted, and make sure that this is deleted from the presentation using the *Delete* button. We close the dialog box with the associated Windows button or with the *Close* button.

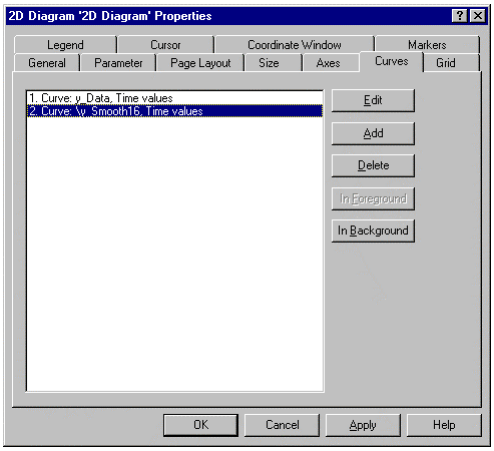


Figure 3.33: The Curves tab

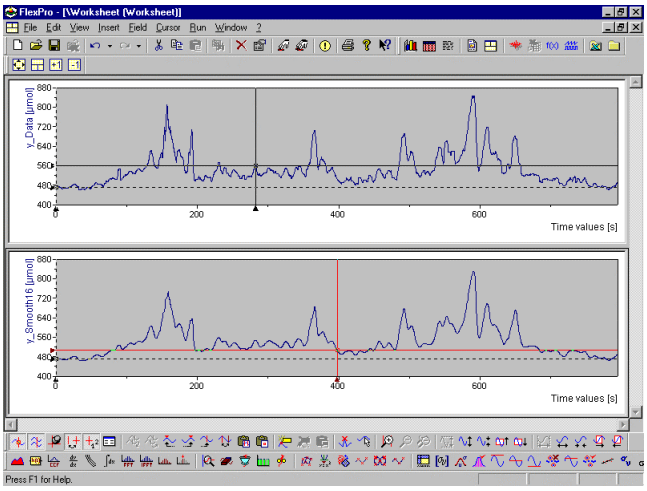


Figure 3.34 Both curves in worksheet panes arranged on top of each other

Note: Alternatively the curve to be erased can be – after activating the respective worksheet pane via double-click – highlighted with a mouse click and then be deleted using the associated button or the <DEL>-key.

We delete the object marker of the upper worksheet pane with the <ESC>-key, make sure that the FlexPro Explorer and the worksheet are visible on screen and drag the smoothed dataset *y_Smooth16* with the already proven method into the lower worksheet pane that we maximize afterwards again (Fig. 3.34).

Note: When the worksheet is activated, the worksheet panes can be maximized separately by selecting the command *Maximize Pane* in the FIELD menu or in the context menu of the worksheet or by clicking on the button *Zoom In* in the *Worksheet* toolbar, with which the action can be undone if necessary.

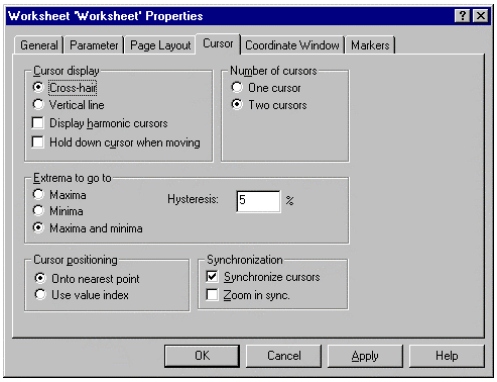


Figure 3.35: Settings in the Cursor tab of the Worksheet Properties dialog

Finally we want to point out, using the worksheet as an example, that here – as well as in a document - the cursor functions can be synchronized. For a test we open the worksheet's context menu via a right-click and select the universal command *Properties* again. The *Cursor* tab is selected in the opened properties dialog box of the object *Worksheet* (see Fig. 3.35). Activating the option *Synchronize cursors* in the *Synchronization* group, means that cursors in several diagrams can be moved synchronously, which can then be individually tested after closing the dialog with the *OK* button.

This function is of interest if for example a curve with different spreading ranges is displayed in the worksheet panes, as the exact positioning of the cursors can be set or controlled this way (Fig. 3.36).

Note: The requirement for the synchronization of the cursors is of course that there is more than one diagram in the worksheet. If you created for example a worksheet with three panes and a diagram is then opened in each, moving the cursors in one diagram would then result in a synchronized movement in the other diagrams – if the function is activated. A combined positioning of the cursors is not available if two different worksheets and thus windows are open.

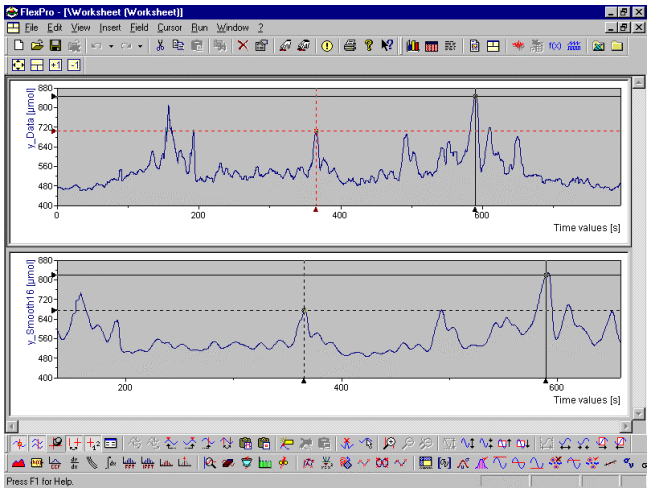


Figure 3.36: Synchronized positioning of the cursors, despite a different spreading

We have now learned about the worksheet in overview and have been informed about its basic functionality in FlexPro. In the following chapter we will add some “improving“ and “display” elements for the presentation of the diagram, such as marker, legend,

table, text labels, and more. Finally the complemented work will be sent as an entity to the printer.

If you need a break now, save the latest stage of the FlexPro project in the already defined project directory.

4 Steps to Presentation Quality

Now that we have learned about the basic functions of diagram windows and worksheet windows, we will work with the diagram that we created before, to carry out some changes and improvements. Since our smoothed curve in the diagram window *\2D-Diagram (2D-Diagram)* is to our satisfaction in comparison to the original, it is now sensible to give the available material in its interim form a visually refined layout which will stand up to more critical inspection. As mentioned before worksheets primarily serve for data editing, whereas a document is more suitable for the preparation of layout and printing of diagrams. This is what we will do in the next step. Thus we have to create a new object, a document, in which to place the edited data with additional information later on. This result can then be used as an overhead transparent in a presentation.

4.1 An Initial Test

If necessary open again the last edited database *Database: 'Analysis1'* which may have been closed. The FlexPro Explorer lists momentarily five objects.

We add a new object named *Document* to the list view of the FlexPro Explorer with INSERT– *Document* in the menu bar, NEW - *Document* in the context menu of the FlexPro Explorer or with the button *Insert Document* in the *FlexPro Objects* toolbar. During this a new window, bearing the default title *FlexPro – [\Document (Document)]* is activated automatically to accept the document. We switch to the FlexPro Explorer, highlight the document object, and change its name to *Presentation1* using the command *Rename* in its context menu. If we switch back to the document window, its title has changed properly to *FlexPro – [\Presentation1 (Document)]* (Fig. 4.1).

Note: The activation of the document window causes a new re- organization of the menu bar, which contains now 11 menus in total, including PAGE, SELECTION, TOOLS and CURSOR. Additionally the *Tools* and *Font* toolbars are activated, and the palette *Colors* appears.

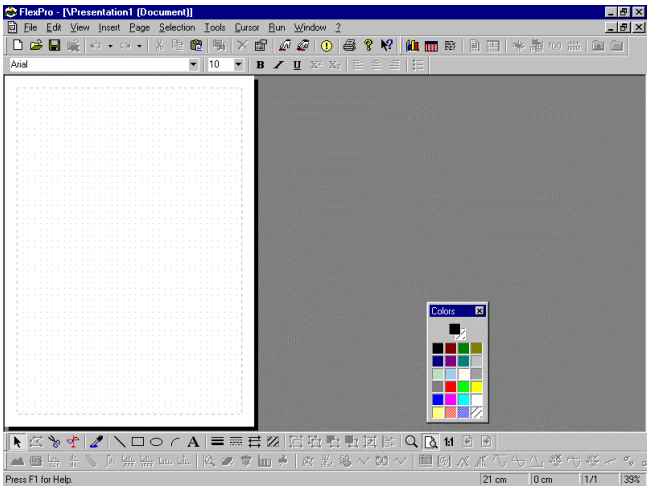


Figure 4.1: The empty newly named document

Note: You might want to play with the idea of dragging the worksheet from the FlexPro Explorer to the document window via the mouse- and <CTRL>-key using the Drag & Drop-method, hoping to transfer the worksheet's layout directly to the new document. However whilst displaying the FlexPro Explorer and the document in a

cascading manner for this purpose, the mouse pointer changes its shape at the height of the document to signal a prohibited action. Therefore this action is not allowed.

But FlexPro offers – as usual – several other possibilities to fill the document. As our main interest is at the moment to present the edited curve or the dataset *y_Smooth16*, we will try now to copy *y_Smooth16* to the document, using the Drag & Drop-method successfully used in the diagrams and worksheets. This workes out without any restrictions. Obviously we get the same presentation, we had in the diagram window or in the pane of the worksheet. Now the window has the boundary markers with the associated handlebars typical for Windows to allow resizing. The cursor changes into the Windows typical four-fold cursor in the shape of an double arrow cross, if we move the mouse pointer to the area of the document window enclosed by this frame. With the left mouse button depressed, we move the diagram object into the page's left upper corner.

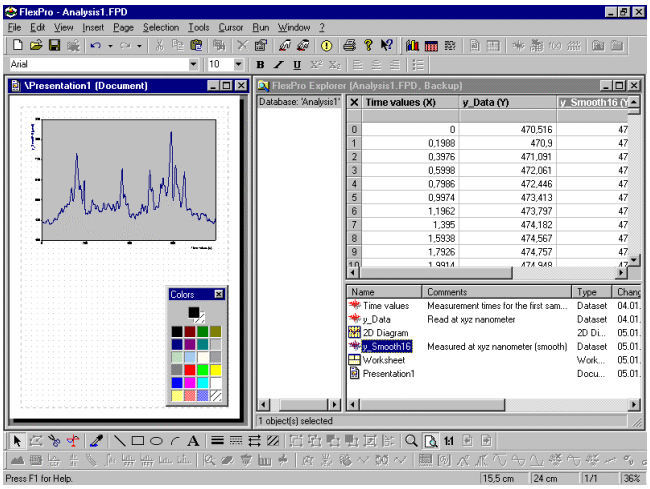


Figure 4.2: The slightly enlarged smoothed curve in the document window

Using the handlebars at the lower right corner we enlarge the diagram until its width fills the printable area of the page. At the same time we make sure, that a proportional enlargement in x- and y-direction takes place, for which the <CTRL>-key or point grid of the document window can be used, what ever the personal preferences (Fig. 4.2).

We double click on the diagram area in the document window. This action turns the cursor back into a normal arrow and marks the diagram with the additional hatched frame which we already know from the worksheet as active. Under this condition single elements of the diagram can be selected by clicking on them once. A double-click on a graphic element would then open dialog boxes associated with these elements, which could then be selected and edited using the tabs. The graphical element which has been just selected is hard to identify due to the small size of the document window which has been set by default. If you want to continue precision work in this surrounding, you will have to enlarge or maximize the document window. We give this a miss here as we want to return to the commands of the diagram window in the following paragraphs. We will find, that the tools to edit curves and axis do not differ in diagram and document windows.

Note: Another possibility to edit the layout properties of this presentation, is using the command *Properties* in the context menu.

Note: In principle this method of arranging a diagram for printing is in accordance with the methods used within other Windows applications, and if you need further information please turn to the online help.

At this stage we want to deal with the diagram and its wizard in more detail. For this we delete the graphical arrangement - which is still activated and was inserted for test purposes only - from the document window. The associated menu commands and buttons are unavailable as long as the hatched frame and thus the activation are present. Clicking outside the diagram area in the document or – as done with the worksheet – pressing <ESC>, makes this activation boundary disappear.

Having clicked the mouse or pressed the button, we activate the simple marking frame with the handlebars again, which automatically replaces the activation boundary when clicking on <ESC>, by clicking into the diagram once. A right mouse click opens the context menu, and we delete the diagram using the command *Cut*. Alternatively the commands *Cut* or *Delete* in the EDIT menu, the respective buttons in the *Standard* toolbar as well as <DEL> can be used.

4.2 Diagram Overview

We leave the empty document window and now return to the FlexPro Explorer. Here we delete or cut the object *2D-Diagram*, the same way, highlighting it and pressing the <DEL>-key. Afterwards we will create a new diagram getting to know the graphic functions better. This time we do not highlight any of the present and displayable datasets at the start of the *Diagram Wizard*.

Note: Many of the settings chosen in cooperation with the *Diagram Wizard* are only to be taken as preliminary. These can be specified in more detail later using the properties dialog boxes and their numerous commands. We will deal with some of them more closely now.

Note: If you need a short tip concerning the commands or the entry possibilities in the dialog boxes, help is at hand – as everywhere – with a mouse click onto the element to be explained using the context sensitive help. This saves us activating the help function via the question mark in the title bar (see appendix II).

The first dialog box named *Diagram Wizard – Step 1 of 4 – Diagram Type* appears on screen as usual. The *Diagram* and *Subtype:* groups are self explaining. Our data structure can be described as fairly standard so that this time we go for a line diagram with data point symbols by selecting *Line* and the fourth subtype of the first column *Lines with Symbols*. That means, every value has a designated symbol. As soon as the subtype is selected in the respective list of symbols, a short explanation appears in the text field below. There is no need to activate the check box *As XY-Display*, since our two y-datasets *y_Data* and *y_Smooth16* have already been linked to the x-values of the data series *Time values* during the import or by manual preparation afterwards (see chap. 2 and chap. 3).

We do not want to change this designation, and the check box *Preview without data* stays inactive. Thus we are able to view the effects of our settings in the preview window during the following steps of the *Diagram Wizard*. At the moment, a noticeable message in red is visible in the preview window, which informs us, that so far no dataset has been specified for the diagram (Fig. 4.3). The reason for this is that no dataset was highlighted when we opened the wizard.

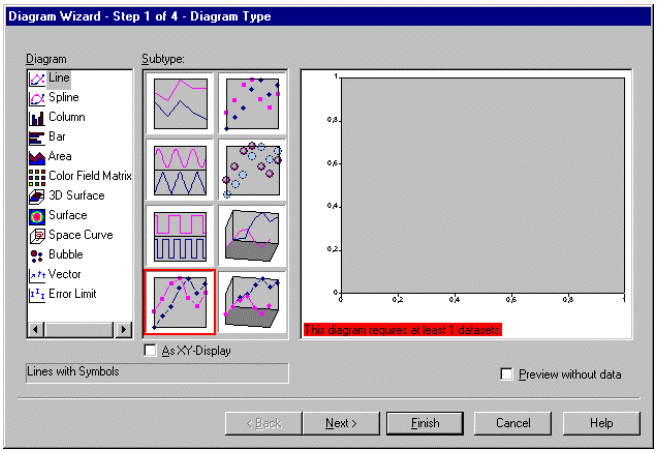


Figure 4.3: Settings in the Diagram Wizard – Step 1 of 4 – Diagram Type

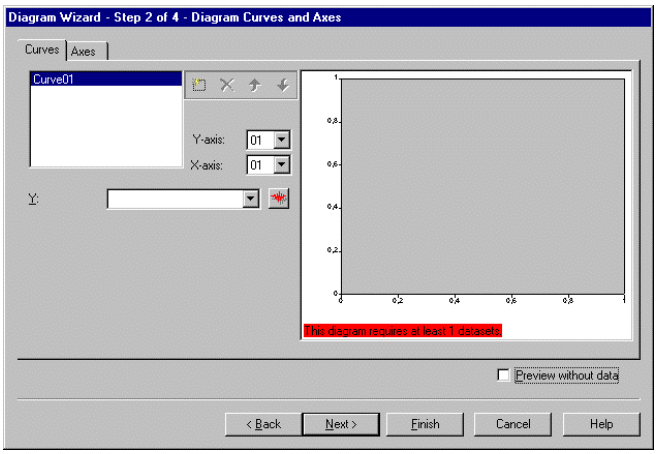


Figure 4.4: The Curves tab in the Diagram Wizard – Step 2 of 4 – Diagram Curves and Axes

Note: If on the other hand a dataset is highlighted in the FlexPro Explorer's list view, or a dataset is highlighted with the right mouse button while opening the context menu and opening the *Diagram Wizard* immediately afterwards, then the graphical presentation of the highlighted dataset appears at once in the preview area of the *Diagram Wizard – Step 1 of 4 – Diagram Type* (see chap. 1).

Clicking on *Next* > we go to the *Diagram Wizard – Step 2 of 4 – Diagram Curves and Axes* dialog box. Here the two tabs *Curves* and *Axes* offer their services (Fig. 4.4). A list box including *Curve 01* can be found on the *Curves* tab. Which curve we are dealing with can be seen from the entry field *Y:* below. If – as in our recent example – no dataset was highlighted when opening the *Diagram Wizard*, this line is empty.

