



Time Series Analyzer

User guide

Version 1.1.0

C) Josef Pirkl 2010-2012

[Web pages](#)

Sorry for my English :-)

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Program

Time Series Analyzer is tool for time series analyzing, creating of regression models, smoothing, seasonal adjustment, hypothesis testing, prediction, curves making, etc. Application has very nice visually output for many of supported areas. Minimum starting settings, possibility to implement that changes later (Picture 1).

What is new ? **NEW!**

Supported areas:

Base: Original data, Mean difference, Variance, Cumulative, ACF.

Statistics: Histogram, Cumulative histogram, N_P plot.

Differences: First difference, Second difference, Third difference, Growth rate, Relative increment (%).

Transformations: Ln(y), Square root(y), Standardization(y), Normalization(y).

Partial sums: 2,3,4,5,6 parts.

Moving averages smoothing: simple, centered.

Median smoothing.

Exponential smoothing: single (first-order), single (Brown`s), double, double (Holt`s).

Regressions: Polynomial (Constant, Linear, Quadratic, Cubic, 4th, 5th), Exponential, Modified Exponential, Power, Gompertz, Logistic.

Regressions residuals.

Autocorrelations: ACF, PACF **NEW!**.

Box-Jenkins: **NEW!** AR, MA, ARMA process.

Seasonal adjustment: Additive, multiplicative, constant seasonal model. Additive and multiplicative decomposition.

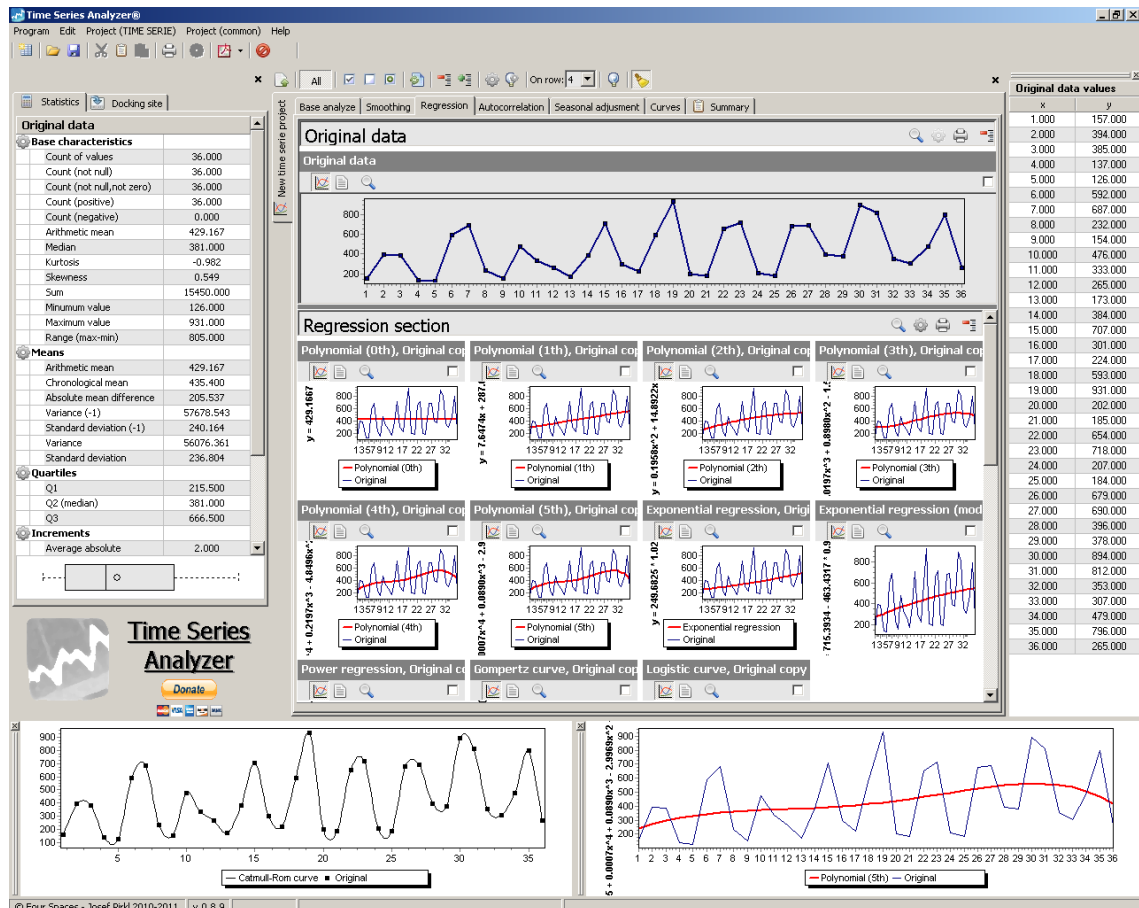
Seasonal smoothing: **NEW!** Triple Holt-Winters exponential smoothing.

Curves: B-Spline, Chaikin, Catmull-Rom, Ferguson.

Hypothesis Testing: Kolmogorov-Smirnov (KS), Kolmogorov-Smirnov (Lilliefors/Van Soest variant), W/S, D`Agostino, Shapiro-Wilk, Jarque-Bera (chi-square), Jarque-Bera (Lagrange multiplier), Jarque-Bera (advanced Lagrange multiplier) normality tests.

Scheduled areas for next development:

Spectral analyzes, Arima, Dependency finder, Neural Network modelling etc.



Picture 1 - "Time series analyzer" program

Easy example especially for a new user you can find [here](#). Detailed program guide is [here](#).

1.1 Special requirements

For Excel .xls reading must be installed **MDAC 2.8** and higher (**Microsoft Data Access**). This software is usually installed in every Microsoft Windows. If there will be problem, download it from official Microsoft web pages (free software).

For Excel .xlsx reading must be installed "**Microsoft 2007 Office system driver: Data Connectivity Components**".

Link: <http://www.microsoft.com/downloads/en/details.aspx?FamilyID=7554F536-8C28-4598-9B72-EF94E038C891&displaylang=en>

1.2 How to: New "Tutorial" document

For base tutorial purpose you can use special file **tutorial.pdf**. This file contains many advice sections in "**How to..**" style.

1.3 Licence

Program is free for personal use and for students (in this version).

Other user types (for example company, school as organization) please contact author for licence dealing.

The author won't take any responsibility for any damages this software will occur.

1.3.1 Project sponsoring

Program is free for personal use and for students. BUT, you can help in next program development by sponsoring across *PayPal* by using this link from application.



https://www.paypal.com/cgi-bin/webscr?cmd=_donations&business=QNDU6QTBUZL4S&lc=CZ¤cy_code=CZK&bn=PP%2dDonationsBF%3abtn_donateCC_LG%2eqif%3aNonHosted

If you send sponsor gift, please, write into PayPal note your suggestion for program improvement - or send it into my mail address.

1.4 Instalation / unistallation

There are no special requirements for the instalation - you can only copy directory structure into any directory and then you can run application (Picture 2).



Picture 2 - program icon

For uninstallation you can delete directory only. All settings are written only to local files, no registers writing.

1.4.1 Advice - saved settings from old version

If you have some older version and if you install new, let in the destination aplication directory your old setup file: **setup.xml**. If new version finds this old setup file, it will use it to try read your saved settings.

1.4.2 Version changes

Version changes are completely descripted in Appendix [here](#).

1.5 Contact

Contact addresses. All suggestions for better program improvement will be welcomed.

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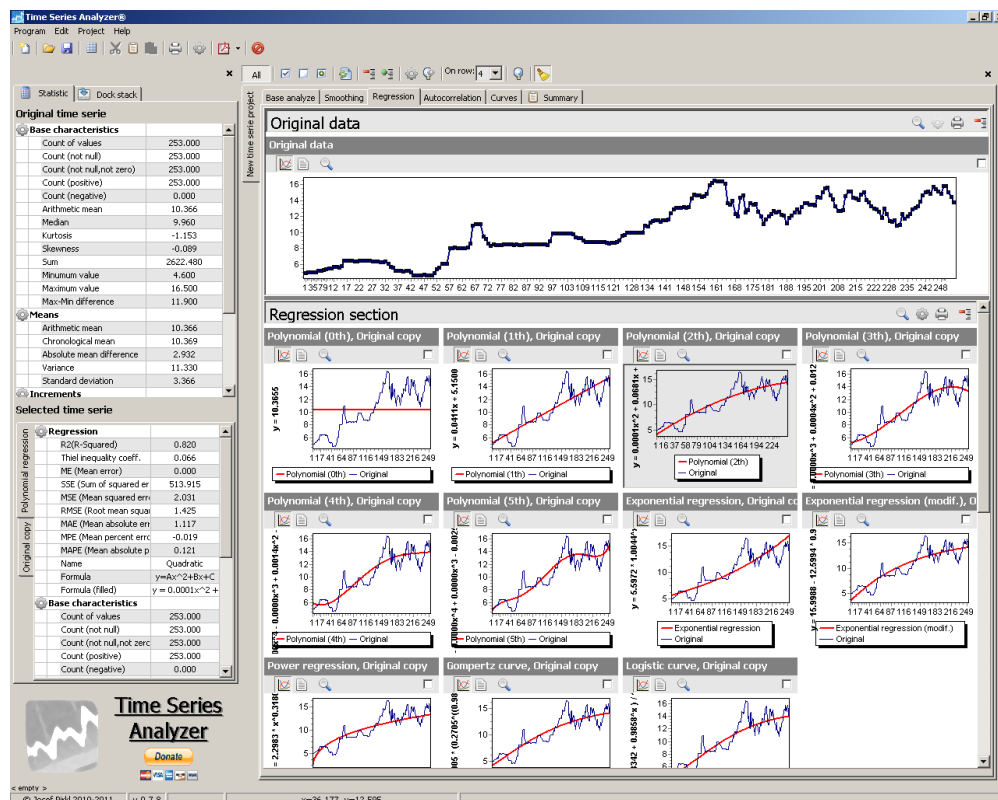
<mailto:TimeSeriesAnalyzer@gmail.com>

www.josefpirkl.com/software.php

2. Program structure

This chapter shows base application structure with opened project (Picture 1). Basic program structure is composed from these elements:

- I. Left space
- II. Work space
- III. Statusbar
- IV. Main menu
- V. Main toolbar
- VI. Current project
- VII. Project toolbar
- VIII. Zoom page
- IX. Statistic page, Dock stack pages
- X. More Graphboxs
- XI. Summary page
- XII. At bottom and at right are new other dock sites.¹

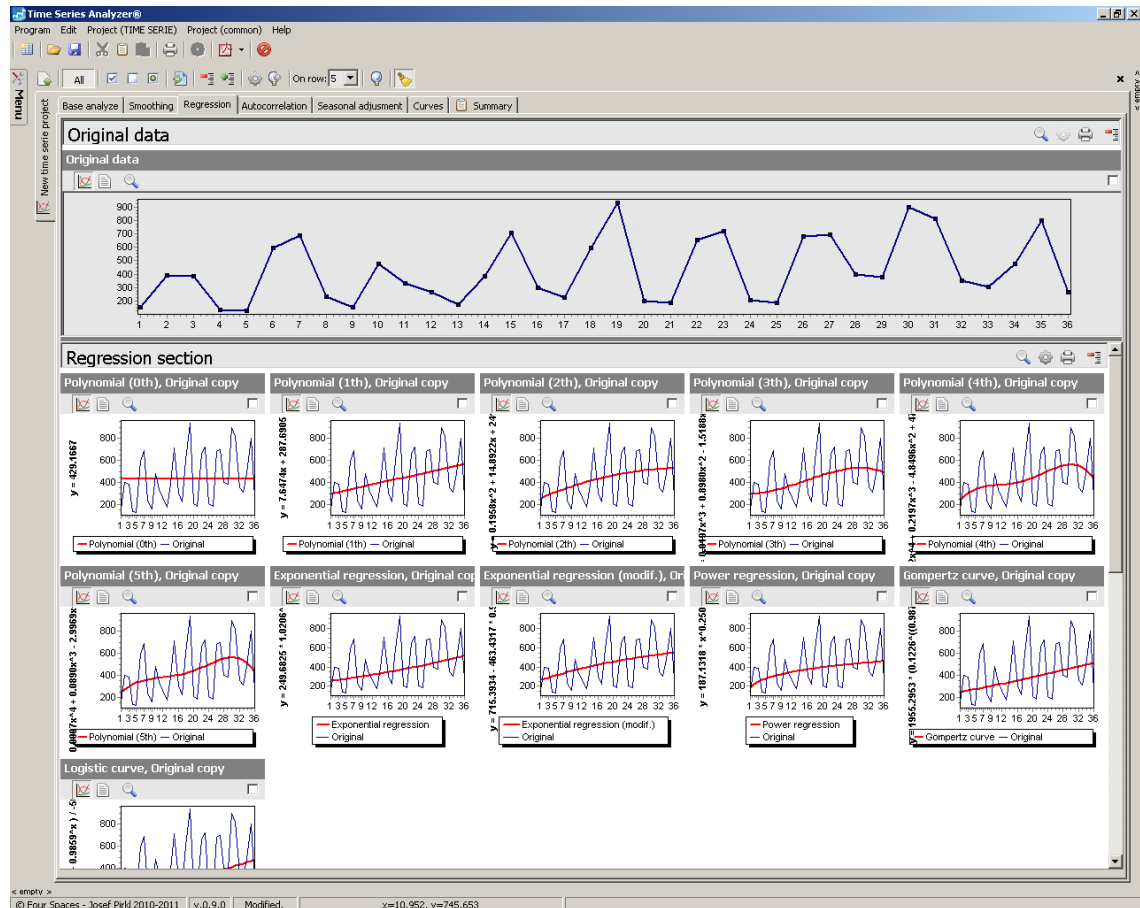


Picture 3 - Basic application structure

¹ Since version 0.7.2.

2.1 Increasing size of work space area

By clicking on the **x** icon left beside Graphbox is possible to hide this area and increase the work space area (Picture 4).



Picture 4 - Increased size of work space area

Returning to initial spaces sizes is performed by moving mouse across Menu button, which will be shown on window left border (if the left side is hidden - Picture 5).