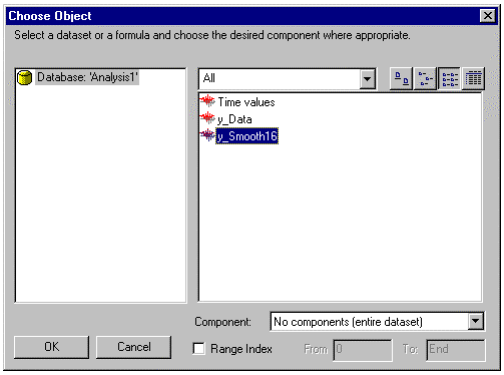


Figure 4.5: The Choose Object dialog box

To fill it, we have the possibility to open the associated drop-down list using the triangular button and select the desired dataset *y_Smooth16*. But we want to use an alternative method and therefore click on the *Insert Dataset* button positioned next to the list. It opens the *Choose Object* dialog box, the contents of which is mostly similar to the display of the FlexPro Explorer. In our example we want to try some of the extended commands of this dialog box. Thus in the list box we select *y_Smootht16* out of the three datasets present. This action now brings further options at the lower edge of the dialog box display. With *Component:* you can specify whether the whole dataset or one of its components should be used. We keep *No components (entire dataset) (Fig. 4.5).*

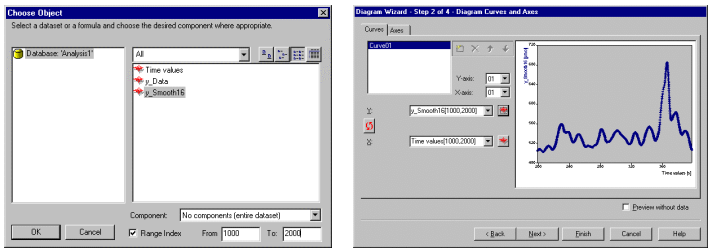


Figure 4.6: Curve section defined by the Range Index

Note: If we activate the check box *Range Index* and enter for example *From 1000 To: 2000*, the dataset name would be expanded automatically by *[1000,2000]* for internal usage and only this range of values specified by the index would appear in the diagram (Fig. 4.6). If you have done this, you should cancel the *Diagram Wizard* afterwards, start it again right away and do the first steps again.

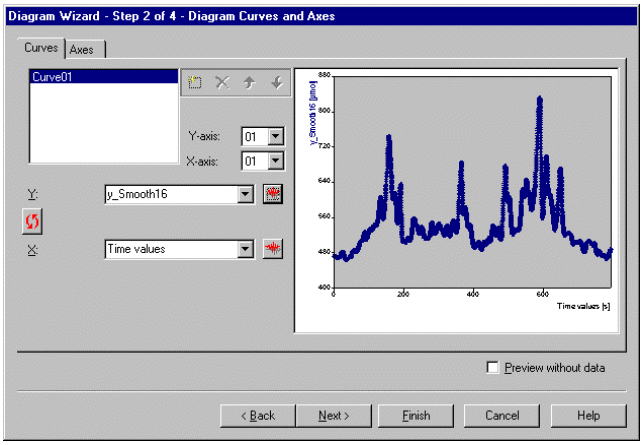


Figure 4.7: New preview in the Diagram Wizard – Step 2 of 4 – Diagram Curves and Axes

We click on *OK*, without any restrictions via the index, which makes *y_Smooth16* appear in the preview window of the wizard. It can be gathered from the x-axis scaling that the dataset was plotted correctly versus the *Time values*. The two drop-down lists *Y-axis:* and *X-axis:* indicate by their entry *01*, that there is only one x- and y-axis in the diagram at the moment. A newly added entry field *X:* shows the x-dataset presently used, and a new button is displayed as well (Fig. 4.7).

Note: With the appearance of the new entry field *X:* the dialog box is expanded by a new button, with which the two data series can be swapped. Clicking on the button therefore leads to a reflection of the values at the diagonal of the coordinate system. Clicking on the button again brings us back to the starting position.

For explanation purposes we want to add another curve to the diagram. For this click on the left button *Add curves* in the small toolbar consisting of four buttons next to the list box. Due to this the entry *Curve02* appears. We now select from the associated drop-down list *Time values* for *Y:*. It can be seen from the graphical presentation in the preview that *Curve01* is obviously based on a different x-axis scaling than *Curve02* (Fig. 4.8).

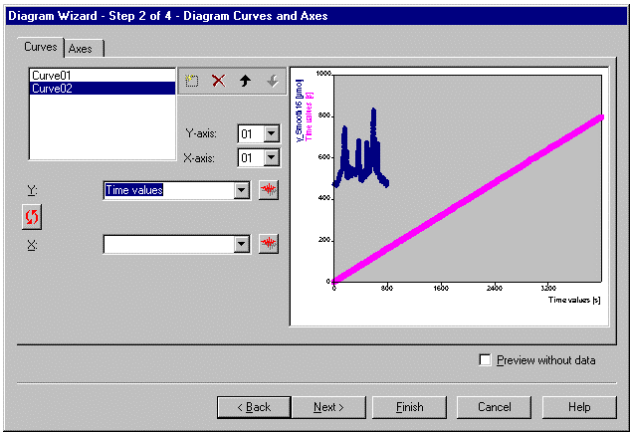


Figure 4.8: Changed scale after adding a second curve

This is due to the following: For FlexPro our x-dataset *Time values* consists of a x- and y-component. The value index is here the x-component and *Time values* presents the selected y-component. If you do not agree with the value index being automatically

used for the x-axis, use the newly added text box *X:* and type in *Time values* here as well, and this time the preview offers a better presentation (Fig. 4.9).

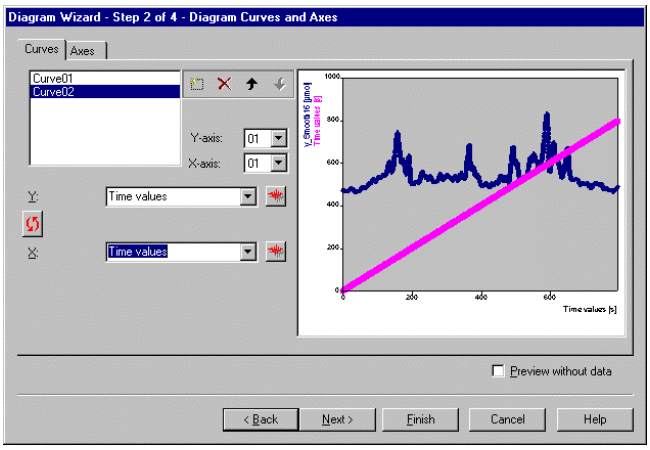


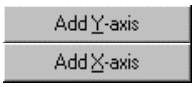
Figure 4.9: The Curves tab in the Diagram Wizard – Step 2 of 4 – Diagram Curves and Axes

Three other buttons, which we want to introduce are in the toolbar next to the list box. The curve which is supposed to serve as the upper layer and therefore overlays the other curves can be specified with the third and fourth button. As with *Curve02* the last one in the list is activated, this order can only be changed using the third button. The presentation of *Time values* versus *Curve01* is moved to the back or one layer level down after the appropriate mouse click. The user notices this due to the change in the default color assignment of the curves.

With *Curve01* the first of the list is active now, and with the fourth button – now available – the previous condition is restored. After testing this we highlight *Curve02* which is the presentation of *Time values* versus *Time values*, and return to the starting situation using the second button *Delete curves*.

With this the commands in the *Curves* tab have been explained, and we now open the *Axes* tab which helps us specify the properties of the coordinate system. We will cover this area quickly, since the commands are self-evident and understood by everybody dealing with data visualization (Fig. 4.10).

Note: Our diagram has at the moment one x- and one y-axis as can be seen on the text box entries *X-axis01* and *Y-axis01*. Further axes can be added to the diagram using the buttons *Add Y-axis* or *Add X-axis*. The check box *Arrange Y-axes under each other* should be mentioned here, as it allows stacking of several diagrams with different y-axes over one x-axis.



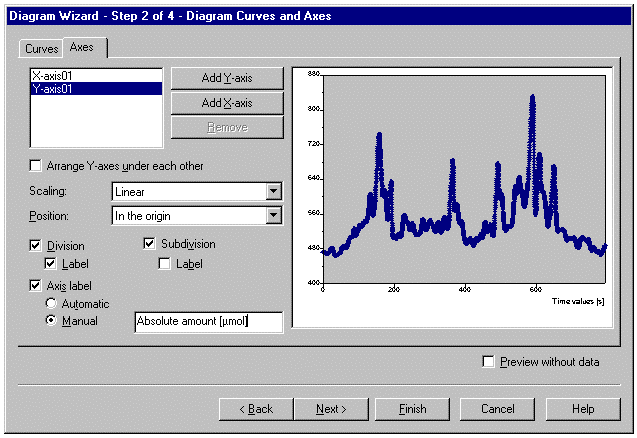


Figure 4.10: The Axis tab in the Diagram Wizard – Step 2 of 4 – Diagram Curves and Axes

At first we want to turn our attention towards the y-axis's settings. Make sure that the entry *Y-axis01* in the list box is highlighted. As *Scaling:* we keep the default *Linear* but select the *Position: In the origin*. Now some check boxes have to be set. Through clicking *Label* and *Division* we choose labeled ticks, and the selection of *Subdivision* places minor ticks. As these are not supposed to be labeled the associated check box *Label* is left blank by default. An *Axis label* should still be visible, thus the check box stays activated. As we already noticed in connection with diagram and worksheet properties the dataset's name and dimension was added *Automatic*ally, in our case *y_Smooth16 (µmol)* (see chap. 3). There is a possibility to change this with the *Manual* option and the respective entry field. Therefore we activate it and type *Absolute amount [µmol]* into the now active entry field.

Note: This option is especially interesting as we can now switch between two alternatively available types of axes titles, using the two options *Automatic* and *Manual*.

Note: The effects of the different setting possibilities for *Scaling:* and *Position:* can be checked in detail in the help.

With this all the necessary settings for the *Y-Axis01* are finished. We switch in the list box to *X-Axis01.* To keep it simple we do the same setting for the x-axis, which means *Linear*, *In the origin*, *Division* including *Label*, *Subdivision* without *Label* and *Manual*. This time we select *Time [s]*, as an axis title and switch to the third step of the wizard afterwards with the button *Next >*.

Next >

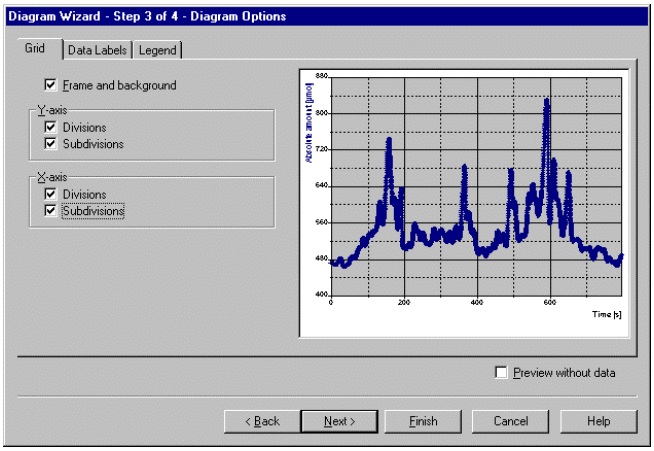


Figure 4.11: The Grid tab in the Diagram Wizard - Step 3 of 4 – Diagram Options

The *Diagram Wizard – Step 3 of 4 – Diagram Options* dialog box contains the three tabs *Grid*, *Data Labels* and *Legend*. *Grid* can be quickly dealt with, as we select with *Frame and background* if it is not the default setting, a framed diagram area. If grid lines are to be displayed for the ticks and minor ticks or for the divisions and subdivisions of both axes, the check boxes in *Y-axis* and *X-axis* have to be activated. This result can be admired in the preview again (Fig. 4.11).

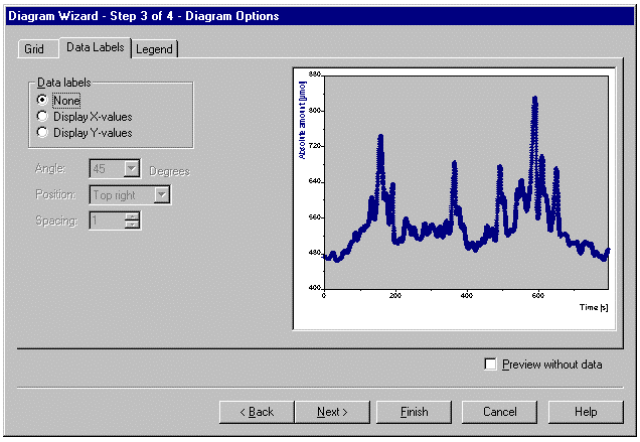


Figure 4.12: The Data Labels tab in the Diagram Wizard - Step 3 of 4 – Diagram Options

Having tested the *Grid* tab as well, the presentation will be set as “grid free“ again. Afterwards we switch to the *Data Labels* tab positioned in this dialog box as well. We keep the default setting *None* unchanged, as according to the selection the associated x- or y-value will be displayed numerically for each data point otherwise. The label arrangement can be set individually with the setting possibilities *Angle:*, *Position:* and *Spacing:* positioned below (Fig. 4.12).

Usually the third tab, which we choose now, will be more important. The properties of the in most cases essential *Legend* can be specified here. First of all we activate the check box *Use legend* and update the preview accordingly. If you like, the legend can be shown with a frame by activating *Border*. Type *Method* into the text box *Title:*, but the additional line will only become visible after - started by further dialog box manipulations – the preview is rebuilt again. To arrange the page more clearly, we position the legend with the appropriate selection in the drop-down list *Position: At the bottom edge*, below the actual diagram area (Fig. 4.13).

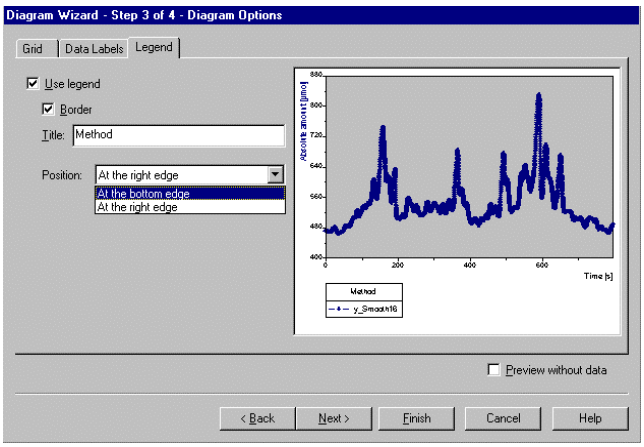


Figure 4.13: The Legend tab in the Diagram Wizard - Step 3 of 4 – Diagram Options

We switch to the last step of the wizard named *Diagram Wizard – Step 4 of 4 – Diagram Positioning* by clicking the button *Next >*. The task here is now to specify in the *Insert diagram* group how the diagram will be treated in future *As a new document* or *As a new object*. We select the option *As a new object*, as we can transfer such an individual object into a document any time. Since we do not want to use the cursors in the next step already, we also deactivate the default *Activate cursors in diagram* (Fig. 4.14).

The diagram object appears in a separate window named *\2D-Diagram (2D Diagram)* on the work area after clicking on the *Finish* button. During a short visit to the FlexPro Explorer we rename the highlighted object via context menu or the <F2>-key to *Smooth16_Diagram*, so that it is easier to identify and find it again.

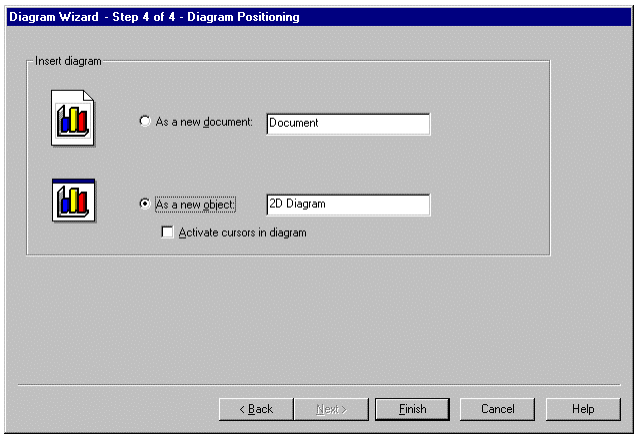


Figure 4.14: Diagram Wizard - Step 4 of 4 – Diagram Positioning

4.3 Diagram Presentation

Maximize the diagram window so we can carry out some adjustments and changes now. For this we temporally close – if they are open – the two toolbars *Position* and *Color* for a clearer work area. Concerning the number of separately marked data points, the axes labeling and the legend the layout of the curve is not really convincing yet.

4.3.1 The Diagram Area

In the following section the diagram window will be used to improve the graphical appearance. We open the context menu by right-clicking on the diagram and select *Properties*. This opens the properties dialog box of *Smooth16_Diagram* where eleven tabs in total offer their properties (Fig. 4.15). We can get to this dialog box even easier by double clicking on the free diagram area.

Further below in this chapter we will see that the commands in this dialog box are still superficial settings, as additional dialog boxes can be opened using its tabs. The additional dialogs can be opened directly by double-clicking on the individual graphic elements of the diagram.

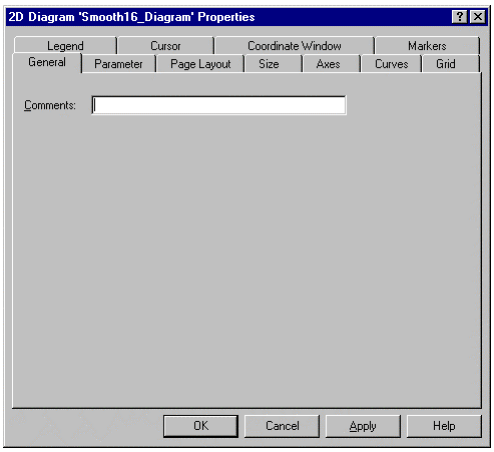


Figure 4.15: The Properties dialog box of Smooth16_Diagram

Note: As with all the other objects before, a specific properties dialog is assigned to the object *Diagram*.

It becomes especially clear with this dialog and its eleven tabs that the wizards have quite general default settings. In this case as with other FlexPro objects as well, all the individual fine tuning can be achieved by changing the object properties, which are not directly available in the wizards.

As there are so many commands hidden behind the diagram's properties they can not be dealt with in detail within the bounds of this tutorial. So we will concentrate on the ones most important for our presentation.

Note: If you need more information, consult the online help function.