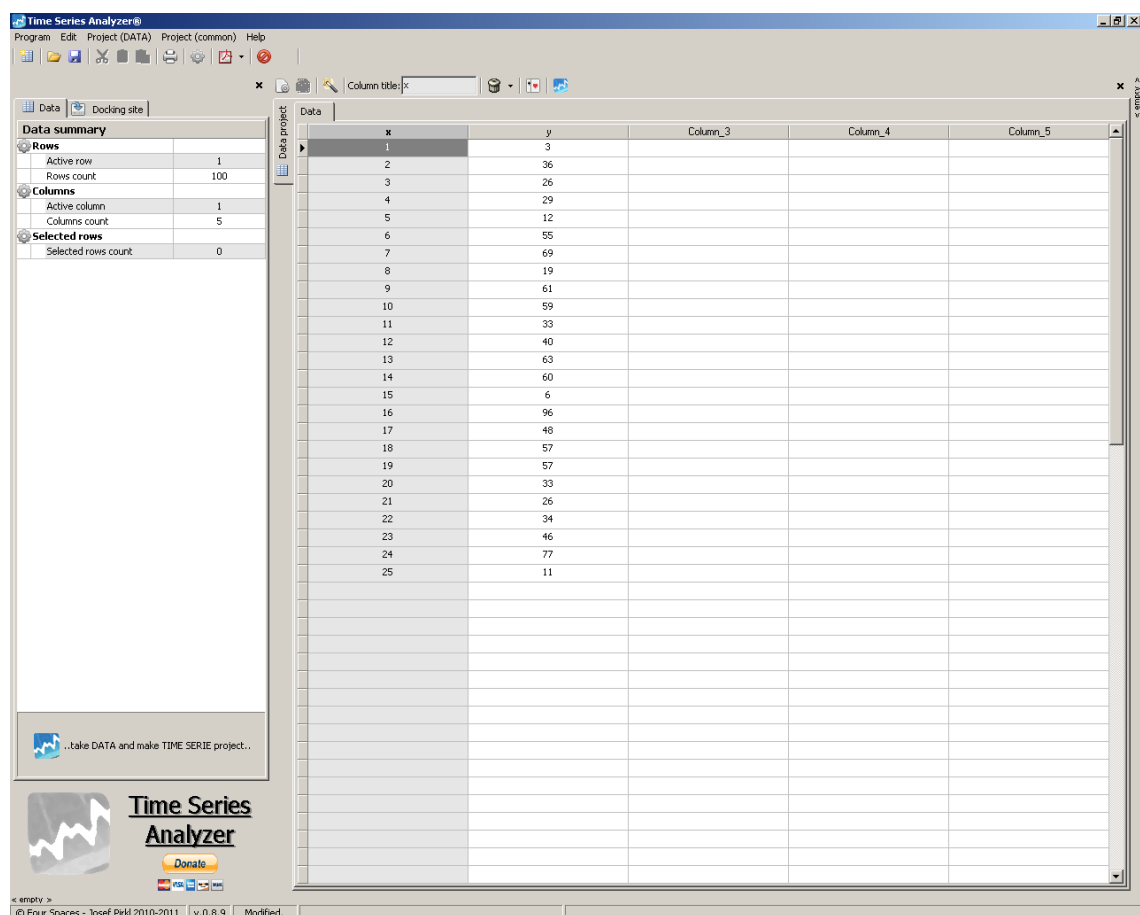
Picture 5 - Menu button

3. Program projects

In the program you can work with these projects:

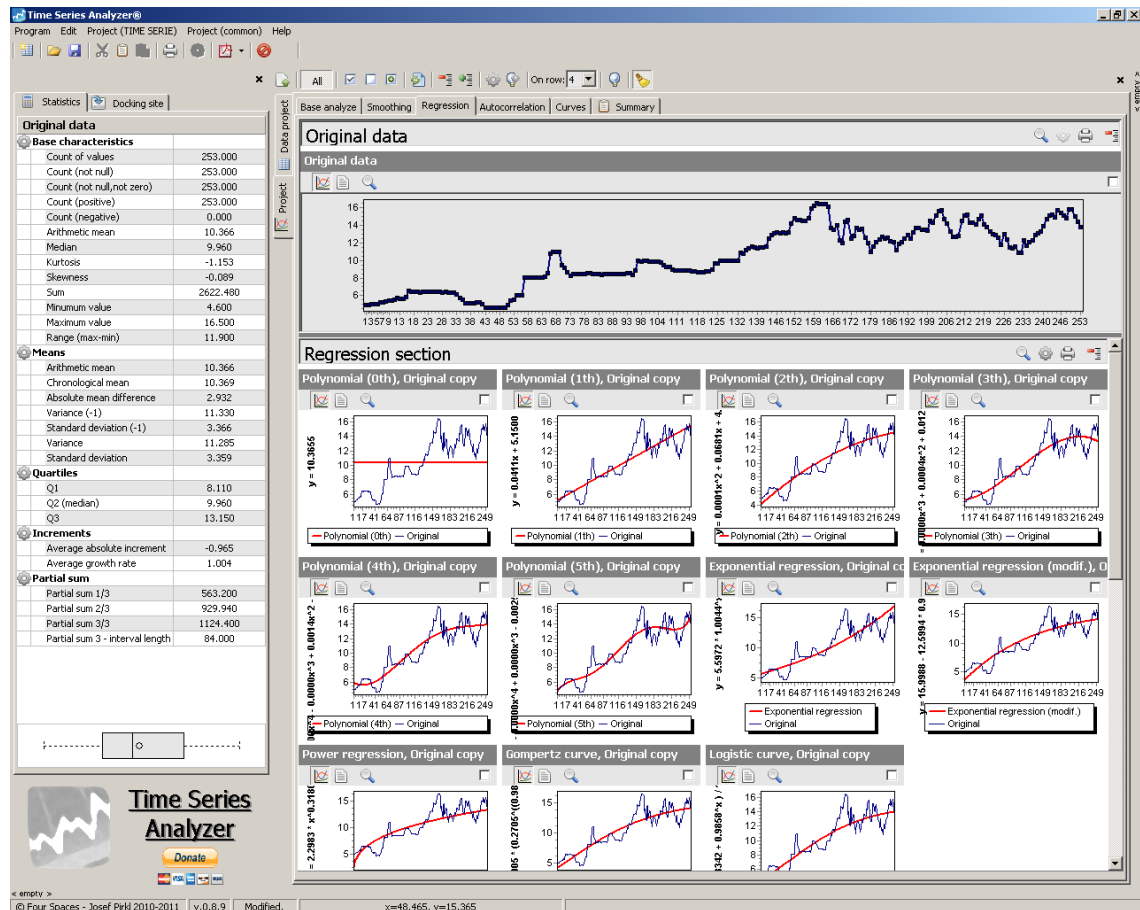
- DATA project.
- TIME SERIE project.

At first you must create DATA project. Into this DATA project you can write yours data by keyboard, or you can load that data from .txt/.xls/.xlsx file. This DATA project you can save, but you needn't it. It is recommended save all used project (Picture 6).



Picture 6 - DATA project

After that you create from this data new TIME SERIE project. This project contains copy of all DATA project data (Picture 7).



Picture 7 - TIME SERIE project

More information about creating DATA and TIME SERIE project you can find in [tutorial.pdf](#) file.

4. Detailed program guide

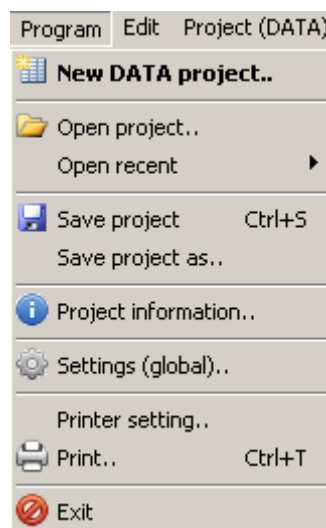
This chapter describes particular parts of *Time Series Analyzer* program.

4.1 Main menu commands

The main menu is menu on top window. It is consisted from several submenus.

4.1.1 Program submenu

This is submenu for operation with project; you can create here new project (Picture 8). Descriptions for particular items contain Table 1.



Picture 8 - Program submenu

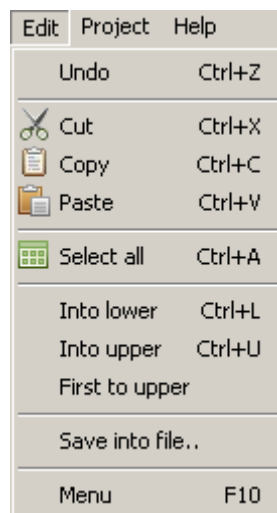
Table 1 - Program submenu description

Action	Description
New DATA project..	Start new empty DATA project.
Open project..	Open saved project from file. Saved project has .tsp extension for TIME SERIE project, and .dp extension for DATA project.
Open recent	List of earlier opened projects. You can open it again.
Save project	Saving project into external file.
Save project as..	Saving project into external file, renaming file name is possible.
Project information..	Dialog with project information.
Settings (global)..	Global settings.
Printer setting..	Standard printer setting dialog.

Print..	For DATA project print data list; for TIME SERIE project print all selected graphs throught all active project Graphboxs.
Exit	Closing application.

4.1.2 Edit submenu

This submenu is prepared for working with edit box (or memo item) in the main window and especially in ["Text" dialog](#). At this time is possible to use F10 key for main menu activation (Picture 9).



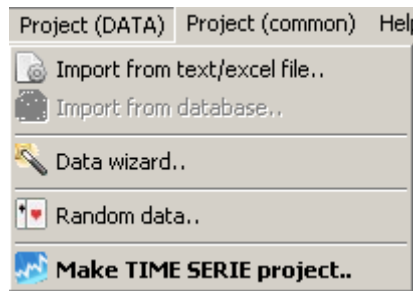
Picture 9 - Edit submenu

Table 2 - Edit submenu description

Action	Description
Undo	Step back in editation.
Cut	Cut text from item.
Copy	Copy text from item into clipboard.
Paste	Paste text from clipboard into item.
Select all	Select all text in item.
Into lower	Convert selected text into lower cases.
Into upper	Convert selected text into upper cases.
First to upper	Convert first letters in every word (in selected text) into upper case.
Save into file..	Saving item text into text file.

4.1.3 Project (DATA)

This submenu is active for DATA project only (Picture 10). Item descriptions shows Table 3.



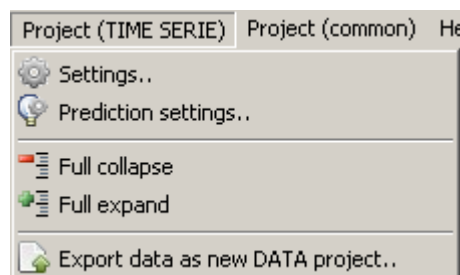
Picture 10 - Project (DATA) submenu

Table 3 - Project (DATA) submenu description

Action	Description
Import from text/excel file..	Opens special dialog for importing data from external file.
Import from database..	Not implemented. Prepared for future versions.
Data wizard..	Shows special dialog for advanced work with data.
Random data..	Generates random data set.
Make TIME SERIE project..	Opens special dialog for create new TIME SERIE project (with DATA project data).

4.1.4 Project (TIME SERIE)

This submenu is active for TIME SERIE project only (Picture 11). Item descriptions shows Table 4.



Picture 11 - Project (TIME SERIE) submenu

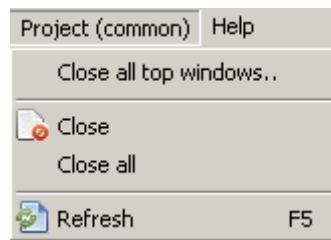
Table 4 - Project (TIME SERIE) submenu description

Action	Description
Settings..	Setting for actual project.

Prediction settings..	Shows " Prediction settings " dialog.
Full collapse	Collapsing all section in Graph box .
Full expand	Expanding all section in Graph box .
Export data as new DATA project..	Shows " Data serie selection " dialog for selection data serie that will be used as base for new DATA project.

4.1.5 Project (commom)

This submenu is common project menu (for all project types). The submenu is connected into active opened project (Picture 12). Description for particular items contains Table 5.



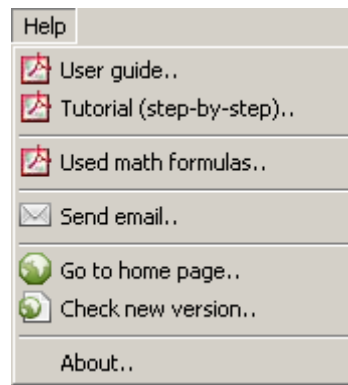
Picture 12 - Project submenu

Table 5 - Project submenu description

Action	Description
Close all top windows..	This item closes all top stayed project's windows (if they exists).
Close	Close actual project.
Close all	Close all opened projects.
Refresh	For TIME SERIE project refresh Graphbox content, or for DATA project refresh data list.

4.1.6 Help submenu

Last submenu in the main menu has information character (Picture 13). A description for particular items contains Table 6.



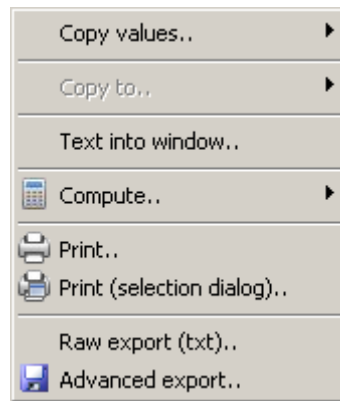
Picture 13 - Help submenu

Table 6 - Help submenu description

Action	Description
User guide	Show user guide in pdf format.
Tutorial (step-by-step)	Special tutorial file in "How to.." style.
Used math formulas..	Incomplete (yet) pdf document with some formulas used in this application.
Send email..	Email (address,subject) with message to author.
Go to home page..	Transferring to project webside
Check new version	If you have access to Internet, you can check new version. For proper update must be in "tools" subdirectory " Update manager " (umanager.exe). If some files are replaced, then original replaced files are placed into "_backup" subdirectory. Tip: It is recommended set full access right in "Time Series Analyzer" directory and below subdirectories.
About	Common information about program.

4.2 List popup (context) menu

For every list is possible to show this context menu (Picture 14) by using right mouse button (above the list). Descriptions for menu items contains Table 7.



Picture 14 – List popup menu

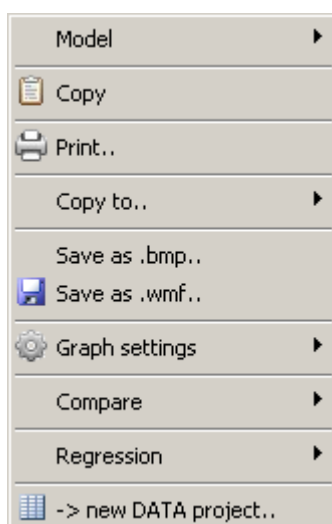
Table 7 - List popup menu descriptions

Action	Description
Copy values.. -> Copy selected cell	Copy only selected cell into clipboard.
Copy values.. -> Copy selected rows	Copy selected rows into clipboard.
Copy values.. -> Copy selected in column	Copy selected rows in active column into clipboard.
Copy values.. -> Copy entire column	Copy all rows in selected column into clipboard.
Copy values -> Copy all	Copy all list context into clipboard.
Copy to.. -> window	Copy active list into window.
Copy to.. -> dock stack.	Copy active list into dock stack (tab in left site).
Text into window..	Enables copy text of current cell into "Text" dialog .
Compute.. -> ..count	For numeric column computes count of selected rows.
Compute.. -> ..sum	For numeric column computes sum of selected rows.
Compute.. -> ..average	For numeric column computes average of selected rows.
Compute.. -> ..variance	For numeric column computes variance of selected rows.
Compute..	For numeric column computes standard deviation of

-> ..standard deviation	selected rows.
Print..	Print all text context in Text report .
Print (selection dialog)..	Print all text context in Text report . Before printing shows " Columns/levels list selection dialog " for selection columns and specify levels for print.
Raw export (txt)..	Easy file export.
Advanced export..	File export dialog with more export settings.

4.3 Graph popup (context) menu

For every graph is possible to show own popup menu (by right mouse button). This menu offer this possibilities (Picture 15). Descriptions for menu items contains Table 8.



Picture 15 – Graph popup menu

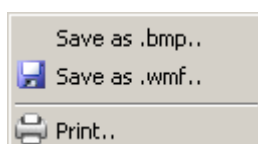
Table 8 - Graph popup menu description

Action	Description
Model -> Output to text	For the graph with proper existing model it shows model characteristics (with using "Text" dialog).
Model -> Output to printer	Print of the model characteristics.
Copy	Copy active graph into clipboard.
Print	Send active graph into printer.
Copy to..	Enables "copy" actual graph figure into: <ul style="list-style-type: none"> ▪ "..window": Graph is copied into new top stayed window. ▪ "..dock stack" : Graph is copied into "Dock stack".
Save as .bmp	Saving active graph into bitmap file in format *.bmp.

Save as .wmf	Saving active graph into metadata format *.wmp. This metadata is useful if you plan to change size of the saved graph, image view quality will be after size changing the same.
Settings -> Settings dialog..	Command shows "Specific graph settings" dialog for custom graph settings.
Settings -> Load settings..	Load specific graph settings from the file.
Settings -> Save settings..	Save specific graph settings into file.
Compare -> Add..	Add data serie to "Dataserie compare" dialog.
Compare -> Clear..	This command clear (unselect) first selected dataserie for "Dataserie compare" dialog.
Regression	This option is visible only for graph with some type of regression. <ul style="list-style-type: none"> ▪ "Predict value (Y) for X.." - show this dialog for value prediction.
➔ new data project..	Very fast method to create new DATA project from current graph (time serie) data.

4.4 Box-plot popup (context menu)

Since version 0.9.0 is for original data serie shown in Statistics tab the box-plot. That box-plot has our context menu (Picture 16). The descriptions for menu items contains Table 9.



Picture 16 – Box-plot popup menu

Table 9 - Box-plot popup menu description

Action	Description
Save as .bmp..	Saving active box-plot into bitmap file in format *.bmp.
Save as .wmf.	Saving active box-plot into metadata format *.wmp. This metadata is useful if you plan to change size of the saved image, image view quality will be after size

	changing the same.
Print	Print active box-plot.

5. Toolbars

5.1 Main toolbar

The main toolbar is located under the main menu and its actions are accessible for all opened projects. All its actions are accessible too from main menu (Picture 17). Items descriptions shows Table 10.



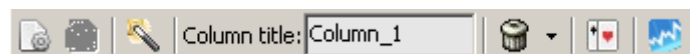
Picture 17 – Main toolbar

Table 10 - Main toolbar items description

Icon	Description
	Create new DATA project.
	Open existing project from file.
	Save active project into file.
	Cut text from active edit box.
	Copy text from active edit box into clipboard.
	Paste text from clipboard into active edit box.
	Print selected graphs through all project's Graphboxes.
	Global settings dialog. ²
	Show user guide/tutorial in pdf format. Adobe Acrobat must be installed.
	Closes application.

5.2 DATA project toolbar







This toolbar is accessible only for DATA project (Picture 18). Items descriptions show Table 11.



Picture 18 – DATA project toolbar

Table 11 - DATA project toolbar item description

² Global settings is not accessible for TIME SERIE project because that project type has our local settings.

Icon	Description
	Opens special dialog for importing data from external file.
	Not implemented. Prepared for future versions.
	Shows special dialog for advanced work with data.
Column title:	Enables renaming of column title.
	Support for clearing/deleting in list. Accessible options: <ul style="list-style-type: none"> ▪ Clear all - clear all cells in list. ▪ Clear all in active column - clear all cells in list active column. ▪ Clear selected in active column - clear all cells in selected rows in active column. ▪ Clear all in selected row(s) - clear all cells in selected rows. ▪ Delete active column - delete (remove) active column. ▪ Delete selected row(s) - delete (remove) selected rows.
	Generates random data set.
	Opens special dialog for create new TIME SERIE project (with DATA project data).



5.3 TIME SERIE project toolbar











This toolbar is accessible only for TIME SERIE project (Picture 19). By this toolbar you are working with active *Graphbox* object. Toolbar items descriptions shows Table 12.



Picture 19 – TIME SERIE project toolbar

Table 12 - TIME SERIE project toolbar items descriptions

Icon	Description
	Shows "Data serie selection" dialog for selection data serie. Its data will be then used as base for new DATA project.
All / Active	When is "ALL", change will be performed into all project's Graphbox on all project's tabs. When is "Active", change will be performed to active Graphbox.
	Select that graph (time serie).

	Deselect that graph (time serie)
	Inverse operation in graph (time serie) selecting.
	Performs refreshing of the current Graphbox - repainting.
	Performs collapsing of all sections in Graphbox (without <i>Base section</i>). <i>Note: This option is not affected by "All / active" setting.</i>
	Performs expanding of all sections in Graphbox. <i>Note: This option is not affected by "All / active" setting.</i>
	Project settings dialog (local TIME SERIE project settings).
	Prediction settings dialog.
On row: 	Graphs count on one row in Graphbox.
	If is checked, turns on show prediction values (for some section).
	If is checked, delete from Graphbox all graphs with errors - for example graph with calc error, a little values for generating, etc.




5.4 Graphbox section toolbar

Every Graphbox section has at right side toolbar (Picture 20) with those functions (Table 13).



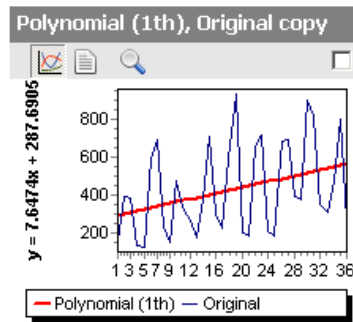
Picture 20 – Graphbox section toolbar

Table 13 - Particular Graphbox section toolbar actions

Icon	Description
	Printing all/selected graphs from section in Graph-grid report .
	For some section is accessible section settings .
	Collapsing / expanding of section.




5.5 Graphbox graph toolbar

Every graph in the Graphbox has its toolbar (Picture 21). The items descriptions shows Table 14.



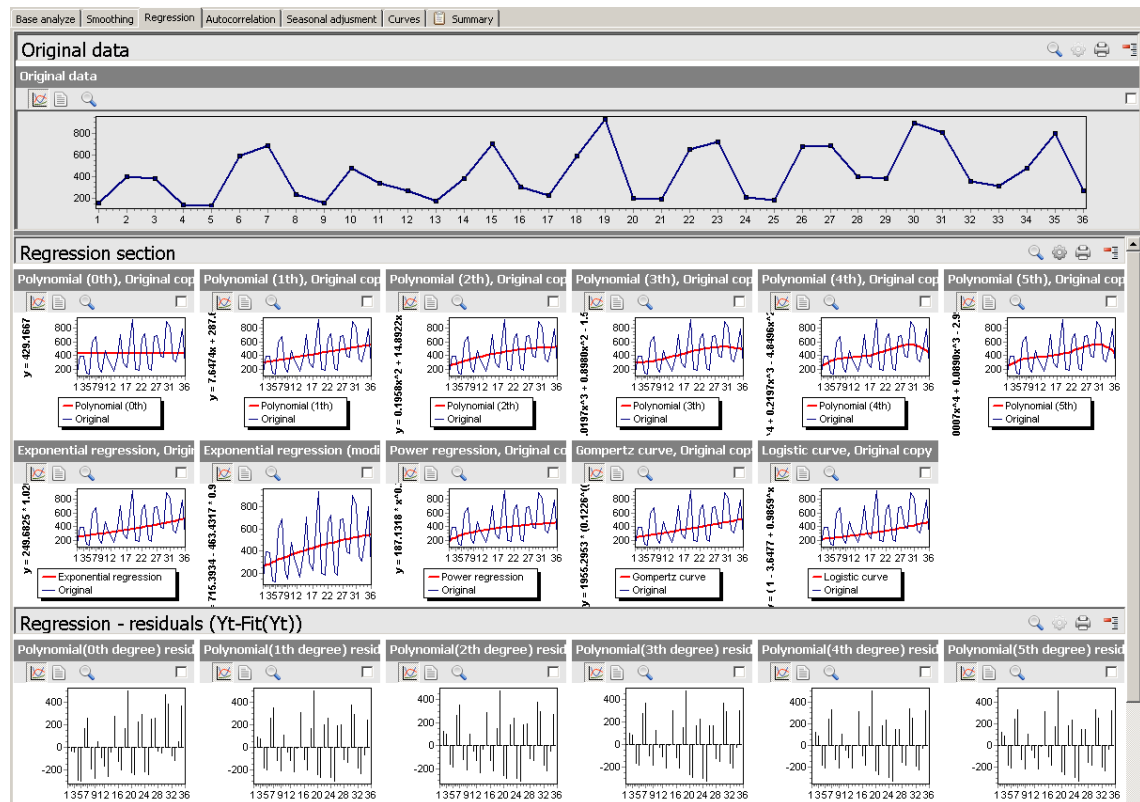
Picture 21 – Particular graph and its toolbar

Table 14 - Particular graph (in Graphbox) toolbar actions decriptions

Icon	Description
	Graphical view to time serie (like on Picture 21).
	Text view to data. More here .
	Other actions with graph. Possible values are: Zoom into "zoom" page.. - Graph will zoomed into "Zoom page". More here . Graph into window.. - Graph will zoomed into stayup window. Graph into dock stack.. - Graph will be placed into dock stack (on left side.) Data into window.. - Data will zoomed into stayup window. Data into dock stack.. - Data will be placed into dock stack (on left side.)
Checkbox	Last checkbox is useful for graph selection, for example for printing.

6. The Graphbox

The Graphbox is base object at every opened TIME SERIE project. It enables display project graphs divided into sections (Picture 22). Top section on every tab with original data is expanded into entire *Graphbox* width.




Picture 22 – The Graphbox




Above Graphbox are tabs divided into this section group:

- Base analyze.
- Smoothing.
- Regression.
- Autocorrelation.
- Box-Jenkins.
- Seasonal adjusment (if is seasonal support in [project creating](#)).
- Seasonal smoothing (if is seasonal support in [project creating](#)).
- Curves.
- Summary.

Clicking into particular graph get that graph focus and became active. This is indicated (according your settings) usually by light gray background.


6.1 Showing used data

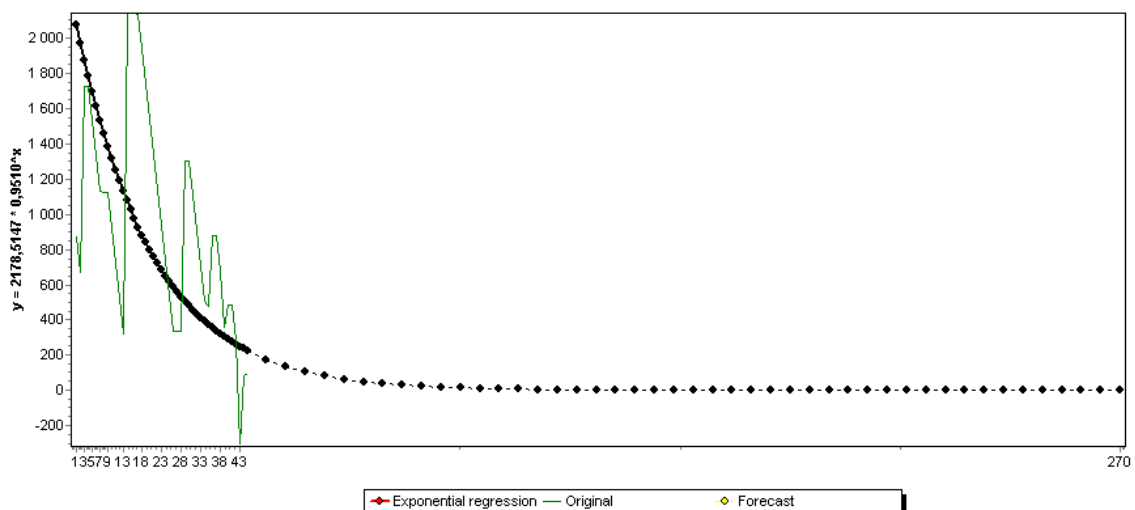
By clicking to icon  is shown list with data in text form (Picture 23). This list contains X, Y, M value. When in graph are more axis then the Y value is writeln moretimes into next columns. Predicted values are writeln with other color.

Original data		
		
Time series values		
x	y	m
1	868,796	1
2	668,796	1
3	1728,800	1
4	1728,800	1

Picture 23 – Text view to graph data

6.2 Values prediction

For some graph (model) is possible to try predict future values. For this function is used icon  on the Graphbox toolbar. When the button is down, predicted values are displayed (Picture 24). For prediction is usually used dotted line.



Picture 24 – Predicted values for regression function (with dotted line)


In text list is for prediction used other color - default values is red.