The first *General* tab allows to enter *Comments:*, which for example simplifies the identification of the diagram object in the list view of the FlexPro Explorer. We enter *2D-Diagram*. As indicated by the name, individual *Parameter* can be entered for the latest object in the next tab, which can be used for example in formulas later on. We miss out testing all the possibilities here and have a glance at the *Page Layout* tab, the commands and check boxes of which concerning *Page orientation* and *Printer setup* are self evident and known from other applications. The details about the dimensions of the *Margins* and the *Size of the diagram surface* in the next tab *Size,* depend on the extension of the diagram window, but are primarily of interest in connection with creating a document and can stay unchanged for the time being. A glance at the drop-down list *Display:* of this tab is worth investigating. As a default setting we find here the entry *Complete diagram*, which we will keep. The alternatives *Split into N partial diagrams* and *N Divisions per partial diagram* appear when opening this list. They are

used if FlexPro is to distribute diagrams on several pages, in order to display for example very long curves in full detail.

Note: Such diagrams with several pages are displayed completely only in documents. Worksheets, diagrams or external applications only visualize the first part.

We miss out the *Axes* and *Curves* tabs for the moment and switch to *Grid*. In contrast to the *Diagram Wizard*, grid lines can not only be selected for the ticks and minor ticks but they can also be formatted using the commands in this tab. To arrange the diagram visually more clearly, concerning the value overview, and still keep it „classic“, we delete the default *Frame* by deactivating the check box and activate the four check boxes for *Horizontal* and *Vertical divisions* or *subdivisions* instead. In all cases we select a dashed line as a *Style*:, second position in the drop-down list, and keep the default *Width:* of *0.3 mm*.

And finally we brighten the whole thing up. Opening the four *Color:* drop-down lists displays the integrated color palette, standard also within other application programs, which increases size drastically after clicking the *Others* button (Fig. 4.16).

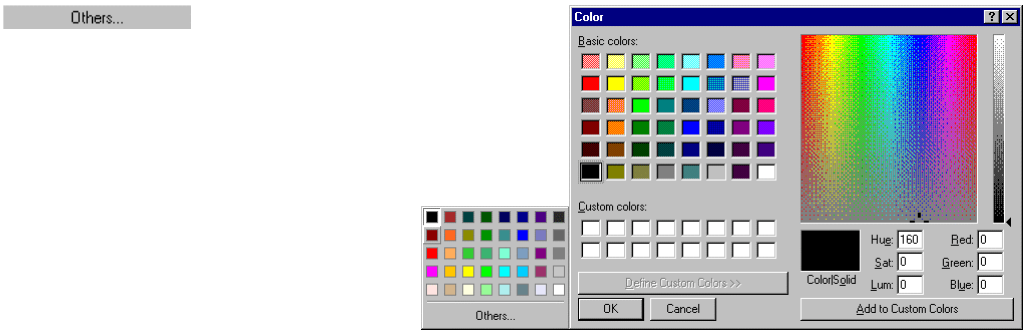


Figure 4.16: Color palette including extension

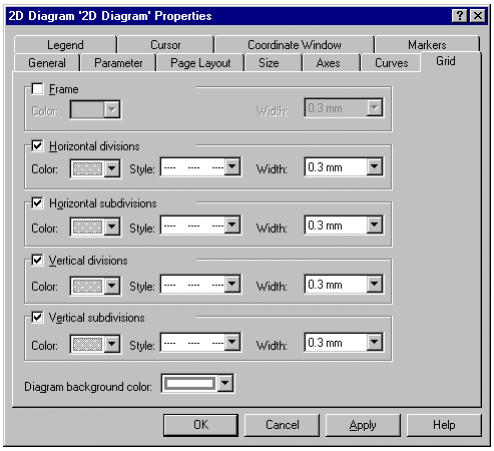


Figure 4.17: Changed settings in the Grid tab

In four successive selection steps, always finished off by clicking on the desired color in the color palette, we select for each division line *Gray-25%*, which can be found at the last position of the fourth row in the not expanded color palette. If in doubt, an automatically displayed Quick Info helps after a short idle period, which gives the full name of the color under the mouse. To make our grid lines clearly visible, set the default diagram's background color to *White* using the drop-down list *Diagram background color:*, which opens the color palette again (Fig. 4.17).

Apply

Clicking on the *Apply* button gives a first impression of the interim result. Do not close the dialog box with *OK* now, since we want to carry out further settings (Fig. 4.18).

Note: If some help lines are still visible, for example a frame is still being suggested as active, it is of no real importance here because the “real“ result will only be visible after closing the dialog box with *OK* and the refresh of the diagram window contents has occurred. If the diagram stays active during this procedure, indicated by the surrounding handle points, then this can be deactivated with a mouse click outside the diagram area.

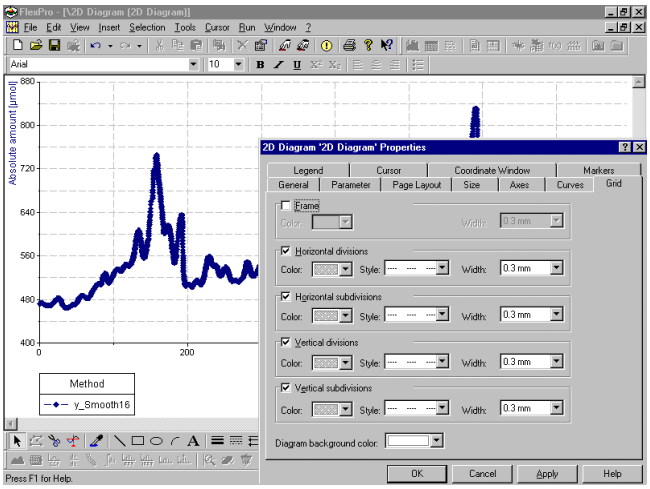


Figure 4.18: An interim result: Changes to the background and the grid

We switch to the *Legend* tab the commands of which are also relatively self evident. For test purposes we position the legend with the drop-down list *To* in the *Position* group *Top left*, which means close to the left upper corner of the diagram area. We select *0.1 cm* or *-0.1 cm* for *Horizontal spacing:* or *Vertical spacing:* and set all fonts to *Arial, 10, bold* using the *Change...* buttons and the respectively following *Font* dialog boxes.

Change...

Something else to note: If the check box *On* for the frame positioned in the *Frame* group of this tab is deactivated, the background of the legend becomes transparent as well, and all grid lines in the area of the legend become visible again. If you do not want to draw a frame around the legend, but want to avoid the grid lines showing through, the solution would be a white frame and a white legend background, which we will do now. The button *Apply* provides a preview afterwards (Fig. 4.19).

Apply

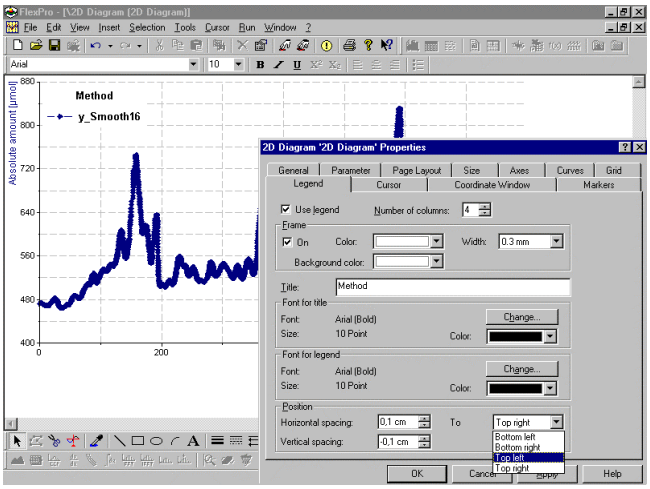


Figure 4.19: The revised legend

We give the three tabs *Cursor*, *Coordinate Window* and *Markers* a miss at the moment. But the individual preparation of the curve and the axes will still be dealt with, and we will continue with this now.

4.3.2 About Curves

After opening the two tabs one after the other with the respective title bars *Axes* and *Curves*, no setting must be changed the defaults are suitable (Fig. 4.20). As for our diagram one x- and one y-axis should really be sufficient, and apart from the curve plotted from *y_Smooth16* and *Time values* nothing should be seen in the diagram at present.

Both tabs contain the button *Edit* though. They open the way to additional special functions, which are important for the visual presentation of diagrams. We want to use these commands to give our diagram the finishing touch at last and open for this the *Curves*. tab. As we just dragged one curve from the FlexPro Explorer to the diagram, this one is automatically highlighted in the list box and thus activated. Clicking *Edit* opens the properties dialog box named *Properties 1. Curve*. It contains nine tabs. Again we can not deal with all of them in full detail here.

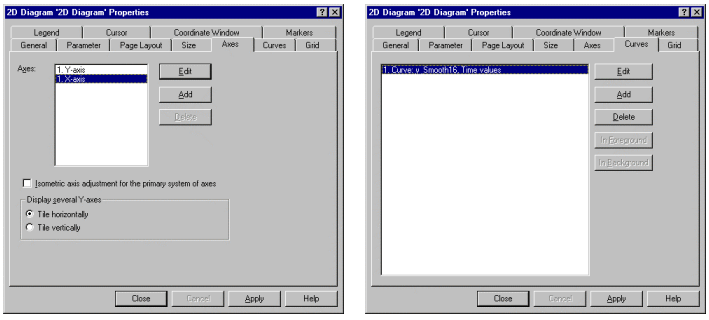


Figure 4.20: Settings in Axes and Curves

Note: Commands which are not dealt with here, are described in the online help.

The first tab has the name *Data* and allows for changes concerning the display of datasets, data fields and numerical formats in a coordinate window, some of which we already met in other dialog boxes so that the present settings can be left unchanged (Fig. 4.21).

There are commands in the *Symbols* tab which come in helpful to carry out other individual choices concerning the curves. If the check box *Symbols on* is activated, most of the following commands are available. Make sure that apart from the *Properties 1. Curve* parts of the diagram window are visible on screen, so that the effects of the changes in the dialog box can be check directly in the diagram after clicking *Apply*. We try this by deactivating *Symbols on* and clicking the *Apply* button. We get the smoothed curve in form of the familiar line graph (Fig. 4.22).

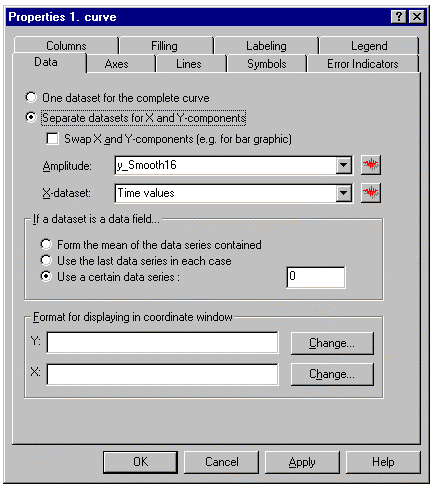


Figure 4.21: Settings in the Data tab

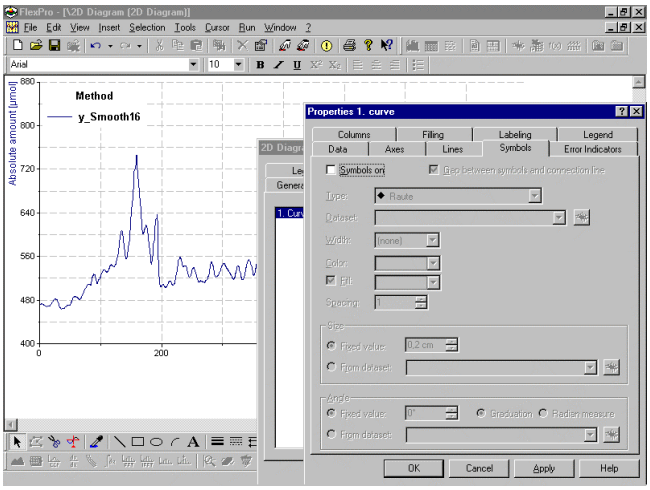


Figure 4.22: The diagram display after switching off the symbols

Activating the symbols and clicking on *Apply* again results in a very broad display of the curve which is due to the overlapping of 4000 relatively large symbols in total in a confined space.

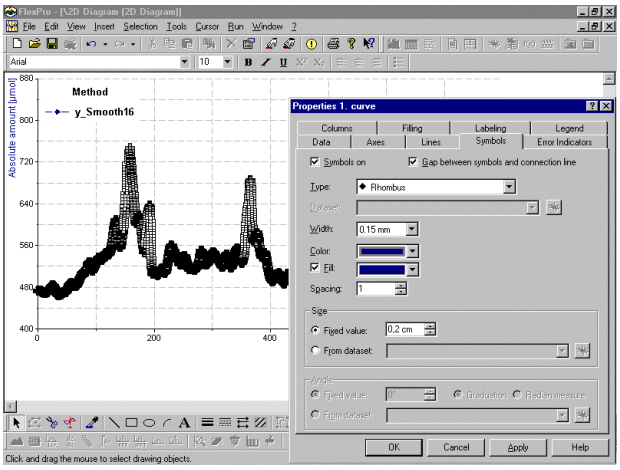


Figure 4.23: Opening Properties 1. Curve directly

Note: We can reach the *Properties 1. Curve* dialog box and its *Symbol* tab far quicker – with the dialog box being closed - via double-clicking on the curve symbols in the diagram window. This action highlights the symbols of the curve. This procedure has the advantage that only one dialog box is open, which can be positioned at any place on the work area. The second, superior but inactive and therefore immovable properties dialog box for *Smooth16_Diagram* is not opened during this procedure and thus does not hinder the current task (see two Fig. 4.22 and 4.23 above).

We want to improve the previous presentation now and select *Circle*, which we find at the first position in the drop-down list *Type:*. As *Width:* we select the value *0.3 mm*. As for *Color:* we can accept the dark blue default. The symbols are to be closed, so that we accept the activated check box *Fill:* in its default setting.

We should be more interested in the *Spacing:*. As the curve is represented by a sum of 4000 individually plotted points at the moment, it would be sensible to reduce the number of symbols drastically. For this enter an *8* in the list box *Spacing:*, so that noticeably less, but still 500 points are displayed in the curve. That this is absolutely sufficient can be checked with the *Apply* (Fig. 4.24). *Size* and *Angle* can be ignored as the default setting for *Size* is ok and vectors are not involved.

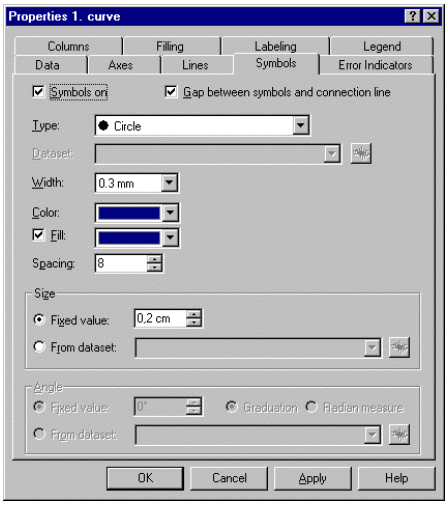


Figure 4.24: Settings in the Symbols tab

We switch to the *Lines* tab, to change the connecting lines between the remaining data point symbols a bit. We keep the check boxes *Connection line on* and *Bridge void values* activated and do not change anything in *Type: Straight line* for the line. Select *Blue-Gray* from the color palette for the *Color:*. We increase the *Line width:* to *0.5 mm* using the drop-down list and the *Line style:* is *OK* the way it is (Fig. 4.25).

Note: If the check box *Palette on* is activated, you have the opportunity to define line attributes as a group, in order to afterwards assign them automatically to one or several datasets. Such a group consists of *Color:*, *Line style:* and *Line width:*.

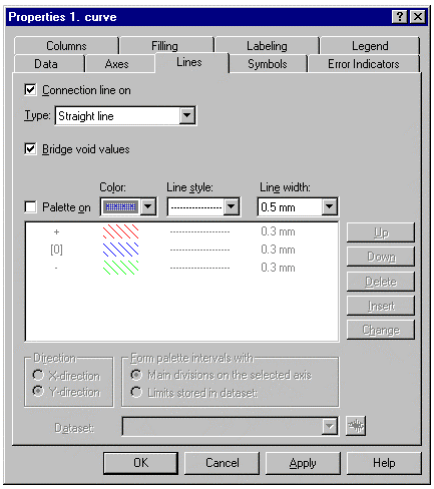


Figure 4.25: Settings in the Lines tab

Note: We skip the *Labeling* tab. It is enough to point out here, that it will get more than confusing in our example, if a numerical value would be displayed in addition at every single data point, even with the number being reduced to 500. This command is more suitable for datasets with a small number of data points. We do not have to deal with the other tabs at this point, as we have neither columns nor statistical values with error bars.

4.3.3 About Axes

We check the interim result again by clicking the *Apply* button, but without closing the dialog box with *OK,* and switch to the *Axes* tab now. The present x- and y- axes can be formatted separately via the appropriate settings in the drop-down list.

As we just have a single x- and y-axis in our diagram, only the entries *1. Y-axis* or *1. X-axis* can be found in the drop-down lists. To start we click on the *Edit* button responsible for the *1.Y-axis* and end up in the properties dialog box of the *1. Y-axis* with five additional tabs in total (Fig. 4.26).

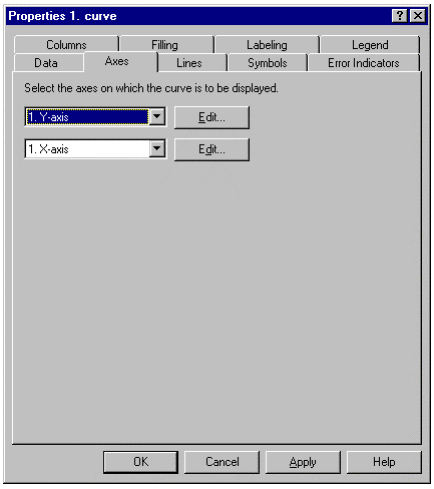


Figure 4.26: The Axes tab in the Properties 1. curve dialog box

Note: We can not try out all the commands here as well, so that the online help can be used as a supplement again.

Note: The following dialog box can be reached with one step again, by double-clicking on the present y-axis in the diagram window.