Time series values			
x	y(Exponential regression)	y(Original copy)	m
38	322,289	681,252	1
39	306,483	362,252	1
40	291,451	482,252	1
41	277,157	482,252	1
42	263,564	282,252	1
43	250,638	-316,748	1
44	238,345	82,252	1
45	226,656	102,000	1
50	176,266		1
55	137,078		1
60	106,603		1
65	82,903		1

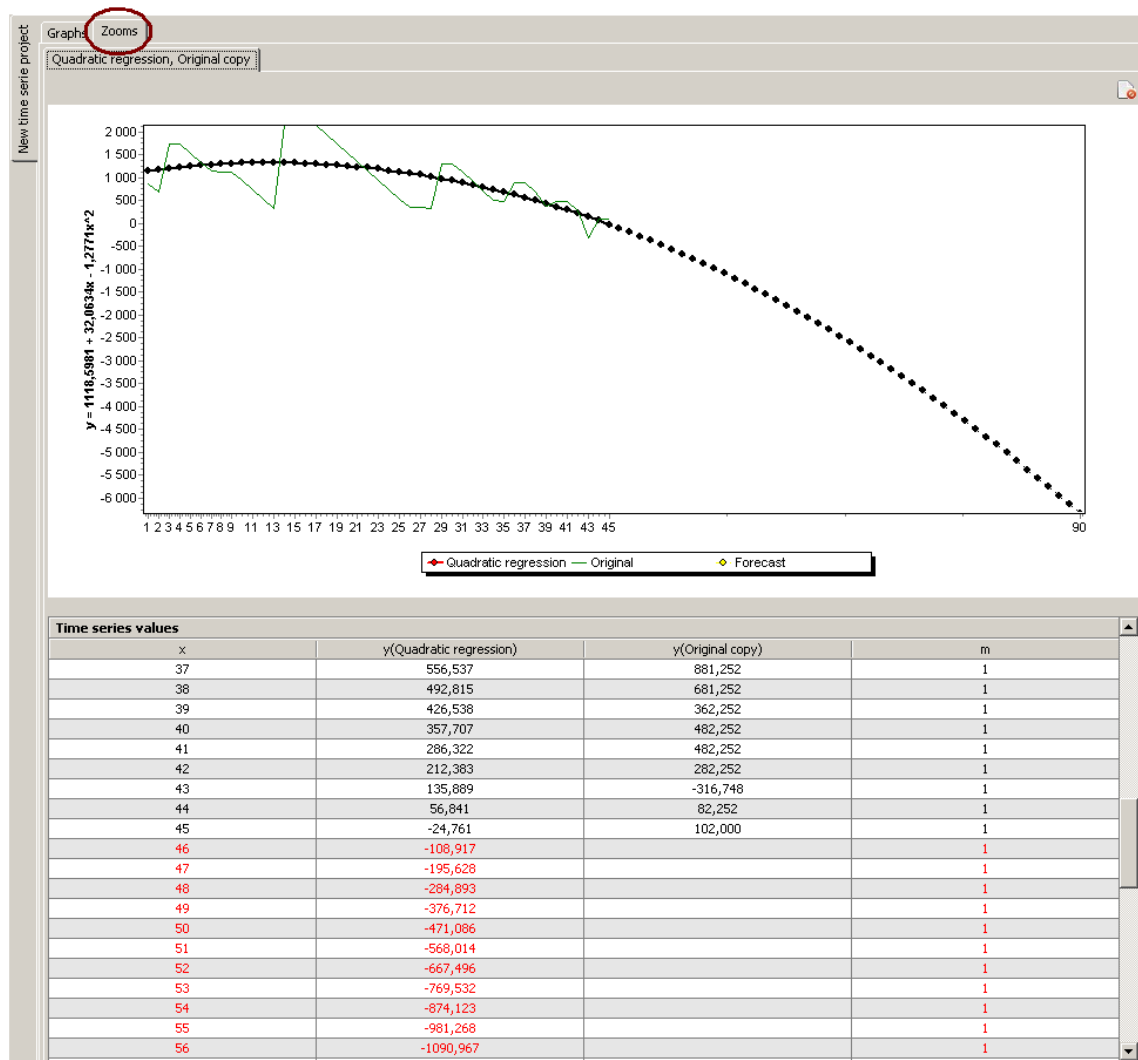
Picture 25 – Predicted values in list with red color

For prediction generation has high influence project settings - especially way of generation X values for predicting. More [here](#).

6.3 Graph zooming

Every graph in Graphbox object is possible to *zoom* into zoom page by clicking on  icon from particular graph toolbar (Picture 26). The zoom page is consisted from zoom graph in top page part, and from list with data. With other color are here predicted values.

On this zoom parent page can be located more zoomed graph. By clicking on  icon in right top border is possible close active zoomed graph. This is useful when you need refresh data into *zoom page*, because if graph exists in zoom page, is displayed only, not refreshed ! For refreshing at zoom page is needed to close zoomed graph and then call zoom for specified graph again.

Picture 26 – Zoom page for particular graph³

Opened graph's zooms are saved into project file, so, when you open project, zoom pages are opened too.

6.4 Statistical page

This page in left part of main window show statistical characteristic of the:

- Original time serie, above (=first time serie in Base section)

Original time serie contains box-plot. Box-plot shows *min* and *max* value, Q1, Q2 (median) a Q3 quartile. With the circle is market *mean*.

- Active time serie, at bottom.

³ This zoom preview is Quadratic regression graph with active prediction. Predicted value are shown with dotted line.

Statistic list for active time serie (at bottom) can contain more time series.

The screenshot displays the 'Statistics' window of the Time Series Analyzer. It features two main sections: 'Original data' and 'Selected time serie'. The 'Original data' section includes a 'Base characteristics' table with 14 rows of statistical data and a 'Means' table with 3 rows. The 'Selected time serie' section includes a 'Base characteristics' table with 14 rows of statistical data and a 'Means' table with 5 rows. A vertical sidebar on the left of the 'Selected time serie' section allows switching between 'Mean difference' and 'Constant' views. A central control area contains a dashed box with a circle icon.

Original data

Base characteristics		
Count of values		36.000
Count (not null)		36.000
Count (not null,not zero)		36.000
Count (positive)		36.000
Count (negative)		0.000
Arithmetic mean		429.167
Median		381.000
Kurtosis		-0.982
Skewness		0.549
Sum		15450.000
Minumum value		126.000
Maximum value		931.000
Range (max-min)		805.000

Means		
Arithmetic mean		429.167
Chronological mean		435.400
Absolute mean difference		205.537

Selected time serie

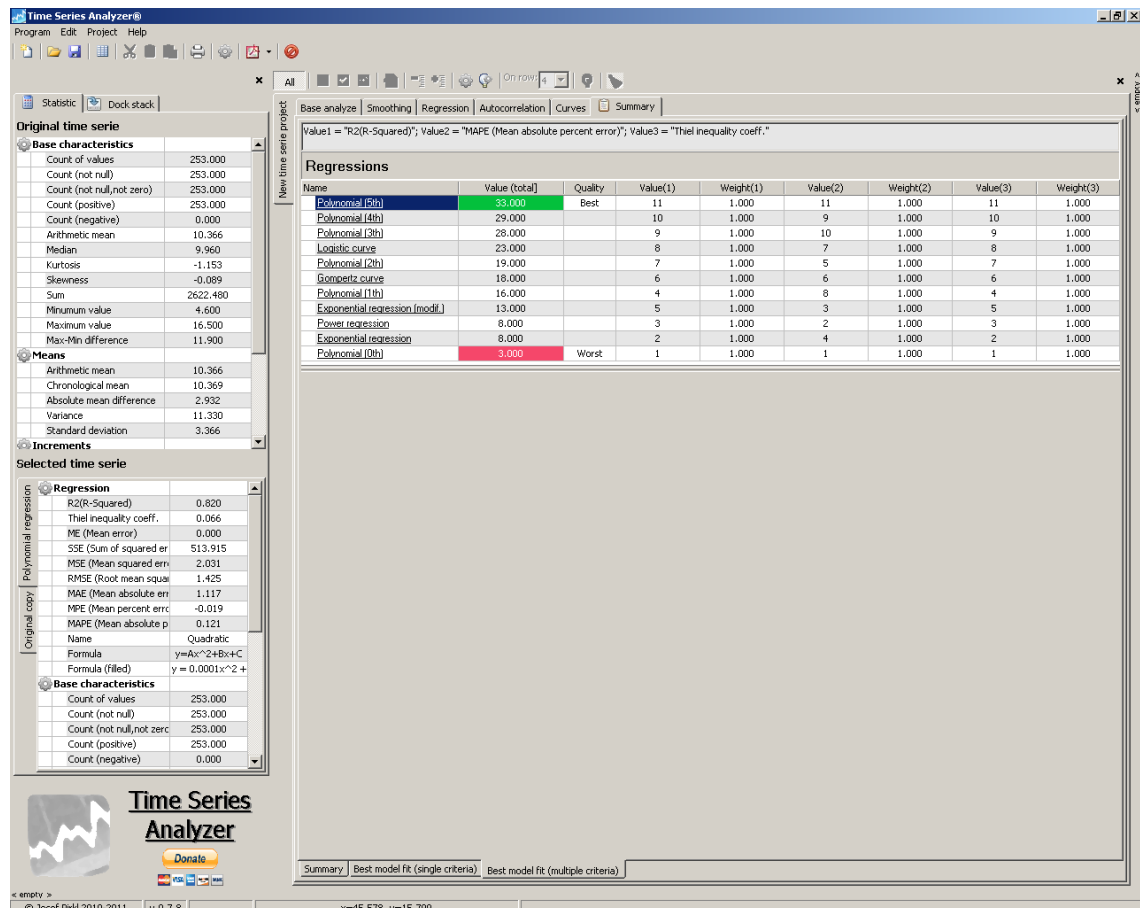
Base characteristics		
Count of values		36.000
Count (not null)		36.000
Count (not null,not zero)		36.000
Count (positive)		14.000
Count (negative)		22.000
Arithmetic mean		0.000
Median		-48.167
Kurtosis		-0.982
Skewness		0.549
Sum		0.000
Minumum value		-303.167
Maximum value		501.833
Range (max-min)		805.000

Means		
Arithmetic mean		0.000
Chronological mean		6.233
Absolute mean difference		205.537
Variance (-1)		57678.543
Standard deviation (-1)		240.164

Picture 27 – Original and selected time serie statistical page

7. Summary page

That page show total information about project. It is divided into more subpages (Picture 28).



Picture 28 – "Summary page" - best model fit (multiple)

Summary page contains that pages (Table 15):

Table 15 - Pages on "Summary page"

Summary subpage name	Description
Summary	Base common information.
Hypothesis testing	Shows results for original's data hypothesis testing. More about used tests you can find in Formulas.pdf document.
Best model fit (single criteria)	This page shows best computed model, for example for regressions, by single selected compare criteria.
Best model fit (multiple criteria)	At this page are shown best computed models by max. 3 criteria. For every selected criteria is possible to set its weight. Hightest computed value is the best model.

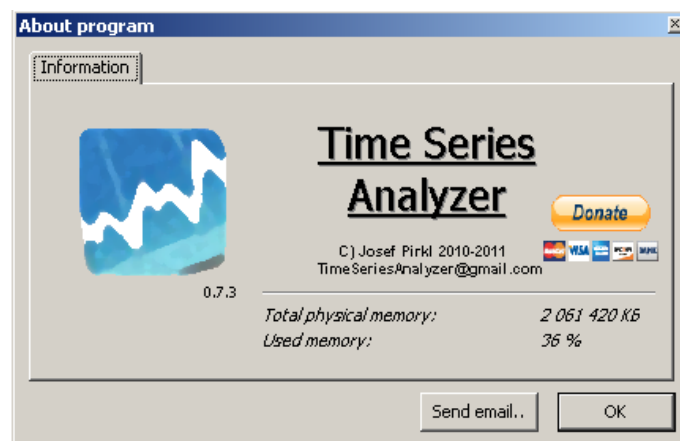
	<p>For three criteria is formula for value calculation:</p> $\text{result} = (\text{criteria1} * \text{weight1}) + (\text{criteria2} * \text{weight2}) + (\text{criteria3} * \text{weight3})$ <p>, where criteria[1,2,3] is points for order by this criteria (for example, if we have five models for testing, the best model gets 5 point, second best model gets 4 points, etc.)</p> <p>Settings is here.</p>
--	--

8. The application dialogs

The dialogs are sorted alphabetically by its name.

8.1 "About program" dialog

This window shows base information about program, especially program version. First version was developed in 2010. At the bottom you can see *Total physical memory* of your computer and *Used memory*, too.



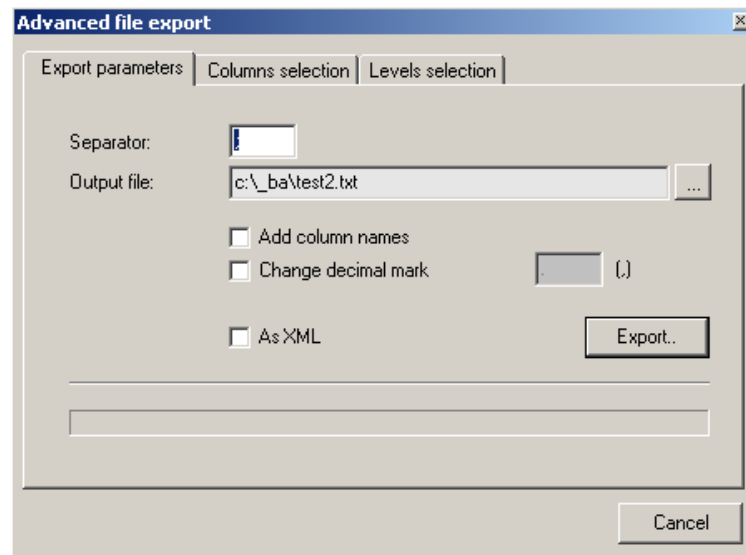
Picture 29 – "About program" window

8.2 "Advanced file export" dialog

File export dialog with more export settings. This dialog is accessible for all list object by right mouse button clicking (Picture 30).

The dialog is composed from three pages:

- **Export parameters** - for base export setting.
- **Column selection** - for columns selection.
- **Levels selection** - for levels section.



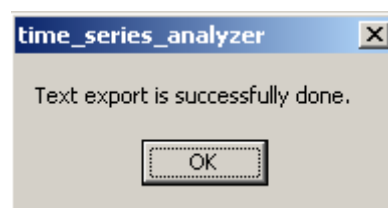
Picture 30 – Advanced export dialog - the first page

It is possible to change that options (Picture 30).

Table 16 - Options descriptions in "Advanced file export" dialog

Option	Description
Separator	Separator for columns values.
Output file	Output file name.
Add column names	If is checked, columns names will be added at the first row into export.
Chage decimal mark	If is checked, is possible change current decimal point into other character. In paranthesis behind edit box is shown current decimal point character.
As XML	If is checked export will be in XML format.

For export performing click to "**Export..**" button. After succesfull export is shown the confirmation (Picture 31). Export format shows Table 17 and Table 18.



Picture 31 – Confirmation after successfully advanced export

Table 17 - Advanced export file form (.txt format)

```

Base characteristics;
Count of values;10
Count of values (not null);10
Arithmetic mean;56,100
Minumum value;12,000
Maximum value;120,000
Means;
Arithmetic mean;56,100
Chronological mean;55,000

```

Table 18 - Advanced export file form (.xml format)

```

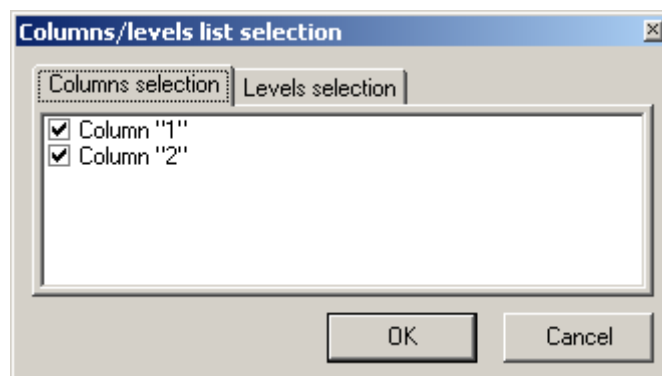
<?xml version="1.0" encoding="UTF-8" ?>
<data>
  <row row="1" level="0">
    <col col="0">
      <value>Base characteristics</value>
    </col>
    <col col="1">
      <value />
    </col>
  </row>
  ..
</data>

```

8.3 "Columns/levels list selection" dialog

This dialog enables to specify columns and levels for printing from list (Picture 32).

Levels tab is visible only when list contains more levels.



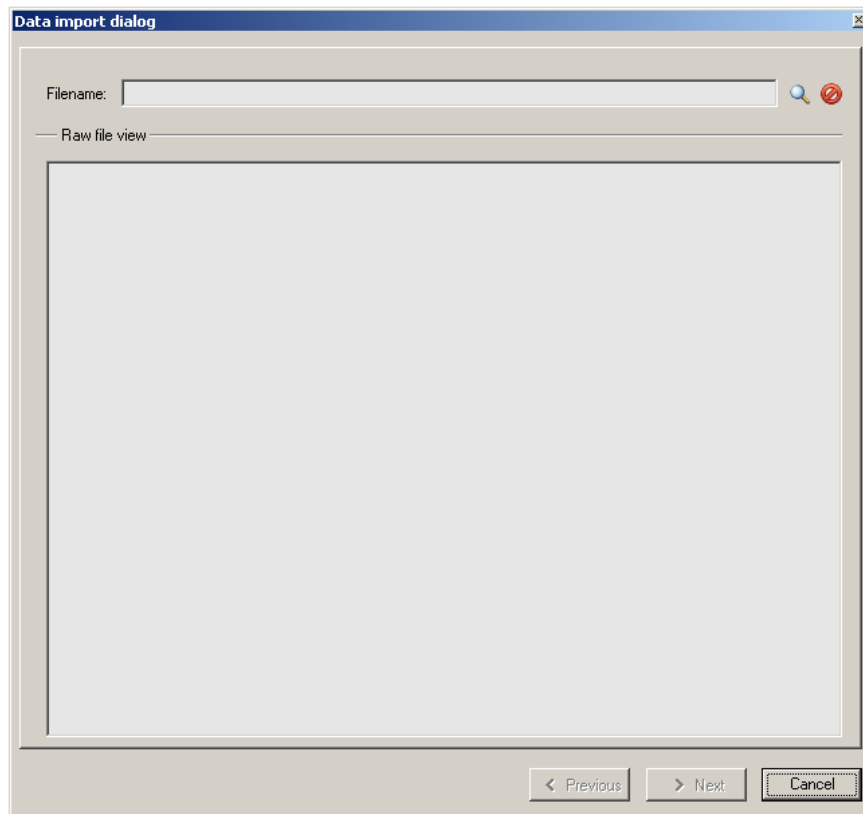
Picture 32 – "Columns/levels list selection" dialog

8.4 "Data import from text/excel file" dialog



This dialog is displayed for import data from external file into DATA project. Data must be prepared in some way - this version is supported data loading from:

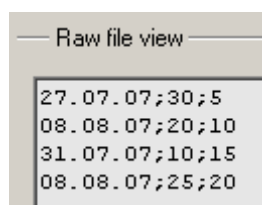
- text (.txt, .prn) file.
- excel (.xls) file.

- excel (.xlsx) file⁴.



Picture 33 – Data import dialog - first dialog page

First page of this dialog allowing read import data file. File opening and first reading is possible by clicking to  icon. Icon beside () can clear this file reading. After correct reading is selected file raw data layout shown on the screen (Picture 34).



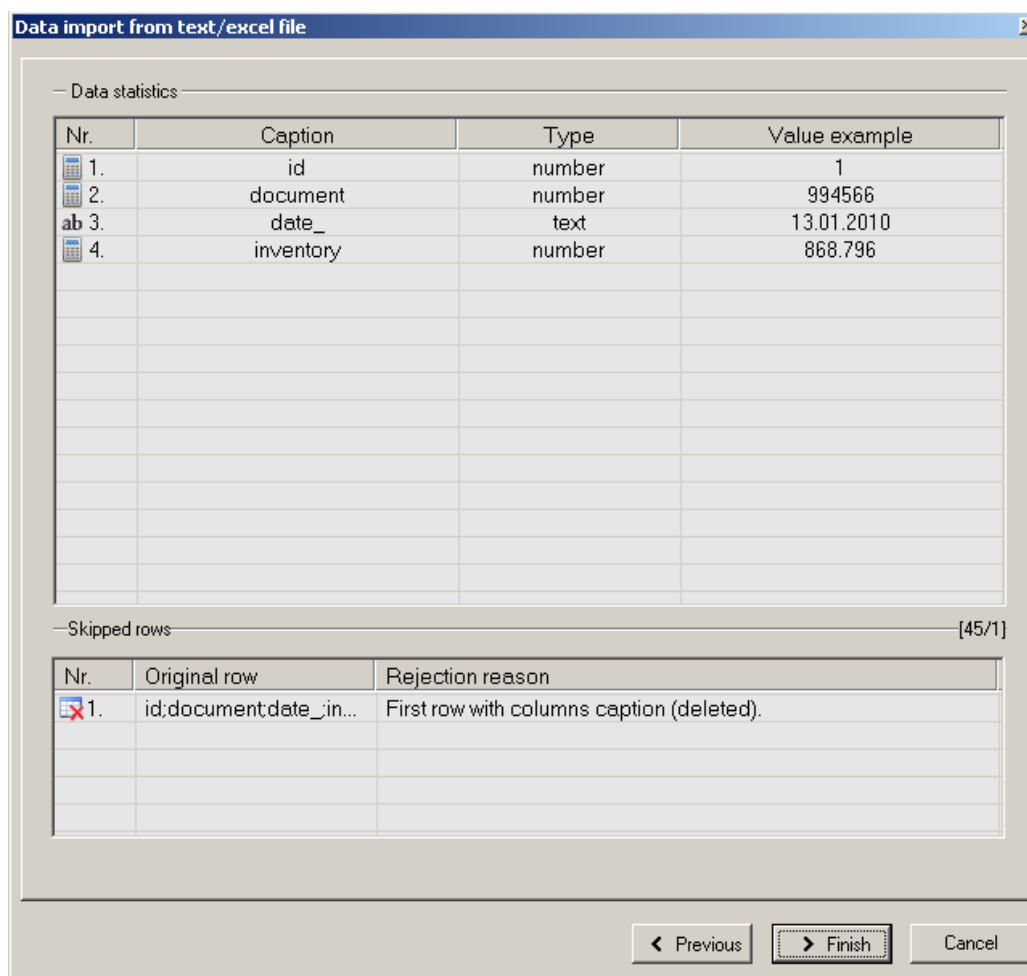
Picture 34 – Raw file view shown after selection file for import

At the dialog bottom part is displayed other next advanced settings for that specific import file type. More about that import settings [here](#) (text file) and [here](#) (excel).

After clicking to "**Next**" button is executed input data analyze, and the you are moved into page 2 (Picture 35). Here is preview of analyzed file columns + preview of skipped

⁴ For .xlsx reading must be installed "Microsoft 2007 Office system driver: Data Connectivity Components". Link: <http://www.microsoft.com/downloads/en/details.aspx?FamilyID=7554F536-8C28-4598-9B72-EF94E038C891&displaylang=en>

rows (at the dialog bottom). These skipped rows are excluded from input data, because there are some problem with them. That problem can be for example other columns count in specific row against other readed rows. For every column in this preview is displayed supposed data type.



Picture 35 – File analyze result - second dialog page

After click on "**Finish**" button will be data transfered into DATA project (Picture 36).

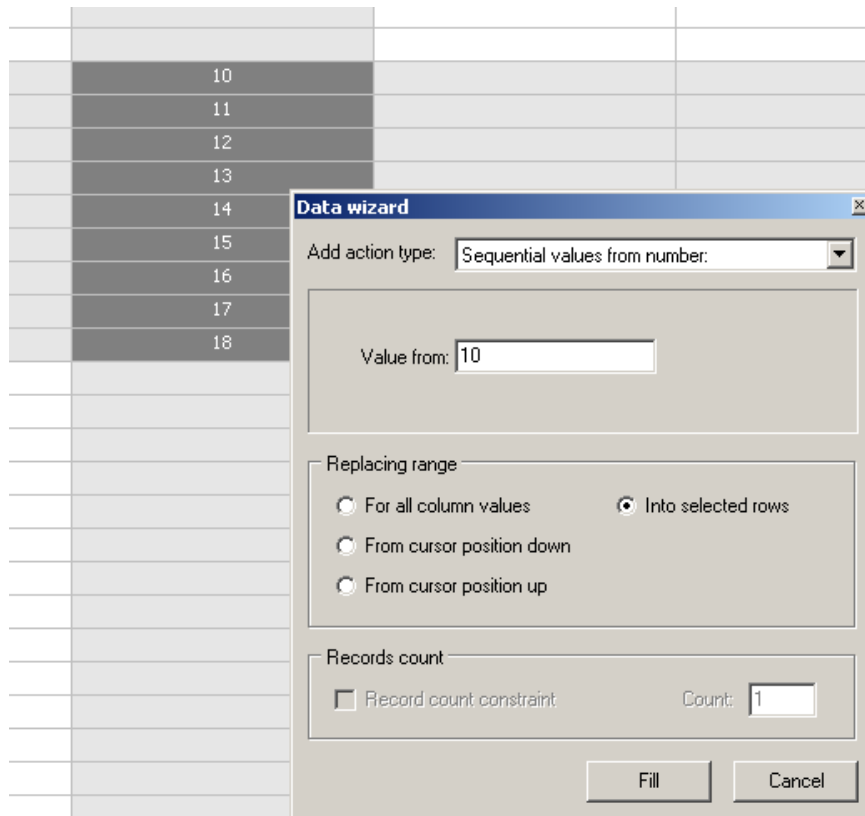
The screenshot shows a window titled "Data" with a table of data. The table has four columns: "id", "document", "date_", and "inventory". The data is as follows:

id	document	date_	inventory
1	994566	13.01.2010	868.796
2	0	25.01.2010	668.796
3	68895	15.02.2010	1728.796
4	8655	17.02.2010	1728.796
5	8670	17.02.2010	1528.796
6	17804	11.03.2010	1328.796
7	21404	17.03.2010	1128.796
8	21405	17.03.2010	1126.948
9	24431	23.03.2010	1124.948
10	34166	08.04.2010	924.948
11	45980	27.04.2010	724.948
12	45983	27.04.2010	524.948
13	45984	27.04.2010	324.948

Picture 36 – Data in DATA project loaded from external file

8.5 "Data wizard" dialog

This dialog is displayed for DATA project only. By this dialog you can work with active column in DATA project (Picture 37).



Picture 37 – "Data wizard" dialog

Available actions shows Table 19.

Table 19 - Description of availables "Add action type:"

Add action type:	Description
Constant:	Add constant value into column.
Sequential values from number:	Add sequential values into column [for number type]. Step=1. You define starting value.

Checkboxes in "**Replacing range**" part defines, what range of active column will be affected (Table 20).

Table 20 - "Replacing range" meaning in "Data creation - Add wizard" dialog

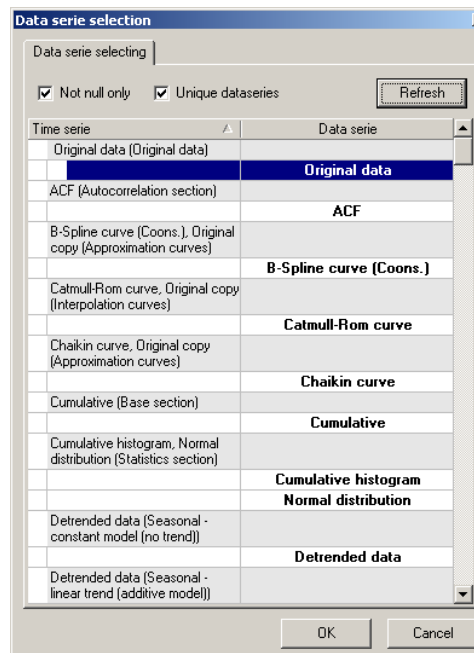
Options	Description
For all column values	Replacing will be performed for all active column rows.
From cursor position down	Replacing will be performed down from active row position

	in active column (with current cell).
From cursor position up	Replacing will be performed up from active row position in active column (with current cell).
Into selected rows	Replacing will be performed only to selected rows of active column.

"**Record count**" section enabled set count of affected rows (only for **Down** range options). If in column is less rows than value here, new rows will be added.

8.6 "Data serie selection" dialog

This dialog shows data series of active opened TIME SERIE project. Purpose of this dialog is data serie selection (Picture 38).



Picture 38 – Data serie selection dialog

After showing this dialog is selected "Original" data serie, which is at first place.

From TIME SERIE project is this dialog useful for copy selected serie data as the base of new DATA SERIE project ([see here](#), or in **tutorial.pdf**).

Filter options:

"**Not null only**" - into selection are added data series without NULL values only.

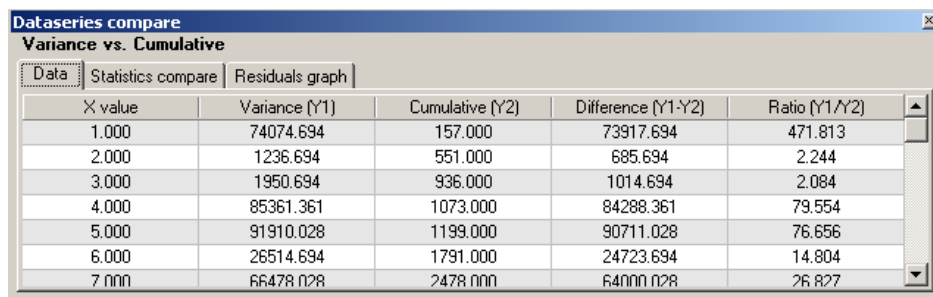
"**Unique dataseries**" - this option eliminate duplicate series (for example "Original copy").

If is checked, is shown first serie occurrence only.

"**Refresh**" - this button click perform refreshing of selected filter.

8.7 "Dataseries compare" dialog

From [graph context menu](#) in the GraphBox is possible to perform "**Compare**". "Dataseries compare" dialog enables to compare two selected data series (Picture 39).



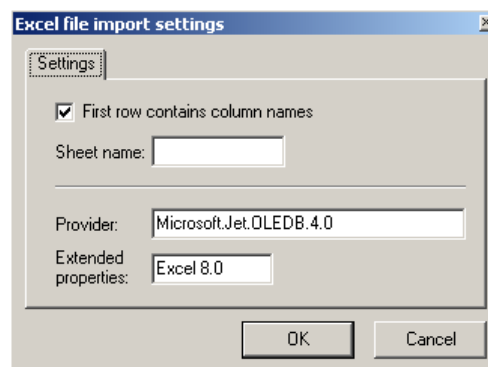
X value	Variance (Y1)	Cumulative (Y2)	Difference (Y1-Y2)	Ratio (Y1/Y2)
1.000	74074.694	157.000	73917.694	471.813
2.000	1236.694	551.000	685.694	2.244
3.000	1950.694	936.000	1014.694	2.084
4.000	85361.361	1073.000	84288.361	79.554
5.000	91910.028	1199.000	90711.028	76.656
6.000	26514.694	1791.000	24723.694	14.804
7.000	66478.028	2478.000	64000.028	26.827

Picture 39 – "Dataseries compare" dialog

Example for this dialog using is in **Tutorial.pdf** file.