The *Scaling* tab appears first (Fig. 4.27). We accept the *Axis type: Linear, Number of divisions* and deactivate the two check boxes for auto-scaling in the *Scaling* group. This action activates the associated text boxes in the lower part of the dialog box. Via the keyboard we set the *Starting value:* to *400*, the *End value:* to *900* and the *Number of* divisions to *5* .

We switch to the *Appearance* tab and add smaller ticks by activating the check box *Subdivisions*. The *Length:* in the *Divisions* group shall be *0,25 cm* and the length in the *Subdivisions 0,15 cm*. The other settings can be tried out, but will not be edited for the final presentation (Fig. 4.28).

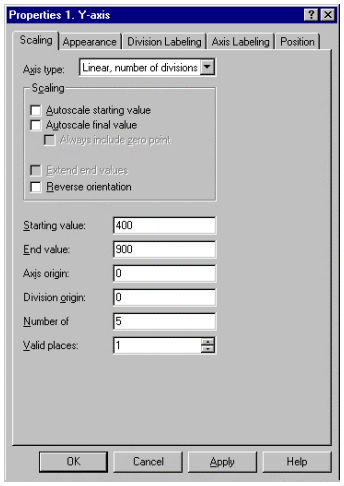


Figure 4.27: Setting in the Scaling tab

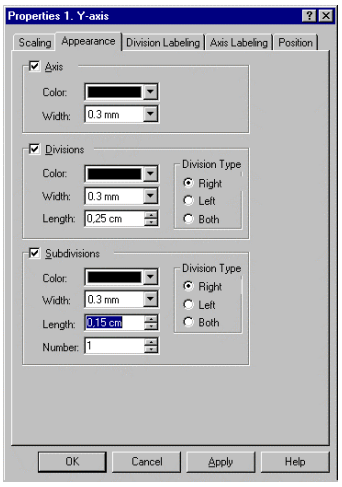


Figure 4.28: Settings in the Appearance tab

In the *Division Labeling* tab we click on *Change...* in the *Font* group and go for *Arial, 10 Points, Regular*. The other default settings stay unchanged (Fig. 4.29).

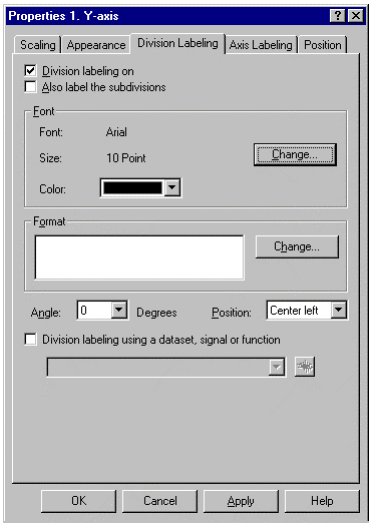


Figure 4.29: Settings in the Division Labeling tab

Note: If changes are to be carried out in the *Format* group of the *Division Labeling* tab, another dialog box opens after clicking *Change...* This contains four additional tabs to set the numerical format. Here the help function serves its purpose as well.

It is finally specified in the *Axes Labeling* tab what is to be seen at the axes and in which form. This is why the check box *Axis labeling on* stays activated. Complex labels can now be created in the *Text* group. The method becomes clear when we open the drop-down list *Insert:*, as obviously all the listed elements might be used. We simply keep the present entry in the text box *Text* and click with the mouse directly to the right of it, whereupon a flashing insertion cursor becomes visible. We enter a space, and then we highlight and click *Date* in the drop-down list *Insert*:. With this FlexPro expands the present text by the entry *%(Date)*. We deactivate the check box *Color texts with their curve colors* activated by default. For *Font* we select *Arial, 10 Points, Regular* again.

The corrected interim result can be viewed once more by clicking the *Apply* button (Fig. 4.30). We are now finished with the default setting *In the axis origin of the X-axis* in the *Position* tab.

As the x-axis starts with zero in our example, selecting the alternative *On the left of the diagram* leads to the same result. With *OK* we finally confirm the new settings in the *Properties 1. Y-axis* dialog box.

Now we still have to deal with the x-axis. This time we open the respective properties dialog box the quickest way, via double-click on the x-axis. This dialog box does not differ in its setup from its counter part for the y-axis, which we just learned about (see Fig. 4.27). So we do not have to go into detail here, but it is enough if we select the same fonts here as we did for the y-axis formatted earlier, which means *Arial, 10 Points, Regular*. We accept the content of *Axis Labeling*, as specified in the *Text* group.

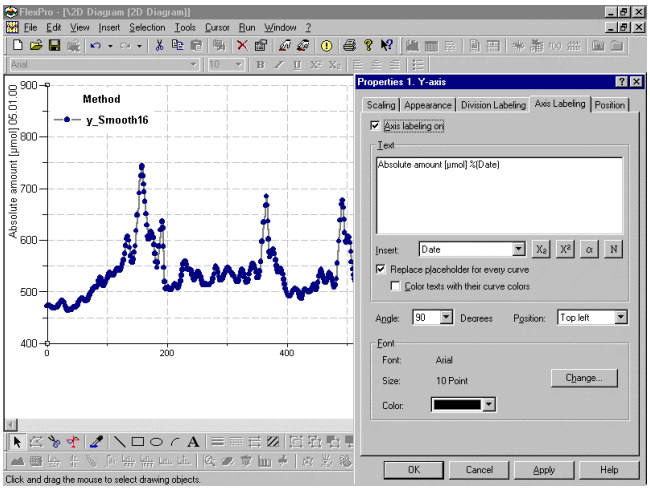


Figure 4.30: Settings in the Axis Labeling tab and the Preview

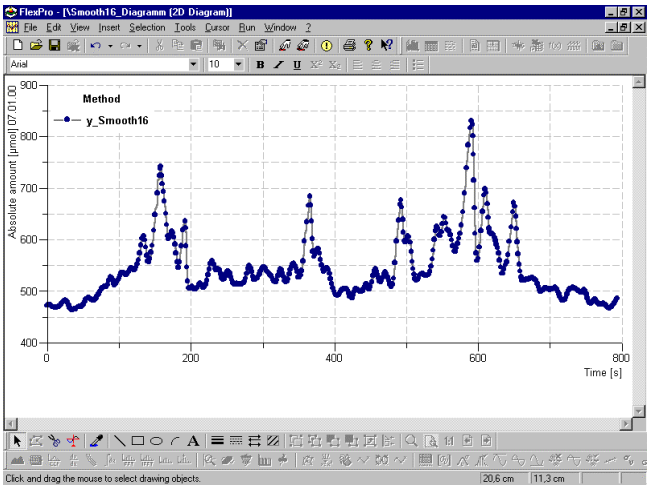


Figure 4.31 The newly arranged Diagram (in the diagram window)

In the *Scaling* tab we deactivate the auto-scaling for this axis as well and set the *Starting value:* to *0* and the *End value:* to *800,* to get „even“ values. We add *Subdivisions* in the *Appearance* tab as well and set the divisions to *0,25 cm* length, the subdivisions to *0,15 cm*. We accept the *Position* and give the final *OK* (Fig. 4.31).

To finish off our document to be presented and to make it a bit more interesting, we could easily add some enhancements. Thus we want to provide the coordinates and the index value of our smoothed highest peak with a label, containing additional information, and then position the diagram in the document so that we are able to set a small text at the beginning of the document. The space underneath the diagram could be used to insert a section of the original data and the smoothing result as a table.

4.4 Set Markers

We start with marking the peak. To set a marker the cursor must be placed at the desired position. Since we are in a screen filling diagram window, we simply select the *Activate Cursors* button in the *Tools* toolbar, to display these tools. We can do without the coordinate window which opens automatically, so that we let it disappear – again via a button – for the time being or we move it to a position at the margin we do not need.

Using the buttons *Cursor on Next Peak Value* or *Cursor on Previous Peak Value* we get to the largest peak to be marked with a few mouse clicks.

Note: Changes have to be made in the *Extrema to go to* group in the *Cursor* tab of the properties dialog box of the *Smooth16_Diagram* to improve the extrema detection if necessary (see chap. 3). The quickest way to do this is via the *Properties* button, VIEW – *Properties* or via opening the context menu of the diagram window. Opening it via a double-click on the diagram area would be annoying during the current setting, as a double-click would turn off the cursors just activated.

If the peak is underneath the cross-hair cursor, a mouse click on the *Place Marker* button in the *Cursor* toolbar or clicking on the <ENTER> key is enough and up come the x- and y-coordinates of the extreme value in a yellow info box in the diagram area. The *Delete Marker* button becomes available at the same time. It can be used to correct possible mistakes.

As we want to integrate the row index as well as the coordinates into the marker, we open the properties dialog box of *Smooth16_Diagram* again via button or context menu, and examine the *Markers* tab closer (Fig. 4.32).

The three groups in this tab are self evident. With the *Index* check box we activate the desired display of the row index, with *No line* we do without an even more obvious marking of the peak and accept in the *Location of the markers* group the selected *At the point,* as the diagram area above the extreme value is very small anyway. FlexPro updates the marker with *OK* (Fig. 4.33).

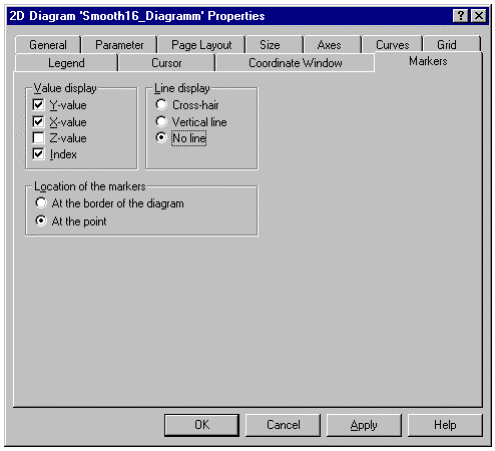


Figure 4.32: Settings in the Markers tab

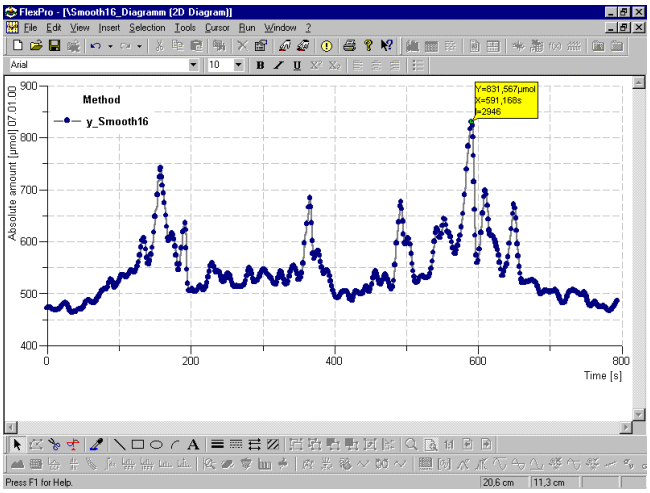


Figure 4.33: The diagram including the created marker

At last our diagram has the desired layout and can be transferred to the document for finishing the presentation. We can gain a better overview for the necessary work by deactivating all tools with the exception of *Standard* and the status bar using the context menu of the toolbars.

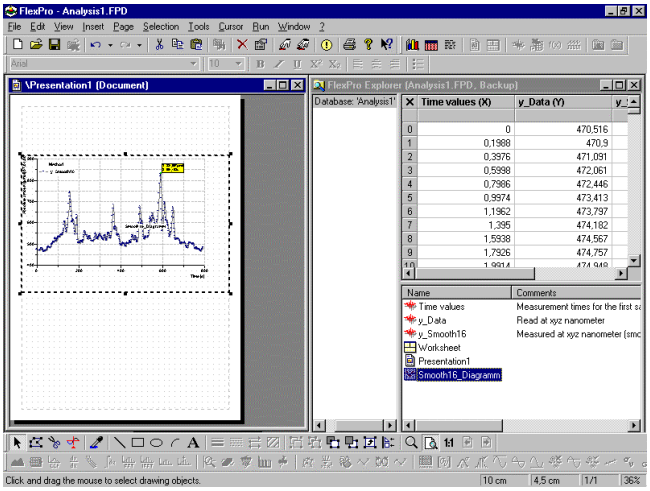


Figure 4.34: After transferring the diagram into the document

After minimizing the diagram window, the windows of *Presentation1 (Document)* and *FlexPro Explorer* are arranged next to each other, in order to copy the object *Smooth16-Diagram* via Drag & Drop into the presentation. Leave some space above the diagram for the indented heading (Fig. 4.34).

Note: At first the diagram will be displayed with a hatched frame in the document window after this transfer. The diagram can be moved about in the document via the mouse and be scaled using the handlebars, as long as the hatching is visible.

When you are satisfied with the position and scaling of the diagram in the document window, remove the hatching with a mouse click on an document area outside the diagram and then maximize the document window (Fig. 4.35).

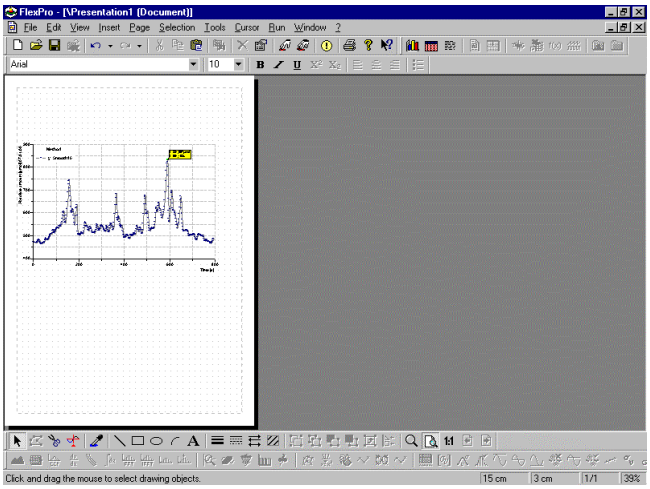


Figure 4.35: Interim result in the maximized document window

Note: If small alterations of the diagram layout are still necessary, this can easily be done, since the commands of the diagram window are also available in the document as mentioned at the beginning of this chapter. The presented objects are reduced in size, as the proportions of the document window are oriented at the format of the printable page. Even in a zoomed document you can not work as precisely as in a diagram window, so that the latter one – at least for extensive tasks – is given the preference. This is why the commands and setting options were described in this chapter using the diagram window.

Note: In order to be able to carry out improvements in the document window, the window content can be displayed in eight different zooming stages via VIEW– *Change Size*. Additionally the button *Magnifier* in the *Tools* toolbar can be used for a smooth changing of size in the document window. Automatically displayed scroll bars enable you to find the desired area specifically. *Fit To Window* resizes the document to its former size afterwards.

4.5 Some Text

Text objects can be directly built into the document, too. For this FlexPro positions at first a text field in the document window after selecting INSERT – *Text*, clicking on the respective button in the *FlexPro Objects* toolbar or the NEW – *Text* command from the document window's context menu. This can be moved via mouse and scaled using the handlebars. Double-clicking into the field changes it into a text box of a text editor and activates all commands in the *Colors*, *Font* and *Text Fields* toolbars (Fig. 4.36).

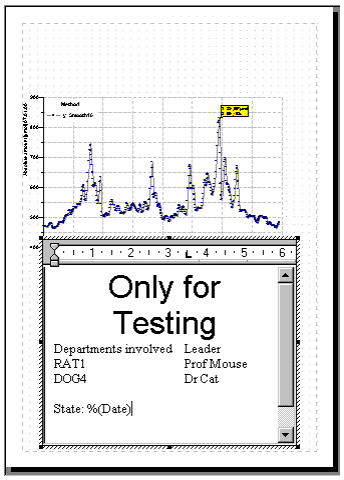


Figure 4.36: Document window including opened text editor and entry

For demonstration purposes we typed centered in the first line “Only for Testing“, highlight the line with the left mouse button staying depressed and assign the font *Arial*, size *24* using the tools in the *Font* toolbar. For the following text the font is set to *Times Roman*, size *10, align left* is selected via the button and a space line is added afterwards with <ENTER>.

Note: The text editor in the document window offers no WYSIWYG ("What you see is what you get"). If in between not everything looks the way it is supposed to be, closing the text editor will help. Then you get the text layout, as it will really appear in the end document.

We place a tabulator at *3.5 cm* in the next line using the mouse, by clicking – as it is common procedure in word processing – at the respective position of the ruler at the upper margin of the text editor. Now type „Departments involved“, press the <TAB>-key and write „Leader“. We finish off the line with the <ENTER>-key, but take over the tabulator, so that we can continue the exercise with as any number of lines. „State: “ could for example be entered in the last line. If the button *Insert Date* in the *Text Fields* toolbar is selected now, FlexPro inserts with *%(Date)* the already known code for the actual date in the text (see Fig. 4.36). A mouse click at a position outside the text editor closes it and we find only the text with its real layout in the document window. Click on the text once, which brings back the boundaries, adjust the height of the frame to the space needed by the text and its width to the printable area of the document, and move it to the reserved free space above the diagram (Fig. 4.37).

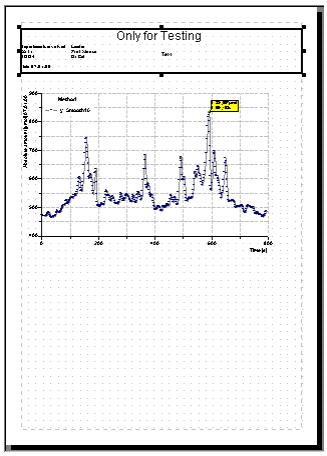


Figure 4.37: After the positioning of the text field

Note: The user gets the same result using a different method, by creating and editing a text object in the FlexPro Explorer, which is then transferred to the document via Drag & Drop. With this method a full screen version of the text editor is available for all tasks.

Although the selected font size might not be appropriate for everybody, we leave the demonstration here since the principle is now clear.

4.6 Table of Values

Finally a small table is supposed to be inserted underneath the diagram, showing the row data and the smoothed data for the area of the largest peak. Such a table can be created as an individual object in the FlexPro Explorer, but also directly in the document window as can be expected. In every case it can be opened alternatively via INSERT– *Table*, the *Insert Table* button in the *FlexPro Objects* toolbar or via the command NEW – *Table* in the context menu. We decide to create the desired table object in the FlexPro Explorer now and click the *Insert Table* button. Another wizard appears on the screen, which is named according to its task *Table Wizard*.