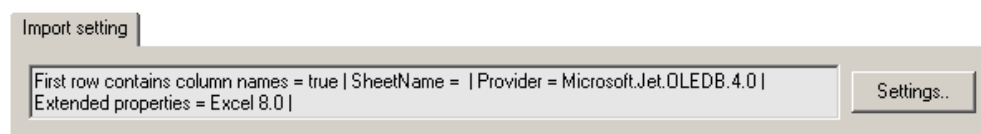
8.8 "Excel file import settings" dialog

By this dialog is possible to change some options, that are used for import data from Excel files into project (Picture 40) .



Picture 40 – Excel file import dialog

This dialog is usually called by **Settings** button, near here is then shorted info form about selected settings (Picture 41). By field "**Sheet name**" is possible change reading sheet name from Excel file. If is empty is used first sheet in Excel file.



Picture 41 – Shorted info about Excel file import settings

Excel import was tested on Excel 2003 and Excel 2003 saved as 97-2003 version.

8.9 "Make TIME SERIE" dialog

This dialog take data from DATA project and create new TIME SERIE project. Data are copied into it. You can used both DATA and TIME SERIE project alone, or you can use TIME SERIE project only.

In dialog is needed select at least column for "Y" values (underline labels). Column for "X" axis can be empty, or any type, but if it isn't number type is internally performed conversion (into number)⁵. Column for "Y" can be only number type.

Picture 42 – Columns selecting - third dialog page

Next table (Table 21) shows all items that is possible fill on this third dialog page:

Table 21 - Fields on third page in "Make TIME SERIE" dialog

⁵ When is "X axis column" selected, program is checking, if imported rows are sorted by this X column. If not, sorting will be performed at first.

Section	Label	Explanation
Time serie fields settings	X axis column (time)	Column for X axis. If is empty, X value will be generated.
	Y axis column (values)	Column for Y axis - values in graph. Mandatory field.
	X period size (optional)	Implicit value for X step. Default value is 1. This value has sence for some calculating only. Optional field.
	X axis labels (optional)	Columns with labels for X axis. Can override default X values as labels. Optional field.
Titles⁶	Title	Base graph title. It is possible fill 2 rows. Optional fields.
	X axis title	Title for X axis. Optional fields.
	Y axis title	Title for Y axis. Optional fields.

When is item "**Advanced**" checked, then is accesible "**Advanced section**". In this section are some other settings for advanced user. That settings shows Table 22.

Table 22 - Fields in Advanced section

Section	Label	Description
Advanced - X column converting	DATE field fox X-axis- conversion function	If for X value is selected DATE field is possible to convert into into NUMBER field. Possible values: 1) ID (order) - order of value (from specifiied index) 2) Mask - order of value, but original date value is converted into X axis labels in mask dd.mm.yyyy.
	STRING field fox X-axis - conversion function	If for X value is selected STRING field, is possible to convert it into NUMBER field. Possible values: 1) ID (order) - order of value (from

⁶ More information for Graph titles you can find in chapter 8.9.1.

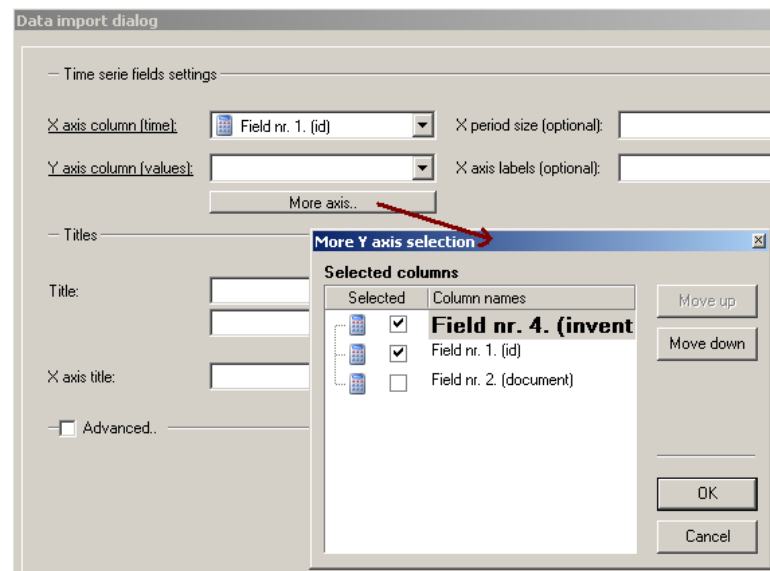
		specified index)
	Starting ID index for converting DATE into number	Index from which is generated order in is used conversion function for X-axis (from DATE/STRING field)
Advanced - Seasonal setting^{7, 8}	Seasonal support for X axis	Disable/enable support for seasonal adjustment.
	Seasonal column	Column with seasonal key, for example: 1/2009 .
	Seasonal mask	Mask in which has " Seasonal column " its values. For example: qq/yyyy .
	Period length	Period for seasonal adjustment. Possible values are: 1) Month by year 2) Month by quarter 3) Quarter

8.9.1 More Y series

Under **Y axis column (values)** edit field is button "**More axis..**". When are in your data more number column, is possible import two or more Y values. Then - the first selected column (in dialog below at top position) is mainly column for that will be calculated statistical characteristics (Picture 43). Other(s) column(s) are only for visual comparison in the graph.

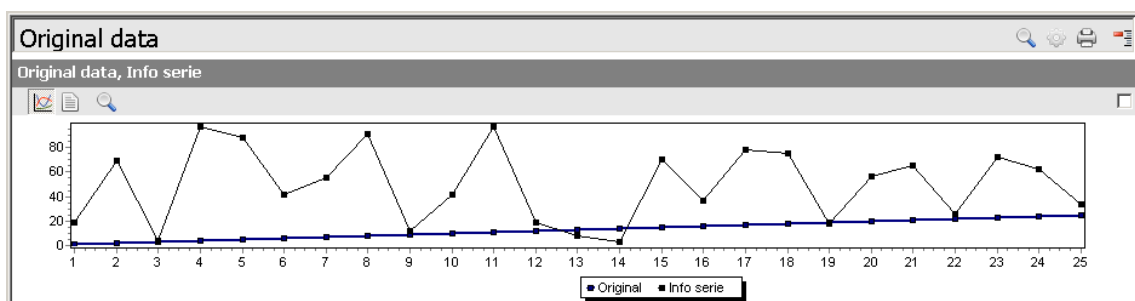
⁷ Example with seasonal support see **tutorial.pdf** file.

⁸ Seasonal adjustment has sense if seasonal key contain more period.



Picture 43 – Dialog displayed after "More axis.." button click

After that data importing are two series in the first graph in Base section (Picture 44).



Picture 44 – More Y series in first graph with Original data

8.9.2 Graph titles for import from external file

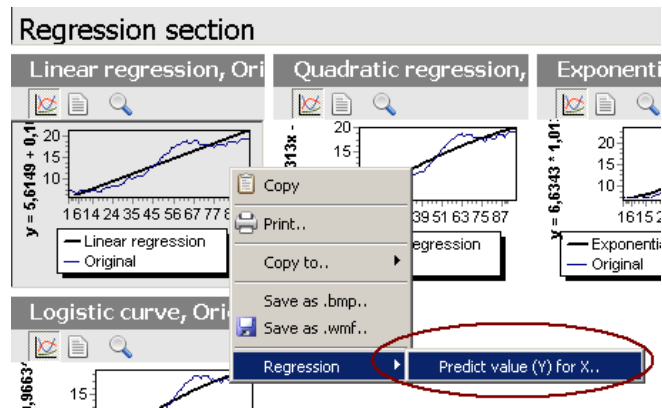
If in the same directory as loaded file exist file with same name but with *.txr extension, application try to read some values from this file. Table 23 show proper form of .txr file.

Table 23 - Proper form of .txr title file

```
[common]
title=Test graph
title1=Other description..
x_title=Time(t)
y_title=Value[kg]
```

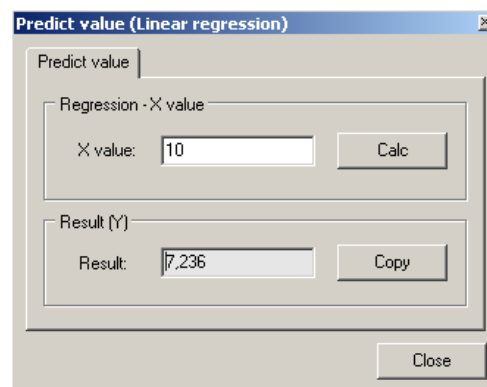
8.10 "Predict value (Y) for X.." dialog (regression)

By click with right mouse button on some regression graph in Graphbox you can show this dialog [*Regression - Predict value (Y) for X..*] (Picture 45).



Picture 45 – Context menu item for calling predict dialog on regression

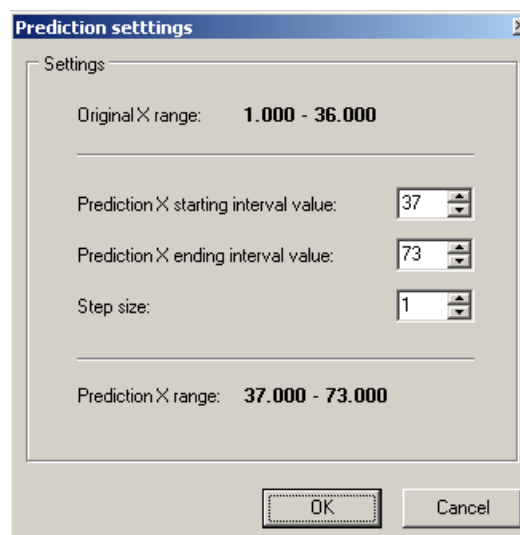
By this dialog is possible calc predicted Y value for entered X value (Picture 46).



Picture 46 – "Predict value (Y) for X.." dialog

8.11 "Prediction settings" dialog

Especially for regression model, is possible to change prediction range interval by "Prediction settings" dialog (called from "Project" menu or by project toolbar button). In this dialog you can change starting prediction interval X value, ending prediction interval X value and the step. Performed changes are saved into project file (Picture 47).

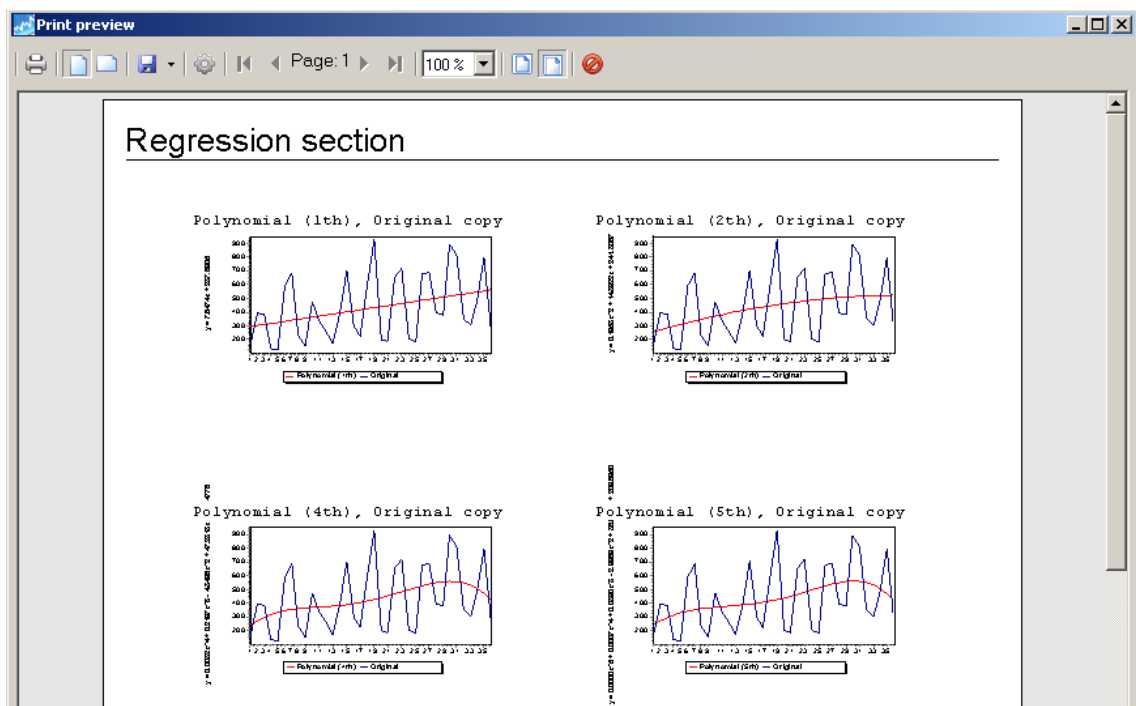


Picture 47 – "Prediction settings" dialog

See more in [tutorial.pdf](#).

8.12 "Print preview" dialog

If is enabled "Print preview" in Settings (defaultly) is every print directed before printing into this dialog (Picture 48). From here is possible continue/cancel printing or change some print settings.

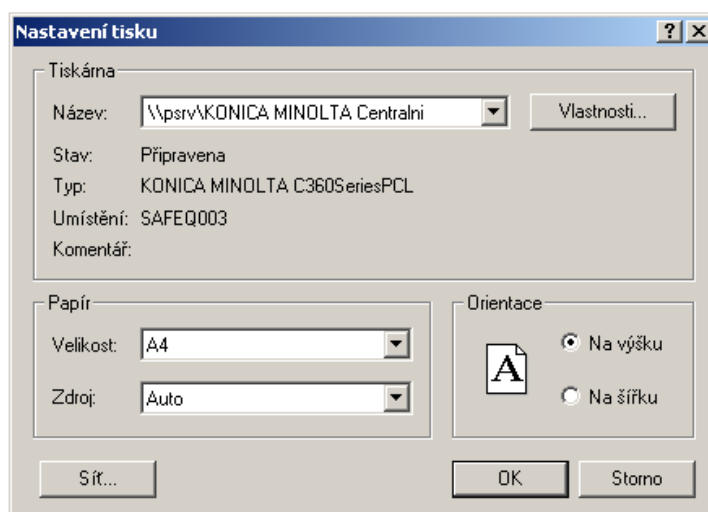


Picture 48 – "Print preview" dialog

Some examples about printing are in [tutorial.pdf](#) file.

8.13 "Printer setting" dialog

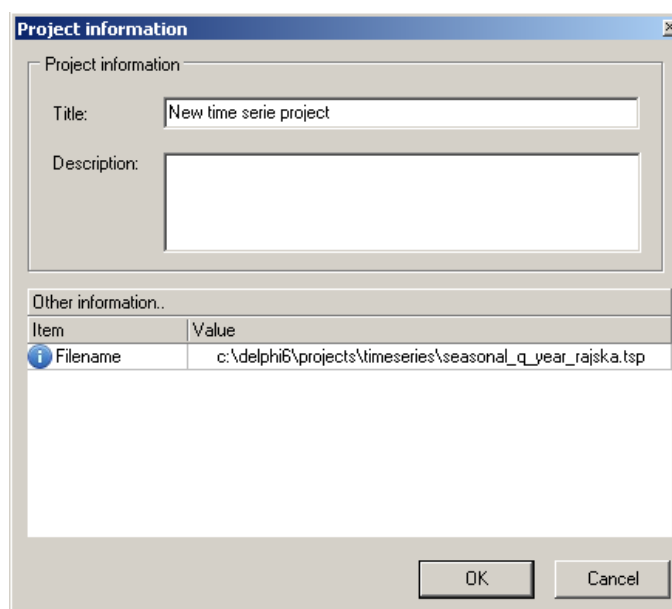
This is standard Windows printer settings dialog (Picture 49). User can select here for example virtual pdf printer (if this virtual driver is installed on the computer).



Picture 49 – "Printer setting" dialog

8.14 "Project information" dialog

This dialog enables to change project title, optional description. It shows project file path too (Picture 50).

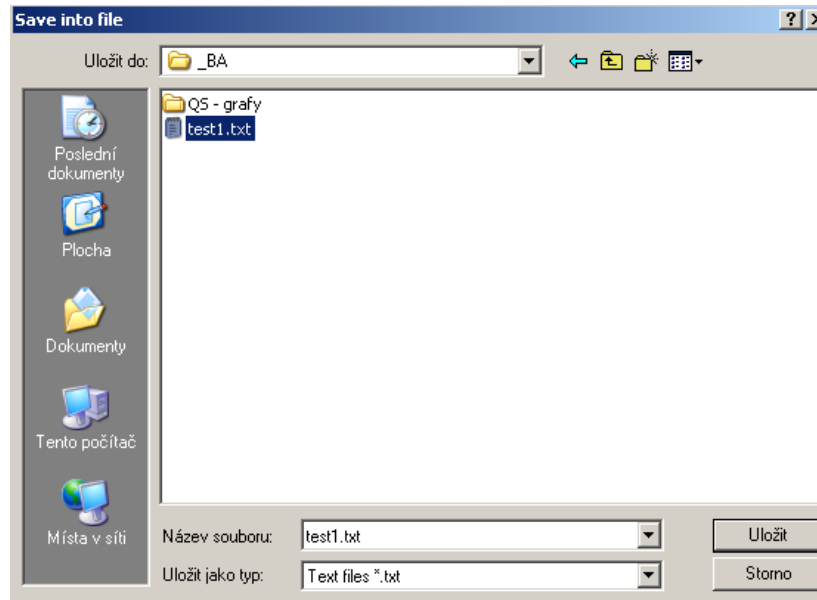


Picture 50 – "Project information" dialog

8.15 "Raw export (txt).." dialog

This dialog is accessible from list popup (context) menu. It enables to make easy data text export from active list object.

At first is displayed dialog for specify output file name (Picture 51). If this output file exists, is shown confirmation override dialog.



Picture 51 – Raw export output file name specifying

Exported file form show Table 24.

Table 24 - Raw export file form

```

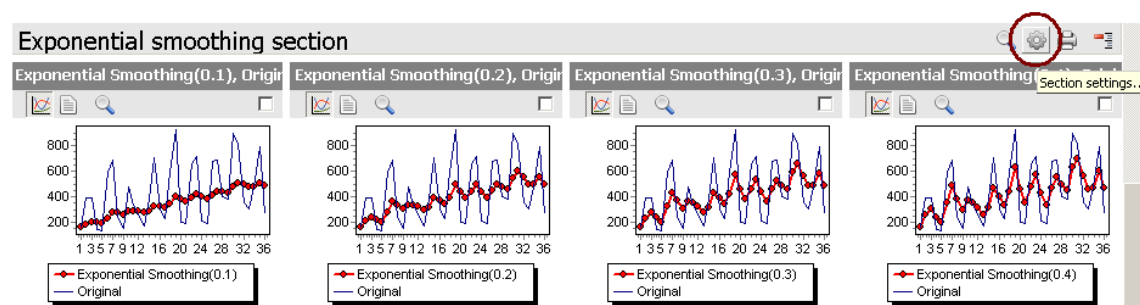
Base characteristics
Count of values      10
Count of values (not null) 10
Arithmetic mean      56,100
Minumum value12,000
Maximum value120,000
Means
Arithmetic mean      56,100
Chronological mean   55,000

```

TIP: This export serves only as very fast export function. For difficult situation with more settings you could use [Advanced export..](#) dialog.

8.16 "Section settings" dialogs

Since 0.7.4 version is possible to change some attributes for some sections. This attributes are saved into project file and can influence calculation flow for section`s time series. This dialogs are activated by clicking on **"Section settings"** button on right side in the GraphBox (Picture 52).

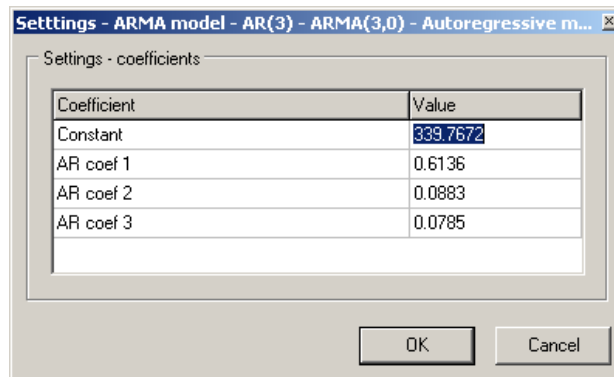


Picture 52 – "Section settings" button

Example for "section settings" is in **tutorial.pdf** file.

8.16.1 "Section settings - Exponential smoothing"

This dialog influences "ARMA" section (Picture 54). Descriptions for form items shows Table 25.



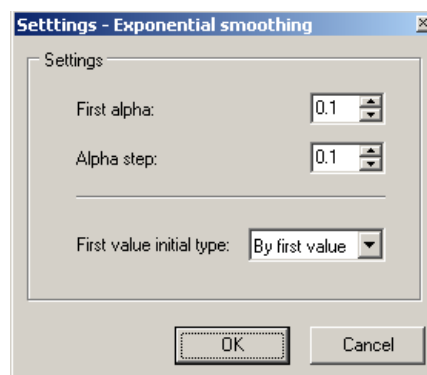
Picture 53 – "Section settings – ARMA model" dialog

Table 25 - Descriptions for items in "Section settings - ARMA" dialog

Form item	Description
Coefficient	Value for coefficient. "Coef" could be only in interval 0..1.

8.16.2 "Section settings - Exponential smoothing"

This dialog influences "Exponential smoothing" section (Picture 54). Descriptions for form items shows Table 26.



Picture 54 – "Section settings - Exponential smoothing" dialog

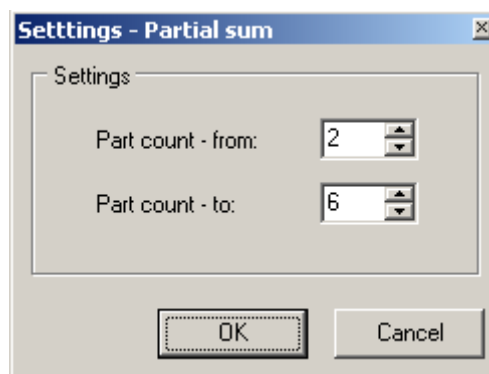
Table 26 - Descriptions for items in "Section settings - Exponential smoothing" dialog

Form item	Description
First alpha	First (starting) Alpha factor.
Alpha step	Alpha factor step (..for next value)

First value initial type	How to compute first value. Possible values are: 1) Null value - first value will be NULL. 2) By first value - first value is first value from original data. 3) By average - first value is average from original data.
Make only one model	This option is enabled only for some Exponential smoothing section dialog. It enables to make only one test model by first initial section (not as loop through steps).

8.16.3 "Section settings - Partial sum"

This dialog influences "**Partial sum**" section (Picture 55). Descriptions for form items shows Table 27.



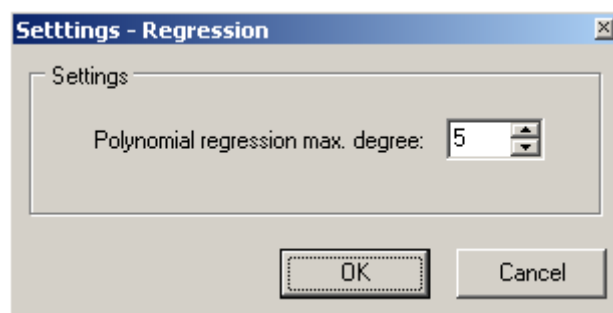
Picture 55 – "Section settings - Partial sum" dialog

Table 27 - Descriptions of items in "Section settings - Partial sum" dialog

Form item	Description
Part count - from	How many part will be computed - starting interval value.
Part count - to	How many part will be computed - ending interval value.

8.16.4 "Section settings - Regression"

This dialog influences "**Regression**" section (Picture 56). Descriptions for form items shows Table 28.



Picture 56 – "Section settings - Regression" dialog

Table 28 - Descriptions of item in "Section settings - Regression" dialog

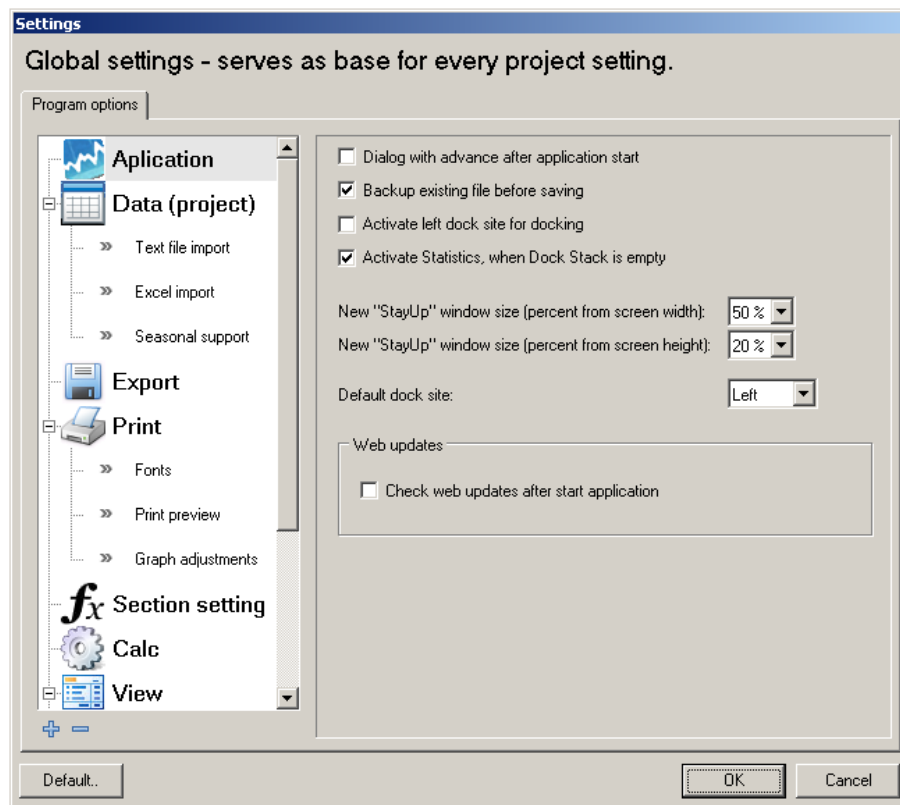
Form item	Description
Polynomial regression max. degree	Maximum calculated degree for polynomial regression. Warning - if degree is too high, calculation may be very slowly in time !

8.17 "Settings" dialog

This window is used for application/project setting. Settings dialog can exists in two variants (Picture 57):

- **Global settings** (for all application, and is used as initial for each TIME SERIE project local settings).
- **Project (local) settings** - (TIME SERIE⁹ project settings which initially takes global values settings as the base).

Global settings is copied into new TIME SERIE project in project establishing. In TIME SERIE project is then worked with this project (local) settings. Global settings contains more items in dialog tree, Project settings is vizually different in other top part of dialog.



Picture 57 – Global settings dialog

⁹ DATA project type work only with global settings.

At left-bottom in dialog is **"Default"** button. By this button is possible to re-read default settings. Warning - all your settings will be lost !

8.17.1 Settings dialog - Application

On this page are settings in relation to the application (Table 29). This settings are accesible only at global settings type.

Table 29 - Descriptions of Application page in Settings dialog

Setting name	Description
Backup existing file before saving	After first saving - or after "Save as" saving is possible to backup this old overrided file. If this setting is active, before overriding is maked .tsp~ copy of old file. If this .tsp~ exists too, that .tsp~ file is copied into .tsp~ with yyyymmddhhmmsszzz indentification (for example is created test_examples.tsp~20110114081549905 file).
Activate dock stack after docking	This selection will activate dock site page after window docking (left dock site) from context menu
Activate statistics, when dock stack is empty	Option activate "Statistics window", when last docked window is removed from Dock Stack (left dock site).
New "StayUp" window size (percent from screen width)	Initial width (in percent of screen size) for "StayUp" windows.
New "StayUp" window size (percent from screen height)	Initial height (in percent of screen size) for "StayUp" windows.
Check web updates after start application	When is checked, then after application start is performed check for new web update (if web connection is presented).

8.17.2 Settings dialog - Data

Setting name	Description
NULL value	Text represetation of NULL value. It has sense in DATA project and for Y column only. As NULL value is always

	taken empty cell value.
List column alignment	Alignment of column in DATA project list.
Clear / delete confirmation question	If is true, will be shown question before clear / delete in DATA project list.
Try to find "Y%" column	If is true, before showing " Make TIME SERIE " dialog is searched column in DATA project, that start with "Y" char. If this column is found, is suggested for "Y" column.
Data wizard - initial constant value	Initial constant value for " Data wizard " dialog.
Data wizard - initial sequentil value	Initial sequential value for " Data wizard " dialog.

8.17.3 Settings dialog - Data - Text file import

On this page are settings for data text file importing (Table 30). This settings are accesible only at global settings type.

Table 30 - Descriptions of Text file import page in Settings dialog

Setting name	Description
First row are column names	If is true, first line in imported text data file is processed as column names. That line will be exluded from reading and imported columns will be renamed according it.
File fix length	If is true, imported columns must have same size. That is useful for example when imported file is text dump from database.
Separator	Column separator character(s) for importing. It has sence only when is not checked File fix length .
Delimiter	Column string delimiter character(s) - optional field, for importing. It has sence only when is not checked File fix length .

8.17.4 Settings dialog - Data - Excel file import

Settings for excel data reading.

8.17.5 Settings dialog - Data - Seasonal support

Settings for seasonal support (initial value for fields).

8.17.6 Settings dialog - Export

On this page are settings in relation to data exporting into file (Table 31). This settings are accesible only at global settings type.