In the first step the desired *Table type* is selected. As our datasets are organized in columns, we select *Column Table*, and to bring some color into the presentation, we click on the example table in column *3* of row four. *Preview without data* can stay unchecked, as we only want to display the values in the area of the maximum in the table, which means a small number of data (Fig. 4.38).

We accept our selection with *Next* > and move to the next step in the *Table Wizard – Step 2 of 4 – Table Columns* dialog box. The setting elements being present here, list boxes and buttons, have already been explained with the *Diagram Wizard*, so that their meaning should now be understood.

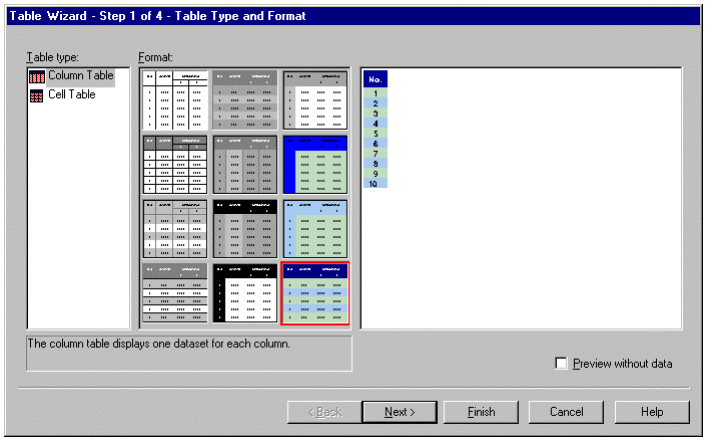


Figure 4.38: Table Wizard – Step 1 of 4 – Table Type and Format

As we want to display sections of the *Time values*, *y_Data* and *y_Smooth16* datasets, we need three columns in total. *Column01* is already present by default, so that we only have to assign the respective data via the *Choose Object* button. Highlight *Time values* in the *Choose Object* dialog box, activate the check box *Range Index* and enter the data range in close proximity of the maximal value, for example *From: 2935 To: 2950* (Fig. 4.39).

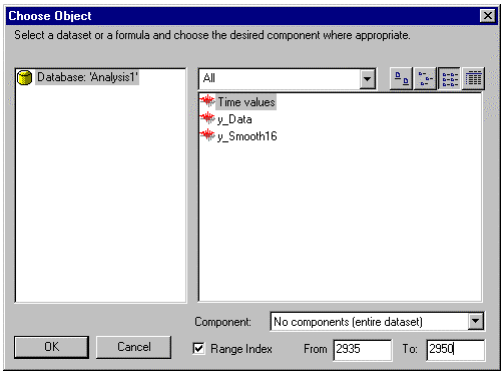


Figure 4.39: Object selection in the Table Wizard – Step 2 of 4

We return to the second step of the *Table Wizard* with *OK*, insert new column clicking on *Add Column*, open the *Choose Object* dialog box again via the button, select here *y_Data* and carry out the same data selection as for *Time values* using the check box *Range Index*. After *OK* the expanded table becomes visible in the preview of the wizard. We finally add another column using the same method, but select the respective data range of *y_Smooth16* and give the *OK* once more (Fig. 4.40).

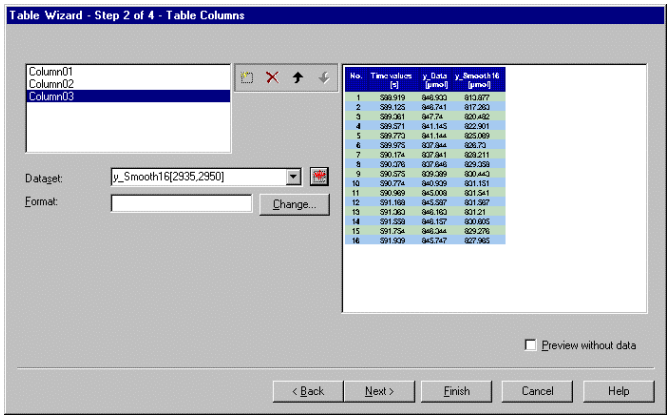


Figure 4.40: Settings in the Table Wizard – Step 2 of 4 – Table Columns

We change over to the *Table Wizard – Step 3 of 4 – Table Options* using the button *Next* >. Activate the *Add table title* check box here and enter the title *Original data* in the text box which opens, and select *Top center* as *Position:*. We accept the table title which is automatically added by FlexPro, by keeping the check box *Add title row* activated. But as we want to do without the display of index values, we deactivate *Insert Index Column* (Fig. 4.41).

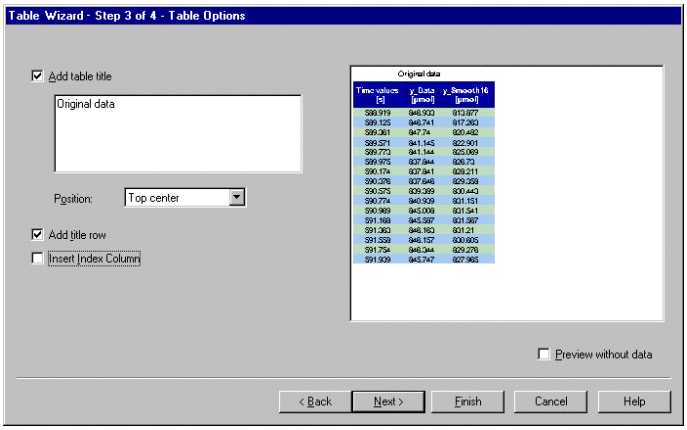


Figure 4.41: Settings in the Table Wizard – Step 3 of 4 – Table Options

Clicking on *Next* > again leads us to the fourth step of the wizard. Here decisions are due concerning the *Table Positioning*. We select *As a new object* (Fig. 4.42).

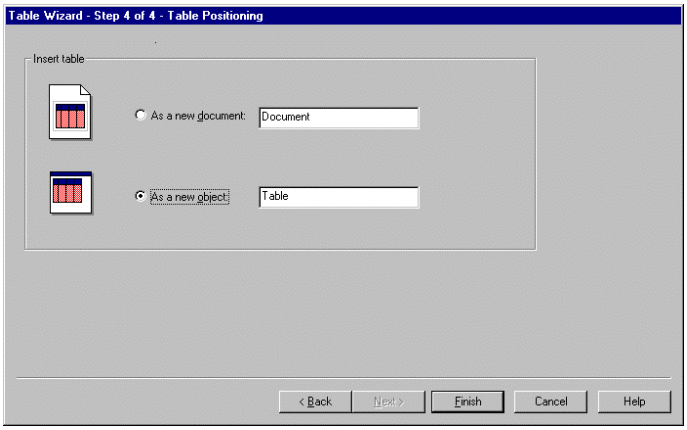


Figure 4.42: Table Wizard – Step 4 of 4 – Table Positioning

We leave the *Table Wizard* with the *Finish* button and find our table in the *FlexPro – [\Table (Column Table)]* window. The toolbars *Position* and *Color* are opened at the same time.

We do not want to investigate all the formatting options at this point, but they can be mastered using the methods which should be routine by now. It will be mentioned in this example, that the highlighted table title can be positioned at six different places using the buttons in *Position*. If the three parts of the table heading are for example highlighted with <CTRL>- and the mouse button, FlexPro takes over the colors used here for font and background into the display of the palette *Color*. Now a left-click on one of the colors in the palette is enough to change the font color, a right-click takes care of a new background color. If you are not satisfied with the colors of the default palette, double-click on one of the color fields. This action opens the *Color* dialog box to color the selected field individually.

Note: The table window has of course a specific properties dialog box. It is opened – as usual – with VIEW – *Properties*, via the context menu or using the respective buttons in the *Standard* toolbar. It contains the seven tabs *General, Parameter, Page Layout, Row Height, Labeling, Columns* and *Lines*, the functions of which will not be discussed in detail here. Possibly questions that may arise can be answered using the knowledge gained by working with similar dialog boxes and using the extensive online program help.

Note: If a part of the actual table is highlighted when opening *Properties*, a column specific properties dialog box opens containing the four tabs *Data, Column Index, Column Title* and *Column*. The automatically created labels of the table heading can be changed here individually through their properties.

We are going to give further improvements a miss and transfer the table as it is at the moment into the document. For this we close the table window, arrange the FlexPro Explorer and the document window next to each other on screen, drag the table via Drag & Drop into the document, and position it as desired (Fig. 4.43).

As there is no accounting for individual taste, we want to leave further possible "Presentation Preparations" and save the finished document together with the FlexPro database *Analysis1* using the button *Save*.

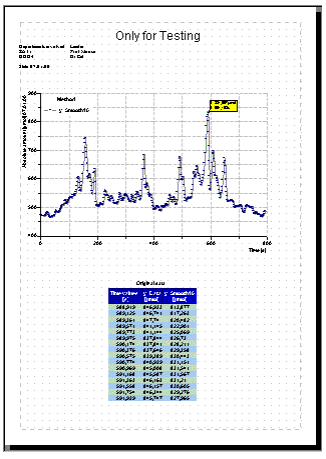


Figure 4.43: The finished document in the document window

I Appendix Individual Setup

I.1 Specify Individual Directory Structures

If the user asks the question about the „Philosophy“ and thus the central function principles of FlexPro, then he inevitable comes across the term FlexPro database apart from the numerous tools which are available via mouse click with their easy handling via Drag & Drop. The program manages data, analysis documents, presentations, worksheets, in short all so called objects which are created or imported in FlexPro databases. A database resembles as such a kind of integrated entity and consists of folders created before, which are hierarchically structured and organized. In principle this structure is similar to a firm, which also consists of different organizational units such as production, management, quality control etc.. In our minds we can compare a FlexPro database with the hard disc of a computer. Datasets, formulas, visualization objects, worksheets and documents which are all needed for an extensive data analysis and –presentation would play the role of files on the hard disk, which for a better overview are filed in a suitably structured system of folders.

Note: To simplify the organization and management of this hierarchical built system, the program has a special navigation tool, called the FlexPro Explorer, the functionality of which is similar to that of the Windows Explorer.

In general the data to be analyzed can be found in a directory independent of FlexPro on a local hard drive or on a network. To speed up the data import from this directory, FlexPro should be given the appropriate directory path information. Using the following example we set FlexPro up so that the folder...\TUTORIAL which is automatically created during the FlexPro installation becomes the standard/default data directory path, so that the example datasets MEASUREMENT1.TXT and MEASUREMENT1.XLS filed here become immediately available.

Note: If the correspondence between the register structure used in this tutorial and thus documented in the figures is supposed to be as close as possible to reader’s PC, we advise to carry out the steps demonstrated in the following, before importing the example datasets (see chap. 2).

To tell FlexPro about the new storage of our data, we open FILE– *Options...*. This opens the *Options* dialog box in which five tabs can be found, as there are *Operation*, *User Rights*, *Regional Settings, Default Settings* and *Messages* (Fig. I.1).

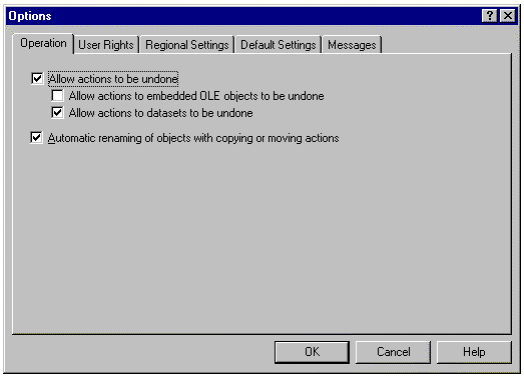


Figure I.1: The Option dialog box with the automatically opened Operation tab

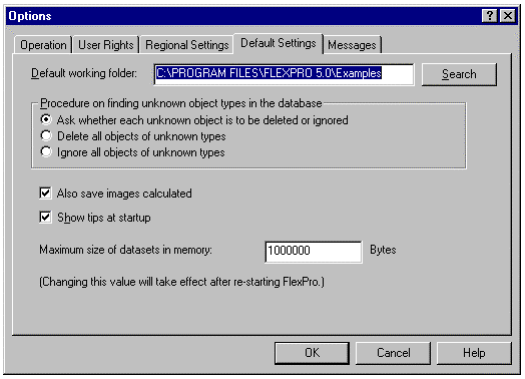


Figure I.2: The Default Setting tab

To achieve our aim, we need the *Default Settings* tab to which we switch via mouse click, to enter in the *Default working folder:* line the desired subfolder.

The default setting is here the folder *Examples*. Thus we will find after the installation in the FlexPro standard path the entry C:\PROGRAM FILES\FLEXPRO 5.0\EXAMPLES (Fig. I.2).

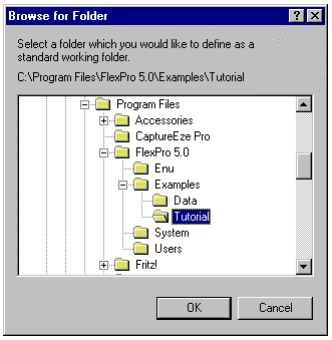


Figure I.3: Settings in the Folder search dialog

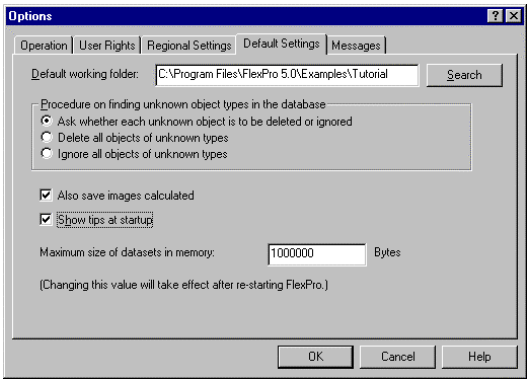


Figure I.4: Changed settings in the Default Settings tab

Typing in a different folder in the *Default working folder* line can be made easier by using the *Search* button. After clicking on it the dialog box *Browse for Folder* appears (Fig. I.3).

In that tree we click on *Tutorial* and newly specify the standard working folder and apply using the *OK* button (Fig. I.4). We accept this setting by finally closing the *Options* dialog with the *OK* button as well.

I.2 Setting Up a Database

To create a database, we click in the *Standard* toolbar on the first button *New*, use the key combination <CTRL>+<N> or alternatively the menu command FILE – *New Database...*.

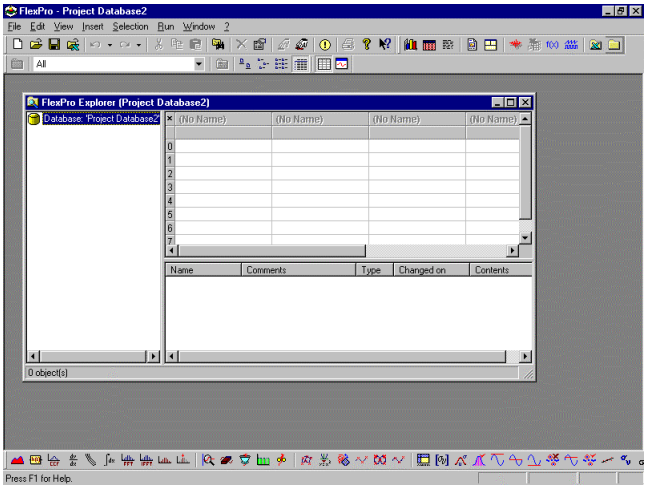


Figure I.5: The empty FlexPro Explorer

Note: FlexPro offers a lot of buttons in the toolbars as well as key combinations or keys to make menu commands quickly available (short cut keys). The user should make it a habit of using them as often as possible. If the meaning of a button is not clear, the presentation of the assigned buttons in the menus in connection with the automatically displayed Quick Info, the short description in the status bar or the tabular summary in the appendix III helps.

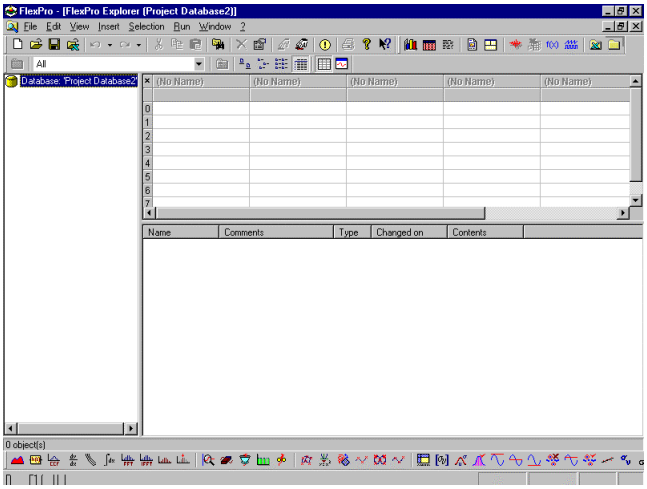


Figure I.6: The maximized FlexPro Explorer with a new name in the title bar

Independent of the chosen method the FlexPro Explorer integrated in FlexPro 5.0 opens. The title bar has the name *FlexPro Explorer*, which has always the word *Project database* and a number after it, which prevents that the same name is given to a database twice.

Note: As FlexPro automatically creates at startup a new database named *Project Database1*, we create with the suggested method, the menu command FILE– *New Database...* the *Project Database2*.

We maximize the window using the Windows button, whereupon the combined name *FlexPro – [FlexPro-Explorer Project Database2)]* appears in the title bar (Fig. I.6). Three areas created by windows dividers can be distinguished. They can be scaled individually, by moving their boundaries with the mouse. The default and vertically orientated field on the left shows a tree of hierarchically interlocking folders in the database. We find here due to the default setting the name of the still empty database, the suggestion *Database: 'Project Database2'*, which can be made visible completely by a suitable extension of this field. A list view can be found on the right hand side, in which the so called FlexPro objects such as documents or diagrams as well as subfolders are listed, under the condition that respective objects have been created. The status bar confirms that, with the creation of a new database, at first only *0 Object(s)* are present. Is in the menu VIEW – *Details* or after right-clicking on the opened context menu VIEW – *Details* activated, recognizable due to the depressed icon in front of the respective menu bar (Fig. I.7), additional file information, common in Windows, is listed below the buttons *Name, Comments, Type, Changed on...* and *Contents*. If the displayed objects are to be newly sorted, a click on one of these buttons specifies the new sorting criterion. Another click reverses the sorting order.

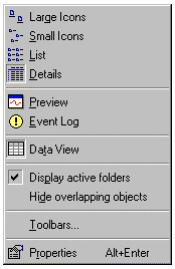


Figure I.7: Commands in the View menu

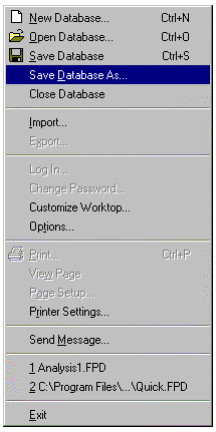


Figure I.8: Commands in the File menu

The right side of the FlexPro Explorer is completed by a table, in which e.g. the structure of imported datasets can be checked. If the screen space is needed for something else, the so called data view can be switched of by clicking on the VIEW– *Data View* in the menu bar.

To customize the name for our database suggested by FlexPro, we open FILE – *Save Database as...* (Fig. I.8) and get to the *Save As* dialog box. We enter our new name for the database in the textbox *File name:* and select for this instead of *Project Database2* for example the name “Analysis1“. We do not have to change the specification given in the *Save as Type:* textbox, as it is already set correctly to *FlexPro Project Databases (.FPD).*

Finally we make sure, that the database is filed in the folder *Tutorial* as specified before. This can be checked in Windows fashion via the textbox *Save in:* and then be corrected if necessary.

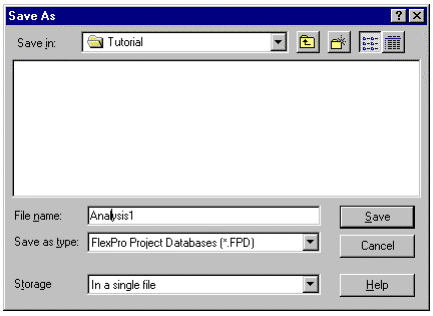


Figure I.9: Setting in the dialog box Save as

Still missing is a selection in the *Storage* list which offers the options *In a single File* or *In several folders and files*. The help function makes the decision easier in this case, as detailed information is given for both options after clicking on the *Help* button.

The default alternative given by the program is the filing of the database in a single coherent file(entity). This makes copying easier later on. For this we have to accept slower access speeds, which is quite a drawback especially when working with large amounts of data. Furthermore there is a higher risk of data loss, e.g. caused by a system breakdown during the saving procedure.

Alternatively the directory orientated filing is preferable, when large amounts of data are to be edited or when the processing speed is to be increased. FlexPro transfers in this case the folder hierarchy of the database to the saving medium. Thus two subfolders including the extensions *.DB and *.TMP (Temporary files) are created in the same folder, apart from the file *.FPD (FlexPro Project Database File). The hierarchical structure of the database is saved in the folder with the extension *.DB. In this structure FlexPro files away each object in its individual file, which can be accessed separately as well. The directory *.TMP contains temporary files and only exists in the presence of an opened database *.FPD. If a database organized this way is to be copied, the directory *.DB has to be taken into account as well as the file *.FPD. FlexPro objects below the *.DB directory should not be manipulated, in order to protect data or documentation from destruction. All the tools required for the safe handling of FlexPro objects are provided by the FlexPro-Explorer.

As long as the imported data material is similar in size to the tutorial examples, the default option *In a single File can be used*. Clicking on the *Save* button creates the database and the project title *FlexPro – [FlexPro-Explorer (Analysis1.FPD, Backup)]* appears in the title bar, if the FlexPro Explorer is still maximized on the work area. If the FlexPro Explorer is reduced in size having used the appropriate Windows button, the program window gets the title *FlexPro – Analysis1.FPD* and the window of the FlexPro Explorer the name *FlexPro Explorer (Analysis1.FPD, Backup)*. The entry in the left pane of the FlexPro Explorer window is adjusted to the name previously selected as well and is now *Database: 'Analysis1*'.

Note: Although there are no entries for objects in the list view at the moment, we want to point out, that – as with the Windows Explorer – present objects can be moved, copied, renamed, deleted or grouped. Furthermore context menus with commands appear in each area after a click with the right mouse button, which we do not have to deal with here specially, as they are redundant to FlexPro menu commands,

additionally they are self evident or already Windows default commands. If you want to find out, simply open further context menus with a right-click.

II Appendix
Help to Self-Help

Due to the limited size of this FlexPro tutorial manual not all the program functions can be detailed and demonstrated extensively. That is why sometimes a hint can be found in the manuals text to advise the reader to turn to FlexPro 5.0's online help function for additional information particularly on certain dialog boxes, tabs or program capabilities. This is the recommended way for a novice as well as a experienced user to get help in case a question arises.

Note: Although it could be taken for granted that the FlexPro user is familiar with the handling of Windows and the type of help which is usually available, the additional help possibilities offered by FlexPro will be presented here for additional information. The FlexPro 5.0 Online help – allows the possibility of linking search terms with logical operators – this is a special feature in respect to normal help searches. The aim of this appendix is to equip the user with the necessary knowledge to make the best use of this available help system.

II.1 Context Helps

A simple source of brief information is the so called context help. To use it click on the last button *Help* in the *Standard* toolbar. The cursor changes into a Windows help-cursor equipped with a question mark. Move this for example to the *New* button in the *Standard* toolbar and click on it once with the help cursor. With this modified cursor we could open a menu just as well and click on the commands in there, in the example we select analog with the help cursor FILE – *New Database...* . This help works context sensitive and provided short explanations concerning a screen element or a menu command. As we can see from the field which displays in both cases, the information here is a combination of the Quick Info and the respective explanation in the status bar (Fig. II.1). Depending on whether help was asked for on buttons or menu commands, a click on the yellow shaded textbox or on any place of the worktop removes this short help again.

Figure II.1: The information display about New Database...

Note: The user gets the same help cursor in the FlexPro dialog boxes, by clicking in the help button in the respective title bars. Moving it to a dialog element, displays help topics and further explanations concerning this element in an information pane.

II.2 FlexPro 5.0 Online Help

Naturally more extensive information is provided by the *FlexPro 5.0 Online Help*. We start it with the command *Help Topics* in the ? - menu. If it does not open to full screen size automatically, it is advisable to maximize this window using the Windows button, in order to get as much help information in one go as possible.

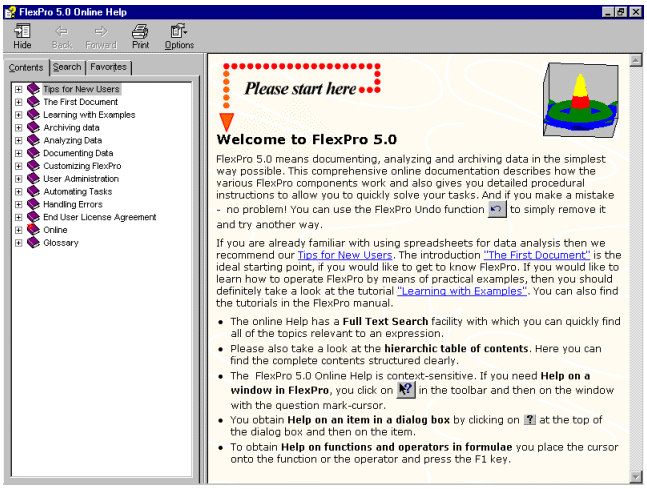
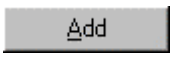


Figure II.2: After the first opening the FlexPro 5.0 Online Help presents Tips for New Users

Apart from the self descriptive menu bar in the Microsoft Internet-Explorer we find in this window two display areas due to window dividers, which can be sized any way in Windows Explorer fashion using the vertical dividers. The left hand side offers three tabs, the right hand side displays the help texts (Fig. II.2).

The first tab named *Contents* provides a branching tree of all the help topics which is set up hierarchically over many levels. As with the Windows Explorer, clicking on a plus sign makes further levels (branches) visible, the minus sign lets the information disappear again. The lowest information level is marked with a question mark. The associated explanation and help text appears on the right half after clicking on it. The third tab *Favorites* produces a list of help topics added to using the *Add* button which contains links to topics defined by the user which can be recalled quickly. These continually referenced topics from the favorite list are also useful, for a forgetful user and appear at once via a click.



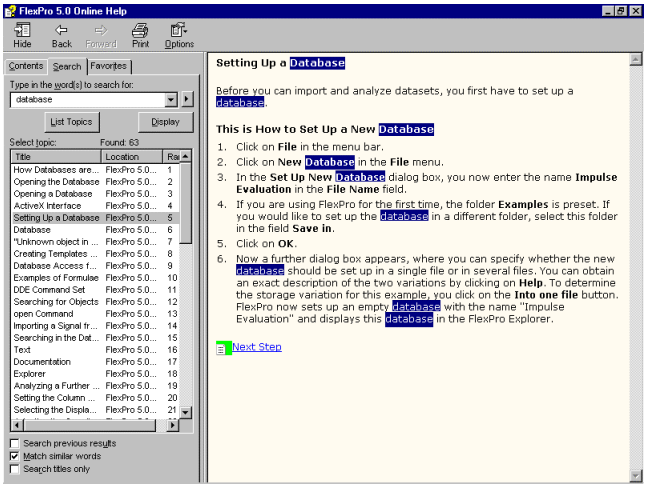


Figure II.3: The contribution of FlexPro 5.0's Online Help for the term „Database"

What will be used the most is the second tab *Search*. Handling the function of this tab is of special importance, because if you master the search system, the particular information you require can be gathered from the integrated, extensive help while the redundant and less interesting topics will be bypassed.

Note: The *FlexPro 5.0 Online Help* additionally takes over the role of a classical reference manual. Thus you can find for example next to the detailed description of commands or objects supplementary examples. If you want to use the program information and the program capabilities correctly to their full extent then the handling of the help system must therefore be mastered.

If you haven't done it already, activate the *Search* tab now. Enter "database" in the textbox *Type in the word(s) to search for:* and then click on the *List topics* button. Now FlexPro fishes out via full text search all passages of the help system, which contain the search term. They appear in a weighted order afterwards in the list *Select topic:*. In our example we find at rank 5 an entry with the title *Setting up a database*, which tells us about the basic steps in handling FlexPro. We highlight this entry and click on the *Display* button or simply double-click on this entry, to get to know more about the topic *Setting up a database* in the right pane. If our search term "Database" pops up there, it is blue shaded in the beginning (Fig. II.3). We move the mouse pointer to the right pane and press the right mouse button once to open the associated context menu (Abb. II.4). There we activate the command *Refresh* and the marker of the search term disappears.

Figure II.4:The context menu in the right help area

Should FlexPro in general stop highlighting the search terms in future, use the menu OPTIONS in the menu bar of the Online Help window: The highlight can be switched of for the future with OPTIONS – *Search Highlight Off* .

Note: There are three ways to get the information just found onto paper, if a printer is installed and online: Firstly the context menu in the right help box offers the command *Print...* Secondly the menu OPTIONS contains a print command and last but not least – indicated by the name already - is the fourth menu PRINT in the menu bar of the Online Help window explicitly in charge of printing.

Figure II.5: Search terms can be logically linked via the press of a button

Note: A small button is positioned next to the textbox for the search term, which is marked with a triangle or arrow pointing to the right. Clicking on it makes four operators available, with the help of which search terms can be linked (Fig. II.5). The reader might like to test this individually as well as the function of the three check boxes *Search previous results*, *Match similar words* and *Search titles only* at the end of this area, which offer additional selection criteria concerning the search volume.

Using this principle, the user can gather all the information that is needed. This allows detailed descriptions to be left out of this manual.

Note: Another possibility to get help is in the form of displayed information boxes or by activating the Online Help using the <F1>-key. Necessary hints on functions and operators in formulae are provided that way, as soon as the writing cursor is positioned on the respective function or the desired operator and <F1> is pressed.

III Appendix
Toolbars and Buttons

Toolbars and the buttons arranged in them are a central operating element of FlexPro, as the Software allows the user access to all the important commands via this enhancement. You just have to click the correct button in the right toolbar to get the desired program capability or action. Depending on the task to be mastered and thus which way the working desktop is organized or which windows are opened for working, the appropriate toolbars are then automatically displayed, opened or activated. This way the user is always presented with the correct tools. Here the intelligence of the program shows through. The advantages of this technology are therefore obvious. As a final comment, if all the toolbars and additional tool palettes were to be kept open at all times, then a rather clever arrangement would be necessary by the program to view all the buttons and toolbars on the screen at the same time. Even if the screen resolution was relatively high, there would not be enough space to perform any tasks!

III.1 Individual Setup

FlexPro toolbars can be displayed or hidden via a context menu, which is opened by right clicking in an area of a present toolbar or status bar (Fig. III.1).

Note: All FlexPro context menus are opened in a Windows fashion via a right-click. Their contents adjusts automatically to the current marker, mouse position or workspace.

As can be gathered from the second line of the context menu, the user can assemble a separate configuration of toolbars for each workspace (user defined). The new toolbar *Customized* is especially helpful for this purpose, where each user can assemble individually the commands he needs to tackle his FlexPro project. So the worktop can be optimized and individually customized to suit the individuals respective needs.

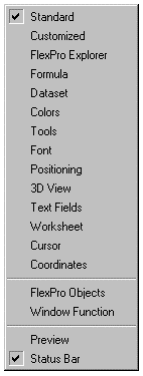


Figure III.1: The context menu of the Toolbar or Status bar

Note: It has to be stressed that not all the toolbars with the associated context menus should be switched off. Otherwise with no toolbar present on the worktop and the status bar closed as well, right-clicking with the mouse to open the context menu is no longer available. The only way to access the toolbars again is in such a case via FILE- Menu. FILE – *Customize Worktop...* opens the dialog box *Customize Worktop Interface* consisting of four tabs. Click here on the *Toolbar display* tab and activate in the *Toolbars:* list for example the minimal equipment *Standard* at first position and *Status bar* at the last.

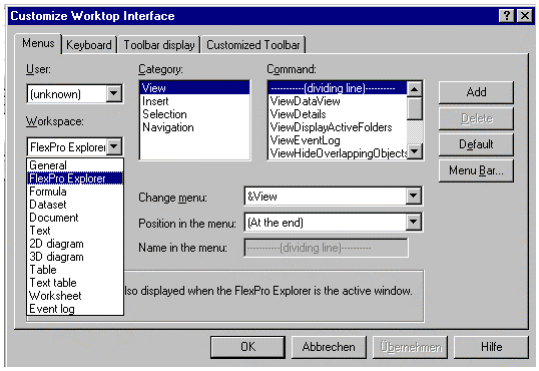


Figure III.2: The Toolbar display tab with the drop-down list Workspace: opened

This intended default setting by FlexPro applies to the *Workspace: FlexPro Explorer* as can be read in the drop-down list *Workspace:* on the left hand side of the dialog box (Fig. III.2).

Note: When opening the drop-down list *Workspace:*, you will find that FlexPro is divided into twelve working areas (Fig. III.2). Each is equipped with a certain portfolio of toolbars, which are opened automatically after activating the respective workspace.

Note: If you clicked with the mouse pointer on the perpendicular lines arranged in parallel at the left edge of each toolbar and then dragged the mouse pointer to the FlexPro workspace, the toolbar changes in Windows-manner from the integrated or docked version characterized by a fixed size to the so called floating or undocked version (Fig. III.3). The latter possesses its own associated title bar in which the Windows-typical button for closing dialog boxes or windows can be found. If a toolbar is moved to the area underneath the menu bar or to the left or right edge by clicking on the title bar and keeping the mouse button down, it docks again automatically at the chosen destination. This is detectable due to the automatic aligning of the toolbar's outline.

Figure III.3: The floating version of the Standard toolbar

III.2 Button Overview

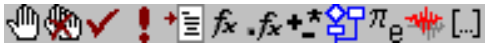
Due to the great importance of the toolbars and their buttons for the effective usage of FlexPro, they are listed in a table in the following. The text of the Quick Info as well as the short description of the status bar is given for each button. The list can serve as a help for the user looking for special program performance at the press of a button. It might be used for looking up the great number of buttons, which are impossible to memorize and recall at once during the first contact with the program. Even after getting used to the program the situation might arise that you have to look up, what the button icon for one or the other command was like or in which toolbar it was located.

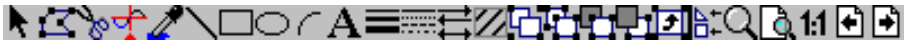
Table III.1: The FlexPro toolbars and their buttons in an overview

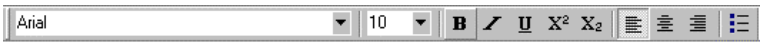
Quick Info	Button	Info in the status bar
1. Toolbar: Standard		

New (Ctrl+N)		Creates a new database.
Open (Ctrl+O)		Opens an existing database.
Save (Ctrl+S)		Saves the active database.
Import Excel Workbook		Imports an Excel workbook.
Undo (Ctrl+Z)		Undoes the last action
Restore (Ctrl+Y)		Repeats the previously undone action.
Cut (Shift+Del)		Deletes the selection and transfers it to the clipboard.
Copy (Ctrl+C)		Copies the selection and transfers it into the clipboard.
Paste (Shift+Ins)		Inserts the contents of the clipboard.
Search		Searches for the specified text
Delete (Del)		Deletes the selection.
Properties (Alt+Enter)		Changes the object properties.
Update		Updates the active object.
Update All		Updates all open objects.
Event Log		Opens the Event Log.
Print (Ctrl+P)		Prints the active document.