Table 31 - Description of Export page in Settings dialog

Setting name	Description
Override question (if exported file exist)	Enables question " <i>if override file</i> " if the same file name exists on the disc.
Change graph color before export	If is checked, performs change of graph bacground color when graph is saved. That is useful because active selected graph has for example gray color, and this would be undesirable.
Change color to	See previous setting Change graph color before export , field contains new changing color.

8.17.7 Settings dialog - Print

On this page are settings in relation printing (Table 32). This settings are accesible only at global settings type. Printing settings dialog can be called from "[Print preview](#)" dialog directly.

Table 32 - Descriptions of Print page in Settings dialog

Setting name	Description
Header printing	If and where place print report header. Available options are: 1) No header - header will not be printed. 2) First page only - header will be printed at first page only. 3) All pages - header will be printed at all pages.
Footer printing	If and where place print report footer. Available options are: 1) No footer - footer will not be printed. 2) Footer with pages - footer will be printed at all pages with page numbers. 3) Footer without pages - footer will be printed at all pages without page numbers. 4) Pages only - footer will not be printed, only page

	numbers will be printed.
Custom text for header	You can specify special custom header text.
Footer mask for date	Here is possible to specify mask for print date/time in footer.
Text report -> Gap between rows [millimeters]	For Text report type specify vertical gap between rows in millimeters.
Ident spaces for next level (in list)	Specify, how much is indented new list level. If you don't want indent text, set here zero.
Graph report -> Horizontal gap between graphs [as ratio from page width 0-1]	Horizontal gap between graphs from interval 0-1. For example, if is 0.2, the gap will be 1/5 part of page width.
Graph report -> Vertical gap between graphs [as ratio from page height 0-1]	Vertical gap between graphs from interval 0-1. For example, if is 0.2, the gap will be 1/5 part of page height.
Graph report -> Graph columns count	Count of graphs on one row.
Graph report -> Graph rows count	Graph rows count.

8.17.8 Settings dialog - Print - Fonts

At this page you can specify fonts and its size (in millimeters) for printing.

8.17.9 Settings dialog - Print - Print preview

At this page is possible change behavior of print preview (Table 33).

Table 33 - Descriptions of Print -> Print preview in Settings dialog

Setting name	Description
"Print preview" dialog initialization	<p>If and how will be shown "Print preview" dialog. Available options are:</p> <ol style="list-style-type: none"> 1) No preview - "Print preview" dialog will not be shown, print will be redirected directly to printer. 2) 100 % - dialog will be shown with 100 % zoom init. 3) Fit width - dialog will be shown with init to fit width.

	4) Fit page - dialog will be shown with init to fit page.
Show printer setup dialog before print	Before every printing will be shown printer settings dialog .
Maximalize "Print preview" dialog	"Print preview" dialog will be maximalized.

8.17.10 Settings dialog - Print - Graph adjustment

At this page you can specify operation, that will be processed at every graph, that input into printing. By this way is possible update graph layout for printing only (Table 34). See **tutorial.pdf** file.

Table 34 - Descriptions of Print -> Graph adjustment in Settings dialog

Setting name	Description
Graph backcolor	You can specify graph background color for printing.
Legend	If print graph legend.
Main title	If print graph title.
X axis title (bottom)	If print X axis title.
Y axis title (left)	If print Y axis title.
Vertical grid	If print vertical graph grid.
Horizontal grid	If print horizontal graph grid.

8.17.11 Section setting

In this part you can display initial global settings for some section. For example: you can set maximal degree of polynomial regression (for regression section). Every new project will be initialized according to this settings.

8.17.12 Settings dialog - Time serie (calc)

On this page are settings in relation to own time serie and to its calculation (Table 35). This settings is accesible in both global and project settings.

Table 35 - Descriptions of Time serie (calc) page in Settings dialog

Setting name	Description
Max. depth for autocorrelation calc	Max shift for observings in autocorrelation calculation.
Prediction length coefficient	Initial length coefficient for prediction range. If is 1, then prediction range will be once large as X length, an so on.
Calc type for X	Step length for prediction. Available values are :

prediction	Unit - 1. First-Second - difference between first and second X value. Avg - mean of X values. Floor(Avg) - down-rounded mean of X values. Ceil(Avg) - up-rounded mean of X values. Defined step.. - step is defined in Step field.
Step	Step for " Calc type for X prediction " = Defined step..
Calc Box-Jenkins	If is false, then program does not compute Box-Jenkins section (=time consuming section).
Calc Curves	If is false, then program does not compute Curves section (=time consuming section).

8.17.13 Settings dialog - View

On this page are settings in relation to data model view and data previews (Table 36). This settings are accesible in both global and project settings types.

Table 36 - Descriptions of View (output) page in Settings dialog

Setting name	Description
Decimal number count (in text)	Decimal number count for using in lists.
Prediction text color	Text color used for predicted values in lists .
Graph selection type	Type of active graph selected into Graphbox. Available values are: 1) Filled rectangle - active graph are visually selected by other color (default gray color). 2) Border line - active graph is only bordered by line.
Activate zoom page	If is checked, after graph zooming will be this zoomed graph focused at Zoom page .
Base (original) graph to entire row width	Original first graph in base section is zoomed to entire row.
Forecasting (prediction) active	Enables active forecasting.
Hide graphs, where is error	Time serie where is some error are not displayed in Graphbox.
Show period (m) in tables	If is true, period column (m) is visible in data list.

List context only to list size	If is true, columns in list (in <i>Graphbox</i>) will use only list width -> columns size will be adjusted to list width. Default value is true.
Decomposition in Graphbox - 2 on row	Seasonal decomposition has defaultly 2 graphs on row for better comparing. If you want standard behavior, disable this option.

8.17.14 Settings dialog - View - Summary page

At this page is are settings for **Summary page**.

Setting name	Description
Summary page - color highlited best and worst model	Green color for best model, red color for worst.
Order fit compare criteria	Compare criteria for single model fit comparing.
Order fit compare criteria [x], Weight [x]	Compare criteria for multiple model fit comparing and its weight.

8.17.15 Settings dialog - Graph

At this page are settings in relation to every used graph in application (Table 37). This settings are accesible in both global and project settings types.

Table 37 - Descriptions of Graph page in Settings dialog

Setting name	Description
Legend showing	This option say if is shown legend for graphs in Graphbox object. Available values: 1) Never - the legend will not be shown. 2) Always - the legend will shown for every graph in the Graphbox. 3) For more series - the legend is shown only if in particular graph are more series. ¹⁰
Legend position	Position of graph legend in Graphbox (only if is presented). Available values are: Left , Right , Bottom , Top .

¹⁰ Into graph series count is not computed *constant* type series.

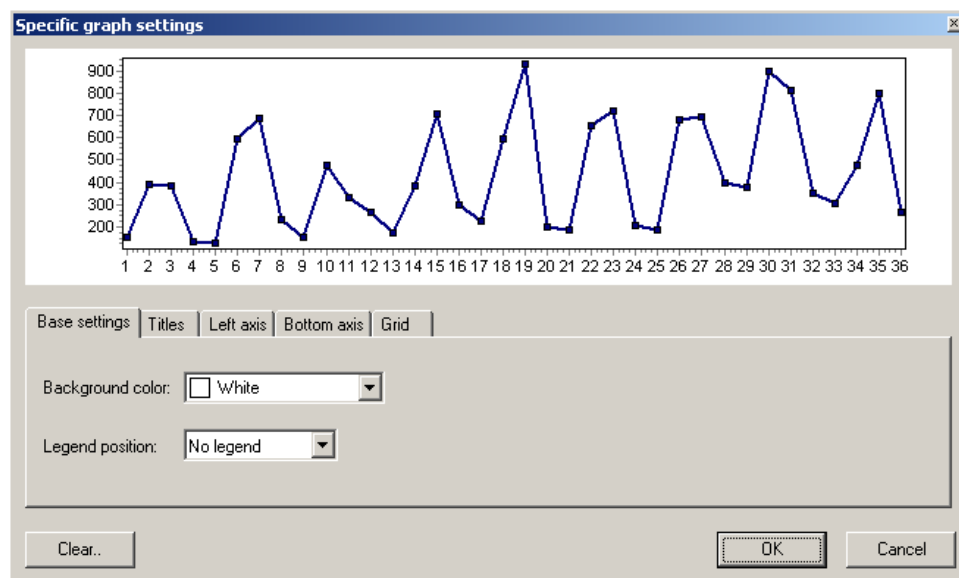
Show graph title	If is true, graphs title in Graphbox will be visible.
Show graph X axis title	If is true, graphs X axis title in Graphbox will be visible.
Show graph Y axis title	If is true, graphs Y axis title in Graphbox will be visible.
Show horizontal grid & Show vertical grid	These options says, if grid lines are visible in graphs.
Top gap (%)	The gap in percent over graph.
Bottom gap (%)	The gap in percent bellow graph.

8.17.16 Settings dialog - Graph - Series appearance

On this page is possible change color, width, pointers, etc. for particular serie type in Graphbox. That setting are then saved into project file.

8.18 "Specific graph settings" dialog

This dialog supports custom specific settings for selected graph (Picture 58). User can replace for example the title with our custom title, and this new title will be then shown for this graph always in the future. Those graphs settings are saved into project file.

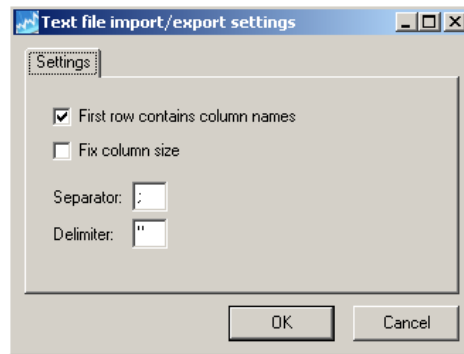


Picture 58 – "Specific graph settings" dialog

"Clear.." button remove all user specific settings.

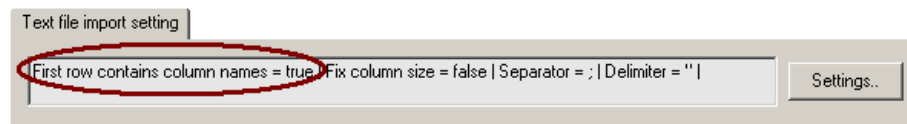
8.19 "Text file import/export settings" dialog

By this dialog is possible to change options that are used for import data from text files into project (Picture 59) .



Picture 59 – Text file import/export dialog

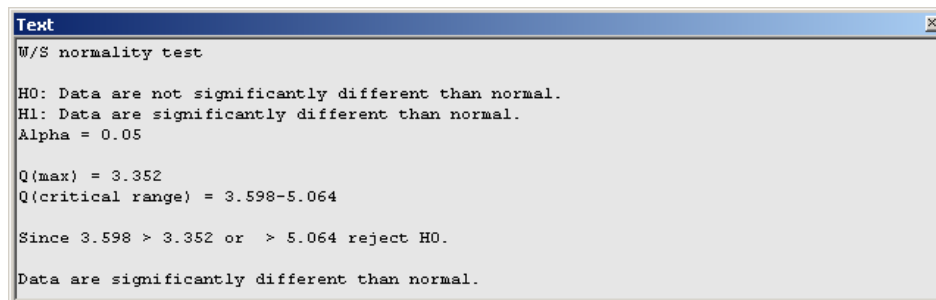
This dialog is usually called by **Settings** button, near here is then shorted info form about current settings (Picture 60).



Picture 60 – Shorted info about Text file import/export settings

8.20 "Text" dialog

This dialog holds text information (Picture 61). The dialog could be docked and has full access into ["Edit" submenu](#).



Picture 61 – "Text" dialog

For copy text into this dialog use right mouse key, option **"Text into Window"** (on any text item).

By using right mouse button on the text you can print contained data into printer.

9. Printing reports

That chapter shows basic application print reports.

9.1 Text report

That report is used for print list data text data (Picture 62).

Data - [Mean difference values]

x	y(Mean difference)	y(Constant)
1.000	-272.167	0.000
2.000	-35.167	0.000
3.000	-44.167	0.000
4.000	-292.167	0.000
5.000	-303.167	0.000
6.000	162.833	0.000
7.000	257.833	0.000
8.000	-197.167	0.000
9.000	-275.167	0.000
10.000	46.833	0.000
11.000	-96.167	0.000
12.000	-164.167	0.000
13.000	-256.167	0.000
14.000	-45.167	0.000
15.000	277.833	0.000
16.000	-128.167	0.000
17.000	-205.167	0.000
18.000	163.833	0.000
19.000	501.833	0.000
20.000	-227.167	0.000
21.000	-244.167	0.000
22.000	224.833	0.000
23.000	288.833	0.000

Picture 62 – "Text" report type

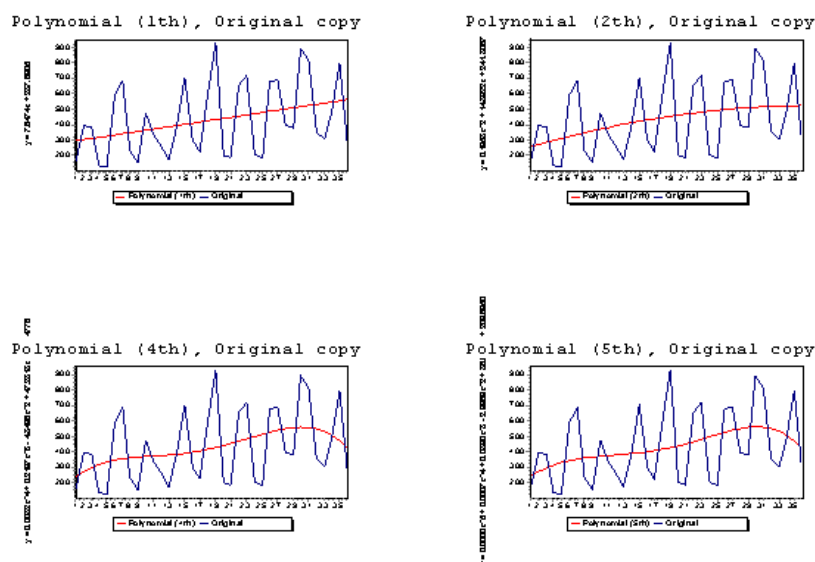
Since version 0.8.2 is accessible ["Columns/levels list selection dialog"](#) dialog.

9.2 Graph-grid report

That report (Picture 63) is used for print:

- One specific graph.
- More selected graphs, for example all section graphs.

Regression section

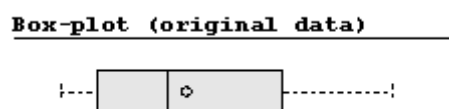


Picture 63 – "Graph-grid" report type

9.3 Image report

That report (Picture 64) is used for print:

- One image with optional title.



Picture 64 – "Image" report type

10. Appendix

10.1 Version changes

Informations about version changes has been moved into this [web address](#).

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