Info		Displays program information, version number and copyright.
Help (Shift+F1)		Displays Help on clicked buttons, menus and windows.
2. Toolbar: Customized		
Print (Ctrl+P)		Prints the active document.
Update		Updates the active object.
Update All		Updates all open objects.
3. Toolbar: FlexPro Explorer		
(De-)activate Folder		Switches the active folder or (de-)activates the folder.
Select Object Group	All	Selects the object group to be displayed.
One Level Up (Backspace)		Moves one level up in the folder hierarchy.
Large Icons		Displays large icons in the Explorer list.
Small Icons		Displays small icons in the Explorer list.
List		Displays objects in the Explorer as a list.
Details		Switches the Explorer list to Detail Display.
Data view		Shows all datasets or Excel Workbooks of the opened folder in an additional window section.

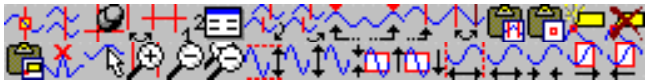
Preview		Shows the Preview.
4. Toolbar: Formula 		
Place/Delete Breakpoint		Places or deletes a breakpoint in the current row.
Delete All Breakpoints		Deletes all breakpoints in the formula.
Syntax Check		Checks the syntax in the formula.
Run		Calculates the formula and outputs the end result.
Test Run		Starts the Formula Inspector.
Insert Function		Activates the Function Wizard to insert a function.
Insert Object Property		Activates the Object Properties Wizard to insert an object property.
Insert Operator		Activates the Operator Wizard to insert an operator.
Insert statement		Activates the Statement Wizard to insert a statement.
Insert Constant		Activates the Constant Wizard to insert a constant.
Insert Dataset		Insert a dataset into the formula.
Insert Index		Activates the Index Wizard to insert an index.
5. Toolbar: Dataset		
Insert Columns		Insert one or several columns before the current column.

Insert Rows		Inserts one or several rows before the current row.
Delete Columns		Deletes the columns currently selected.
Delete Rows		Deletes the rows currently selected.
Merge Datasets		Merges the selected Datasets.
Change Data Type		Changes the data type of the selected dataset or of the selected dataset component.
Fill or calculate a column		Fills a column with values or calculates a column with a given formula.
6. Toolbar: Tools 		
Select Drawing Objects		Tool for selecting and modifying drawing objects.
Reshape		Reshapes the selected line, polyline or the selected polygon.
Cut		Cut drawing objects.
Activate Cursors		Activates the cursors in all diagrams of the active window.
Adopt Attributes		Adopts the drawing attributes of a drawing object.
Line		Inserts a drawing object "Line".
Rectangle		Inserts a drawing object "Rectangle".
Ellipse		Inserts a drawing object "Ellipse".
Arc		Inserts a drawing object "Arc".
Label		Inserts a drawing object "Label".

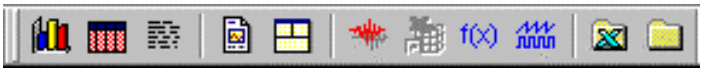
Line strength		Selects a line strength.
Line style		Selects a line style.
Arrow Type		Selects an arrow type.
Fill Style		Selects a fill style.
Group		Groups the selection
Ungroup		Cancels the selected group.
Place In Front		Places the selection in the front.
Place In Background		Places the selection in the background.
Rotate By 90°		Rotates the selection by 90° to the left.
Align Selection		Aligns the selected objects to each other or to the page.
Magnifier		Changes the size of the visible page segment.
Fit To Window		Fits the display size to the window size.
Display 100%		Displays the document in size 100%.
Previous Page		Switches to the previous page of the document.
Next Page		Switches to the next page of the document.
7. Toolbar: Font (Design) 		
Font	Arial	Changes the font of the selection.
Font Size	10	Changes the font size of the selection.

Bold		Changes the selected text into bold type.
Italics		Changes the selected text into italics.
Underline		Underlines the selected text.
Superscript		Displays the selected text as superscript
Subscript		Displays the selected text as subscript.
Align Left		Aligns the text to the left.
Center		Centers the text.
Align Right		Aligns the text to the right.
Insert Bullet		Inserts a bullet into the row.

8. Toolbar: Position(ing)		
---		Please specify the object size here.
---		Please specify the rotation angle for the object here.
Position Top Left		Positions the selection at the top left.
Position Top		Positions the selection at the top.
Position Top Right		Positions the selection at the top right.
Position Left		Positions the selection on the left.
Position Center		Positions the selection in the middle.
Position Right		Positions the selection on the right.
Position Bottom Left		Positions the selection at the bottom left.
Position At Bottom		Positions the selection at the bottom.
Position Bottom Right		Positions the selection at the bottom right.
Dividing Lines Left or Bottom or Outward		Draws dividing lines to the left or at the bottom or outward.
Dividing Lines in Both Directions		Draws dividing lines in both directions.
Dividing Lines Right or Top or Inward		Draws dividing lines to the right or at the top or inward.
9. Toolbar: 3D View		
Rotate Right		Rotates the diagram to the right.
Rotate Left		Rotates the diagram to the left.
Lower Inclination		Reduces the inclination of the diagram.
Higher Inclination		Increases the inclination of the diagram.
Standard view		Displays diagram in standard view.
Plan view		Displays the diagram in plan view.
10. Toolbar: Text Field (Text Placeholder))		
Insert Date		Inserts a placeholder with the current date into the text.
Insert Time		Inserts a placeholder with the current time into the text.
Insert Placeholder		Inserts a placeholder for displaying

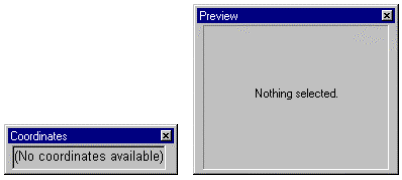
		data into the text.
Edit Formatter		Changes the formatter under the input cursor or inserts a new one.
11. Toolbar: Worksheet		
Zoom In		Displays a close-up of the selected window pane.
Window Layout		Changes the number of fields and the field layout in the worksheet window.
Add Field		Adds an empty field to the worksheet.
Remove Field		Removes the selected field from the worksheet.
12. Toolbar: Cursor 		
Link Cursor to Curve		Links the cursor to the curve.
Synchronize Cursors		Synchronizes the cursors in all of the diagrams in a worksheet or document.
Hold Cursor		Holds the cursor at the current position when moving.
Cross-Hair Cursor		Shows the cursor as a cross-hair.
Two Cursors		Switches the second cursor on.
Coordinate window		Shows the coordinate window.
Both Cursors on Previous Curve (Page up)		Places both cursors onto the previous curve.
Both Cursors on next Curve (Page down)		Places both cursors onto the next curve.
Cursor on Previous Peak Value (Alt+Ctrl+Left)		Places the cursor onto the previous peak value.

Cursor on Next Peak Value (Alt+Ctrl+Right)		Places the cursor onto the next peak value.
Go To (Ctrl+G)		Places the cursor onto a certain value.
Switch Cursor (Tab)		Switches the active cursor.
Copy segment		Copies the curve segment between the cursors as a formula to the clipboard
Copy Value(s)		Copies the Y-value(s) displayed in the coordinate window as a dataset to the clipboard.
Place Marker (Enter)		Places a marker at the cursor position.
Delete Marker (Alt+Del)		Deletes the marker closest to the cursor position.
Copy Markers		Copies the coordinates or the indices of the markers to the clipboard.
Value Void (Ctrl+Del)		Makes the value under the cursor void.
Change Cursor Value(s) (Ins)		Changes value(s) at the cursor position or between the cursors.
Spread X-Range Between cursors (Num +)		Spreads the X-range between cursors.
Restore Previous Image Section (Num -)		Restores the previous image section.
Restore Original Image Section		Restores the original image section.
Show Curve At Full Height		Displays the curve at full height.
Stretch Curve Vertically		Stretches the curve vertically by 10%.
Compress Curve Vertically		Compresses the curve vertically by 10%.
Image Section Up		Scrolls the image section up by 10%.

Image Section Down		Scrolls the image section by 10% down.
Show Curve In Full Width		Displays the curve at full width.
Stretch Curve Horizontally		Stretches the curve horizontally by 10%.
Compress Curve Horizontally		Compresses the curve horizontally by 10%.
Image Section Right		Scrolls the image section by 10% to the right.
Images Section Left		Scrolls the image section by 10% to the left.
13. Toolbar: FlexPro Objects 		
Insert Diagram		Inserts a new diagram.
Insert Table		Inserts a new table.
Insert Text		Inserts a new text.
Insert Document		Inserts a new document.
Insert Worksheet		Inserts a new worksheet.
Insert Dataset		Inserts a new dataset.
Insert Excel Data Link		Inserts a new link to an Excel Workbook.
Insert Formula		Inserts a new formula.
Insert Signal		Inserts a new signal.
Insert Excel Workbook		Inserts a new Excel Workbook into the database.
Insert Folder		Inserts a new folder.
14. Toolbar: Window Function		
Insert Area Under Curve		Inserts a new area under curve.
Insert Convolution		Inserts a new convolution.
Insert Correlation		Inserts a new correlation.
Insert Derivation		Inserts a new derivation.
Insert Family of acceleration hyperbolae		Inserts a new family of acceleration hyperbolae.
Insert Integral		Inserts a new integral.

Insert Fourier Spectrum		Inserts a new Fourier spectrum.
Insert Inverse Fourier Transformation		Inserts a new inverse Fourier transformation.
Insert Order Analysis		Inserts a new order analysis.
Splitted Orders		Inserts an object for the individual orders.
Insert Event Isolation		Inserts a new event isolation.
Insert Signal Correction		Inserts a new signal correction.
Insert Signal Filter		Inserts a new signal filter.
Insert Time filter		Inserts a new time filter.
Insert signal smoothing		Inserts a new signal smoothing.
Insert 2D Spline Interpolation		Inserts a new 2D spline interpolation.
Insert Approximation		Inserts a new approximation.
Insert Curve Transformation		Inserts a new curve transformation.
Insert Linear Interpolation		Inserts a new linear Interpolation.
Insert Parametric Spline Interpolation		Inserts a new parametric spline interpolation.
Insert Spline Interpolation		Inserts a new spline interpolation.
Insert ANOVA		Insert new ANOVA.
Insert Confidence Interval		Insert a new confidence interval.
Insert Distribution		Insert new distribution.
Insert Goodness–of-Fit Test		Insert new goodness-of-fit test.
Insert Maximum		Inserts a new maximum.
Insert Mean Value		Inserts a new mean value.
Insert Minimum		Inserts a new minimum.
Insert Outlier Correction		Insert new outlier correction.
Insert Root Mean Square (RMS)		Inserts a new root mean square (RMS).
Insert Outlier Test		Insert new outlier test.
Insert Regression		Inserts a new regression.
Insert Statistic Quantity		Inserts a new statistic quantity.
Insert Variance Test		Insert new variance test.
Insert Compound Count		Insert new compound count.
Insert Count		Insert new count.
Insert Count Matrix		Insert new count matrix.
Insert Histogram		Inserts a new histogram.

Insert Rainflow Count		Insert new rainflow count.

Additional palette: Colors 		
---		You have to double-click to define a new color
Additional window: Coordinates and Preview 		
---		Press F1 for Help.
Additional bar: Status bar 		
---		Press F1 for Help.

Note: Behind some of these buttons in the listed toolbars are extension modules, the installation of which is not compulsory. To investigate which extension modules are included in FlexPro, click the last but one button *Info* in the *Standard* toolbar, or open the help menu ? and choose *Info on FlexPro...* . Both these actions open a dialog named *About FlexPro*, providing useful information such as License holder and the Serial number. The currently installed ones are all listed in the *Extension modules:* list (Fig. III.4, left). These include for example Import- and Statistical analysis functions. Clicking on he button *Serial number...* opens a subsequent dialog named *Change serial number*, in which the serial number and license holder can be newly assigned. This button gets into action, if one or several extension modules are installed afterwards, as the activation of these modules follows only after entering a new serial number (Fig. III.4, right).

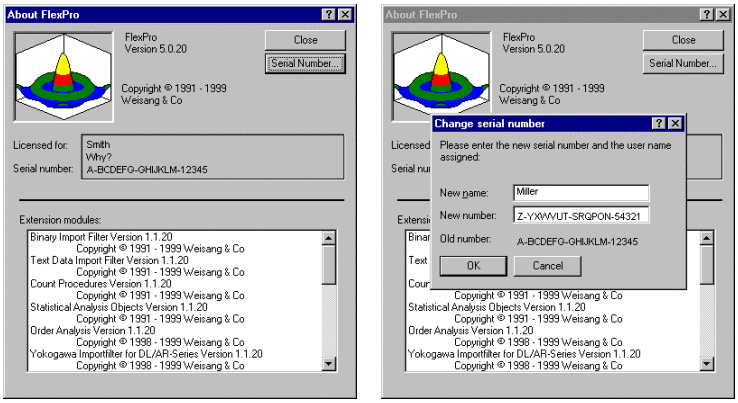


Figure III.4: License information and installed extension modules

Index

Accept
function ... 100
Activate
button ... 56
cursor ... 75
curve ... 116
extension modules ... 220
visualization object ... 109
Active
Cursor ... 91
Add
axis ... 27
curve ... 26, 122
Additional information
marker ... 140
Additional palette
Colors ... 220
Adjust
axes labeling ... 125
desktop automatically ... 73
diagram size in document ... 116
menu bar ... 106
scaling ... 85
toolbars ... 106
units ... 44
Analysis
FlexPro object ... 29
of data series ... 42
starting possibilities ... 28
Analysis object
create ... 29
insert ... 29
Analysis range
specify ... 91
Apply
settings ... 101
Arithmetic Operators ... 23
Arrange
curves ... 123
panes in the worksheet ... 106
Arrange panes
worksheet ... 108
ASCII-file
import ... 38
ASCII-Format ... 38
Assign
colors ... 153
component ... 57
variable type ... 57
Automate
data import ... 47
Automatic
adjust desktop ... 73
adjust toolbar ... 106
assign x-values ... 22
axis labeling ... 107
column title ... 65
data import ... 47
diagram display ... 106
display cross-hair cursor ... 73
find extreme values ... 95
labeling of axes ... 73
layers for curve ... 123
name of dataset ... 66
open FlexPro 5.0 Online Help ... 9
rename object ... 66
scaling ... 85, 122
x-axes designation ... 107
Automatically
customize desktop ... 116
Axes
add ... 27
adjust division labeling ... 136
adjust scaling to curve ... 27
axes system ... 27, 125
divisions/subdivisions ... 125
format ... 135
label automatically ... 73
position ... 27
scaling ... 135
specify division ticks ... 135
specify Starting/End values ... 138
Axes division
specify ... 135
Axes elements
labeling ... 136
Axes labeling
add additional information ... 136
automatically ... 125
change ... 125, 136
manually ... 125
Axes parameter
change ... 125
specify ... 125
Axis labeling
worksheet ... 107
Background color
set ... 129
Button
activate ... 12
activate automatically ... 56
apply ... 101

assigning key combinations ... 13
assignment to menu command ... 12
can be activated ... 12
deactivate ... 12
function according to Quick Info ... 13
function according to Status bar ... 13
help ... 164
Info ... 220
overview ... 170
Quick Info ... 12
serial number ... 220
Shortcut assignment ... 13
tab ... 12
toolbar ... 169
Buttons ... 12
group ... 12
Calculate
datasets ... 23
difference values ... 90
Calculation range
specify ... 91
Calculation result
issue ... 103
Change
axes labeling ... 125, 136
axes parameter ... 125
cursor display ... 88
Clipboard ... 63
data format ... 66
Excel import ... 64
import dataset ... 66
import text dataset ... 66
Color palette ... 134
Colors
additional palette ... 220
assign ... 153
select from palette ... 134
Column
add to table ... 151
name automatically ... 17
set header information ... 44, 49
title automatically ... 17
title with Excel data ... 65
width in list view ... 47
Combine
datasets ... 23
Command
help ... 164
preview ... 54
Component
assign ... 57
dataset ... 121
Compress
spread curve ... 86
Confirm
settings ... 101
Contents
help ... 166
preview ... 54
Context menu ... 162
diagram ... 78
FlexPro Explorer ... 20, 23, 32
toolbar ... 169
Context sensitive
help ... 163, 164
Coordinate window
calculate differences ... 90
copy content ... 90
display ... 89
find values ... 91
hide ... 76
index entry ... 91
issue values ... 91
open data table ... 91
open data view ... 91
place ... 76
read values ... 90
Coordinates ... 31
display ... 89, 220
Coordinates window ... 31
Copy
content coordinate window ... 90
data from the Text Data Import Wizard ... 40
Excel data ... 61, 65, 68
import dataset ... 38, 46
Create
analysis object ... 29
database ... 159
dataset object ... 17, 91
diagram ... 71
diagram object ... 20, 30, 71, 119
document ... 115
document object ... 34
document object ... 115
Excel Workbook ... 60
FlexPro object 17, 20, 23, 29, 30, 32, 34
formula object ... 23, 98
legend ... 126
subfolder ... 60
table object ... 149
table object ... 32
Cross-hair cursor ... 31
Cursor
activate in diagram ... 75
active ... 91
change display ... 88
cross-hair ... 31

detect extreme values ... 95
display ... 79
dissolve link ... 84
harmonic ... 82
help ... 164
hold down ... 83
issue values ... 90
leading ... 79
linked ... 78
menu ... 78
multiple ... 82
navigate via keyboard ... 80
navigate via mouse ... 80
original ... 79
position equidistantly ... 83
read values ... 90
set hysteresis ... 95
sign difference values ... 90
switch ... 88, 91
synchronize ... 112
toolbar ... 31, 78
vertical ... 88
Cursor interval
spread ... 85
stretch ... 85
Cursor lines
dock ... 80
Cursor link
dissolve ... 84
Cursor position
display ... 90
Cursor positioning
curve ... 83
equidistant ... 83
method ... 83
Cursor properties
display ... 78
Curve ... 26
activate ... 116
add ... 26, 122
arrange ... 123
compress ... 86
delete ... 124
delete from document ... 118
delete from worksheet ... 109
display ... 26
display automatically ... 106
display completely ... 104
display section ... 83
fine tuning ... 132
format ... 132
Paste ... 26
position at cursor ... 83
reflect ... 122
scale several ... 122
scaling for several ... 123
select ... 120
smooth ... 96
specify layers ... 123
specify symbols ... 133
specify type of line ... 134
spread ... 83, 103
stretch ... 83
Customize
desktop ... 116
menu bar ... 73
toolbars ... 73
workspace ... 170
Customized
toolbar ... 169
Data
edit ... 57
Preview ... 53
properties ... 56
Data entry
data view ... 18
manual ... 17
Data field
import ... 65
with strings ... 65
Data filing
organization ... 157
Data format
clipboard ... 66
edit ... 56
set ... 44
Data import
automatic ... 47
data view ... 65
formats ... 38
manual ... 40
via import schema ... 51
Data points
label in diagram ... 126
Data search
via index ... 91
Data section
diagram ... 92
diagram object ... 92
Data series
analyse automatically ... 42
Data table ... *See also* Data view
open via coordinate window ... 91
Data type
edit ... 56
Data view
after Excel import ... 65
column header information ... 44, 49

data entry ... 18
data import ... 65
dataset properties ... 57
delete rows ... 58
direct import ... 65
display/hide ... 160
edit data ... 57
FlexPro Explorer ... 17
function ... 17
import data ... 65
index ... 91
index column ... 17
insert rows ... 58
new dataset ... 18
operations ... 58
row index ... 18, 22
row number ... 18, 22
scrollbar ... 57
Database ... 16, 157
default name ... 159
extension ... 160
file extension ... 160
insert ... 159
new ... 159
save ... 160
save in a single file ... 161
save in folders/files ... 161
storage formats ... 161
task ... 157
Dataset
aggregated ... 68
combine ... 23
complex ... 68
component ... 121
copy ... 38, 46
define section ... 91, 151
description ... 44
display as diagram ... 73
display in worksheet ... 106
displaying Preview window ... 53
edit ... 96
edit comments ... 56
edit properties ... 56
edit unit ... 56
enter via formula ... 23
FlexPro object ... 17
from formula object ... 103
header information ... 43
import object ... 38, 46
name ... 66
new ... 18
origin ... 56
Preview ... 53
properties ... 18, 56, 101
rename in diagram ... 125
signal ... 68
simple ... 68
smooth ... 96
structure ... 68
transfer to document ... 116
transfer via Drag & Drop ... 116
unit ... 125
Dataset object
create ... 17, 91
divide ... 91
from sub dataset ... 91
insert ... 17, 91
Date
insert into text ... 136
Date/Time
insert into text ... 197
Deactivate
highlight search term ... 167
Default
name database ... 159
Default setting
import ... 59
path ... 158
Define
column header information ... 49
diagram as document ... 127
diagram as object ... 127
diagram type ... 119
import schema ... 47, 50
Definition
signal ... 46
Delete
cursor link ... 84
curve ... 124
curve from worksheet ... 109
import schema ... 53
object marker ... 111
placeholder ... 63
rows ... 58
Desktop
adjust automatically ... 73
customize ... 116
save setup ... 73
Diagram ... 71
activate cursor ... 75
activate in document ... 116
adjust size in document ... 116
background color ... 129
context menu ... 78
create ... 71
data section ... 92
deactivate in document ... 117
define as document ... 127

define as new object 127
delete from document 118
display automatically 106
display function 101
display section 86
distribute over several pages 128
fine tuning 127
FlexPro object 20, 30
insert 71
insert function 101
insert marker 140
label data points 126
name 73
properties 109, 127
Properties dialog box 127
scale proportionally in document 116
select display 20
specify type 119
split 128
stack 125
transfer into document 143
Diagram object
create 20, 30
data section 92
delete from document 118
insert 20, 30, 119
properties 109
Diagram properties 25
open 25
Diagram type
specify 119
Diagram window 22
open 73
Diagram Wizard 20, 71, 119
open 71
Diagrams over several pages 128
Dialog boxes
reduce number 133
Dialog help 165
Difference values
coordinate window 90
Dimension
FlexPro Explorer 16
Display
cursor position 90
cursor properties 78
curve 26
data in the Text Data Import Wizard 40
data view 160
extreme values 95, 140
function 101
help text 166
help topics 166
index value 91
object information 160
properties 56, 101
toolbar 169
via visualization object 109
window 73
Display completely
curve 104
Display/hide
coordinate 89
coordinate window 76, 89
cross-hair cursor 73
grid lines 126
Tip of the Day 8
toolbar 169
Dissolve
cursor link 84
Distribute
diagram over several pages 128
Divide
dataset object 91
Division labeling 136
Division ticks
specify 135
Dock
cursor lines 80
Docked
toolbar 170
Document ..... 71, 115 *See also* Document object
activate diagram 116
deactivate diagram 117
delete curve 118
FlexPro object 34
insert 115
insert text 146
print 34
results 155
revise 145
split diagram 128
transfer dataset 116
use text-editor 147
Document object 115
create 34
insert 34
Document window 115
Documentation
results 37
Drag & Drop 116
direct import from Excel 61, 68
direct import from Excel data 68
direct import of Excel data 61
import from Excel 68
with <CTRL>-key 106
Dynamic

display value ... 90
Edit
data ... 57
data type ... 56
dataset ... 96
dataset properties ... 56
properties ... 101
text ... 147
Edit axes ... 135
End values/Starting values
specify ... 138
Entry mark ... 57
Equidistant
cursor ... 83
Evaluate
object ... 103
Example file
folder ... 37
format ... 37
path ... 37
Excel
import data ... 63
Excel data
column title automatically ... 65
copy ... 61, 65, 68
data view ... 65
Drag & Drop import ... 61, 68
import ... 63
import at the press of a button ... 59
import via button ... 59
import via the clipboard ... 64
link with FlexPro ... 62
Excel import
Drag & Drop ... 68
Excel subfolder
automatic ... 60
Excel Workbook
in the FlexPro Explorer ... 60
open in FlexPro ... 60
Extension modules
activate ... 220
External formats
import ... 38
Extract
values ... 95
Extreme values
display ... 140
find automatically ... 95
F1-key ... 168
help function ... 168
Favorites
help ... 166
File
name extension for database ... 160
File formats ... 38
File structure
set ... 42
Find
extreme values ... 95
Fine tuning
curve ... 132
diagram ... 127
grid lines ... 128
legend ... 131
marker ... 143
Fix
cursor ... 83
FlexPro
components additionally install ... 220
Database ... 16
Installation ... 6
object ... 17
organization ... 17
project ... 16
set language ... 6
Start ... 16
system requirements ... 6
FlexPro 5.0 Online Help ... 9
FlexPro database ... 157
FlexPro Explorer ... 159
context menu ... 20, 23, 32
data view ... 17
dimension ... 16
list view ... 17
set up ... 16
setup ... 160
start analysis ... 28
FlexPro object
analysis ... 29
create ... 17, 20, 23, 29, 30, 32, 34, 38
dataset ... 17
delete ... 118
diagram ... 20, 30, 119
document ... 34, 115
Excel link ... 62
Excel Workbook ... 60
formula ... 23
highlight ... 20
insert ... 20, 23, 29, 30, 32, 34, 38
rename ... 56, 100
size in document ... 34
table ... 32, 149
text ... 146
transfer to document ... 34
visualization- ... 109
worksheet ... 104
FlexPro objects
sort by object attributes ... 160

sort by object information 160
FlexPro project 17
FlexPro Signal 46
Floating
toolbar 170
Floating point number 44
Folder
search 159
specify 157
Font
change 147
Font type
change 131, 136, 137
Format
axes 135
curve 132
legend 131
Formula
enter dataset 23
FlexPro object 23
result 103
Formula Editor
accept function 100
open 98
Formula object
create 23, 98
insert 23, 98
transfer into dataset 103
Formula window 23
Function 99
accept 100
button 13
data view 17
database 157
diagram 71
display graphically 101
document 71
Properties dialog box 127
select 99
worksheet 71, 104
Function insert
diagram 101
worksheet 101
Function Wizard 99
set parameters 99
Grid lines
display/hide 126
fine tuning 128
Harmonic cursor 82
Header information
dataset 43
Help
button 164
command 164
contents 166
context sensitive 163, 164
cursor 164
dialog box 165
F1-key 168
favorites 166
link search terms 168
menu command 164
Online 163
print topic 167
search for terms 167
searching with logical operators 168
Help topics
display 166
Hide ..... *Refer to* Display/hide
data view 160
Highlight
FlexPro object 20
Hysteresis
set 95
Image section
restore 86
Import
as data field 65
as text dataset 65
ASCII-file 38
ASCII-Format 38
automatic 51
default setting 59
direct 65
directly via Drag & Drop 61, 68
Drag & Drop 68
Excel data 59, 63
external formats 38
from Excel 63
text dataset 66
text file 38
Import data
data view 65
properties 47
Import file
select 39
Import filter 38
Import object
dataset 38, 46
Import schema 51
automatic data import 51
define 47
delete 53
save 50, 52
select 52
specify 50
Improve
curve 132

legend 131
Index
coordinate window 91
data search 91
data view 91
define range 151
insert value into marker 143
Index column 17
Individual setup tasks 157
Insert
analysis object 29
database 159
dataset object 17, 91
date in text 136
Diagram 71
diagram object 20, 30
diagram object 71
diagram ojekt 119
document 115
document object 34, 115
FlexPro object 20, 23, 29, 30, 32, 34
formula object 23, 98
legend 126
rows 58
scrollbar 85
subfolder 60
table object 32, 149
table title 152
text into document 146
Installation 6
Internet Explorer 6
Issue
cursor values 90
Key combinations
assign to button 13
Keyboard
navigate cursor 80
Label
data points in diagram 126
Labeling
axes elements 136
Language
select 6
Layer
automatically for curve 123
Leading cursor 79
Legend
format 131
insert 126
properties 126
Update 126
License holder 220
Link
search terms 168
Link object
for Excel data 62
List view 17
change column width 47
Magnifier 85
Management
object 157
Manual
Courier 6
data entry 17
data import 40
italic 6
note 5
small caps 6
Marker
delete 111
fine tuning 143
insert index value 143
insert into diagram 140
set 140
Marker frame 86
Menu
cursor 78
window 73
Menu bar 12
adjust 106
customize 73
Menu command
assigned button 12
help 164
Info on FlexPro 220
information in Status bar 13
presentation 12
Microsoft
Internet Explorer 6
Mouse navigation
cursor 80
cursor positioning 83
Move
toolbar 170
Multiple cursor 82
Name
database 159
diagram 73
Name of dataset
automatically 66
Object
evaluate 103
Excel link 62
manage 157
rename 56, 100
rename automatically 66
size in document 116
transfer into document 143

use multiple times ... 155
worksheet ... 104
Object attribute ... 160
Object information
display ... 160
Object management ... 162
Object marker
delete ... 111
Objects
sort ... 160
Online help
Microsoft Internet Explorer ... 6
Online Help ... 163
highlight search term ... 167
link search terms ... 168
print ... 167
setup ... 165
tab ... 165
Open
diagram properties ... 25
diagram window ... 73
Diagram Wizard ... 71
Excel Workbook ... 60
Formula Editor ... 98
function ... 99
help ... 164
toolbar ... 73, 106, 169
Worksheet Wizard ... 105
Operations
Data view ... 58
Operator Wizard ... 23
Organization
data filing ... 157
FlexPro Explorer ... 160
Organize
FlexPro windows ... 7
Origin
dataset ... 56
Original cursor ... 79
Overview
buttons ... 170
toolbars ... 170
Page view ... 34
Pane layout
worksheet ... 108
Panes
maximize in worksheet ... 112
worksheet ... 106, 108
Paste
curve ... 26
Path
default setting ... 158
search ... 159
specify ... 157
Peak values
select with cursor ... 95
Place
coordinate window ... 76
Placeholder
delete toolbar ... 63
text ... 197
Position
axis ... 27
curve at cursor ... 83
object in document ... 155
text field ... 148
Positioning
object in document ... 143
Preview ... 53
command ... 54
contents ... 54
data ... 53
display ... 220
print out ... 34
text data ... 66
Preview window ... 10
Print
document ... 34
Online Help ... 167
preview ... 34
Project
Database ... 16
Prompt ... 17
Properties
data ... 56
dataset ... 18, 56, 101
diagram ... 109, 127
diagram object ... 109
display ... 56, 101
edit ... 101
FlexPro object ... 18
imported data ... 47
legend ... 126
quick view ... 57
via data view ... 57
worksheet ... 109, 112
worksheet object ... 112
Properties dialog box
function ... 127
Quick Info ... 12
Range index ... 151
Reduce
number of dialog boxes ... 133
Reflect
curve ... 122
Rename
dataset ... 56
dataset in the diagram ... 125

FlexPro object ... 56, 100
object ... 56, 100
worksheet ... 107
Restore
image section ... 86
Results
document ... 155
documentation ... 37
Revise
document ... 145
Row index ... 18, 22
Row number ... 18, 22
Rows
delete ... 58
insert ... 58
Save
database ... 160
import schema ... 50, 52
in a single file ... 161
in folders/files ... 161
setup desktop ... 73
window setup ... 73
Scale
diagram proportionally ... 116
Scale division
specify ... 135
Scaling
adjust ... 85
automatically ... 85, 122
axes ... 135
multiple curves ... 123
Scrollbar
data view ... 57
insert automatically ... 85
Search
folder ... 159
help ... 167
help topic ... 167
in Online Help ... 167
path ... 159
text file ... 41
via coordinate window ... 91
with logical operators ... 168
Search term
deactivate highlight ... 167
link several ... 168
Online Help ... 167
Section
curve ... 83
dataset ... 91, 151
Select
curve ... 120
diagram display ... 20
function ... 99
import file ... 39
import schema ... 52
text file ... 41
Serial number ... 220
Set
background color ... 129
column header information ... 44
data format ... 56
data format/-type ... 44
data type ... 56
file structure ... 42
hysteresis ... 95
marker ... 140
Set parameters
Function Wizard ... 99
Settings
apply ... 101
confirm ... 101
Setup
FlexPro Explorer ... 16, 160
Online Help ... 165
Shortcut ... *Refer to* Key combination
Sign
cursor values ... 90
Signal ... 68
definition ... 46
in FlexPro ... 46
Size
object in document ... 116
Size in document
FlexPro object ... 34
Slider
insert automatically ... 85
Smooth
curve ... 96
dataset ... 96
Sort
objects ... 160
Specify
axes parameter ... 125
calculation range ... 91
dataset section ... 151
diagram type ... 119
division ticks ... 135
folder and path ... 157
layers for curve ... 123
properties of table ... 154
scale division ... 135
Starting/End values of axes ... 138
symbols for curve ... 133
table title ... 152
type of line curve ... 134
type of line for curve ... 134
value range ... 83

Split
diagram 128
Spread
between cursors 85
curve 83, 103
Stack
diagram 125
Start
FlexPro 16
Start of program 16
Starting/End values
specify for axes 138
Status bar 12, 220
Storage formats
database 161
Stretch
between cursors 85
Structure
dataset 68
Subfolder
create automatically 60
Switch
active cursor 91
active window 91
122
x versus y 122
Symbols
specify for curve 133
Synchronize
cursor 112
System requirements 6
Tab ..... *Refer to* Quick Info
Online Help 165
Table
add column of data 151
FlexPro object 32
specify properties 154
title 152
Table object 149
create 32
insert 32
Table Wizard 32
Text
insert Date/Time 197
Text data
preview 66
Text Data Import
set file section 42
Text Data Import Wizard 40
Text dataset
automatically 65
Text Editor 147
Text field
position 148
Text file
ASCII-Format 38
import 38
search 41
select 41
Text object 146
Tip
display 8
hide 8
Tip of the Day
display 8
hide 8
Title
table 152
window 162
Title bar
name 162
toolbar 170
Toolbar 12
3D View (Overview) 196
all buttons (Overview) 170
built in 170
context menu 169
Cursor 31, 78
Cursor (Overview) 199
Customized 169, 175
Dataset (Overview) 182
display 169
docked 170
extract 170
FlexPro Explorer (Overview) 176
FlexPro Objects (Overview) 208
floating 170
Font (Design) (Overview) 190
Formula (Overview) 179
meaning 169
move 170
open automatically 106
overview 170
Position(ing) (Overview) 193
select via menu 169
size 170
Standard 170
Text Fields (Overview) 197
Text Placeholder (Overview) 197
title bar 170
Tools 31
Tools (Overview) 184
Window Function 27
Window Function (Overview) 210
Worksheet (Overview) 198
Toolbars
adjust 106
customize 73

open automatically ... 73
Tools
toolbar ... 31
Transfer
data into worksheet ... 106
dataset into diagram ... 73
formula object into dataset ... 103
object in document ... 143
Transfer to document
FlexPro object ... 34
Tutorial
example file ... 37
task ... 37
Type of line
define for curve ... 134
Undo
image section ... 86
Unit
dataset ... 125
Units
adjust ... 44
Value range
specify ... 83
Values
coordinate window ... 91
display dynamically ... 90
extract ... 95
read via coordinate window ... 90
Variable type
assign ... 57
Vertical
cursor ... 88
Visualization object ... 109
activate ... 109
Window
active ... 91
close ... 9
coordinates ... 31
Coordinates ... 220
diagram ... 22
formula ... 23
organize ... 7
Preview ... 10, 53, 220
switch ... 73, 91
title ... 162
Window Function
toolbar ... 27
Window layout
worksheet ... 108
Window setup
save ... 73
Windows-button
close window ... 9
Wizard ... 20, 23, 32, 40, 71
Diagram ... 20, 71, 119
Function ... 99
open ... 71
Operator ... 23
Table ... 32
Text Data Import ... 40
Worksheet ... 105, 108
Worksheet ... 71, 104
arrange panes ... 106, 108
axis labeling ... 107
display data ... 106
maximize panes separately ... 112
pane layout ... 108
properties ... 109, 112
rename ... 107
several panes ... 108
synchronize cursor ... 112
Window layout ... 108
Worksheet object ... 104, 112
properties ... 112
Worksheet Wizard ... 105, 108
Workspace ... 12
customize ... 170
customize individually ... 170
Writing cursor ... 57, 147
x-axis
scale automatically ... 85
x-values
assign automatically ... 22