Examples and Exercises to Work with the InpGraph Program

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Start

Notes:

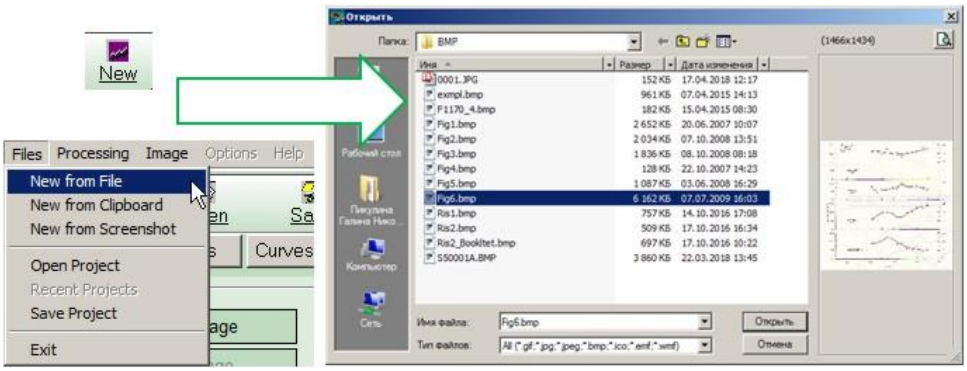
To run **InpGraph** double-click the InpGraph icon on a desktop or double-click the filename in a program folder.

Exercise 1: Uploading of a picture to be digitized

1. Run **InpGrpah**.

Procedure 1

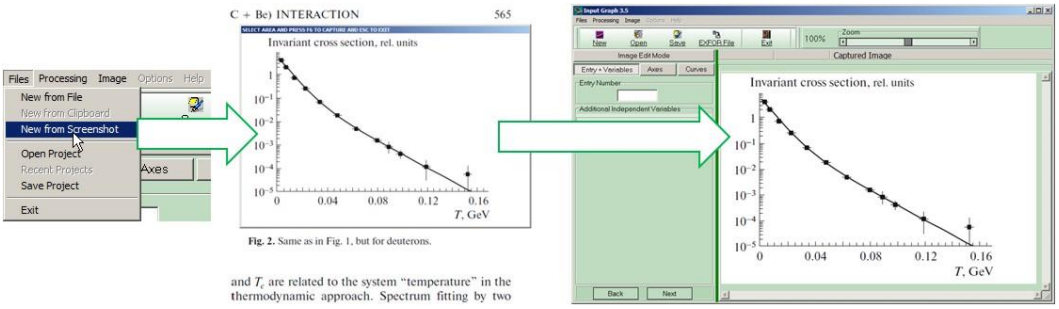
2. Click the **New** button on a Toolbar or select the **New From File** item from menu **Files**.



3. Select and open a file (of any graphic format) for digitizing.

Procedure 2

2. Select the **New From Screenshot** item from menu **Files.**



3. Select an image area to be loaded dragging and resizing window frame.
4. Press **F6** key to load the selected area into digitizer.
5. Press **ESC** key to close the frame without loading the image.

Plot digitizing

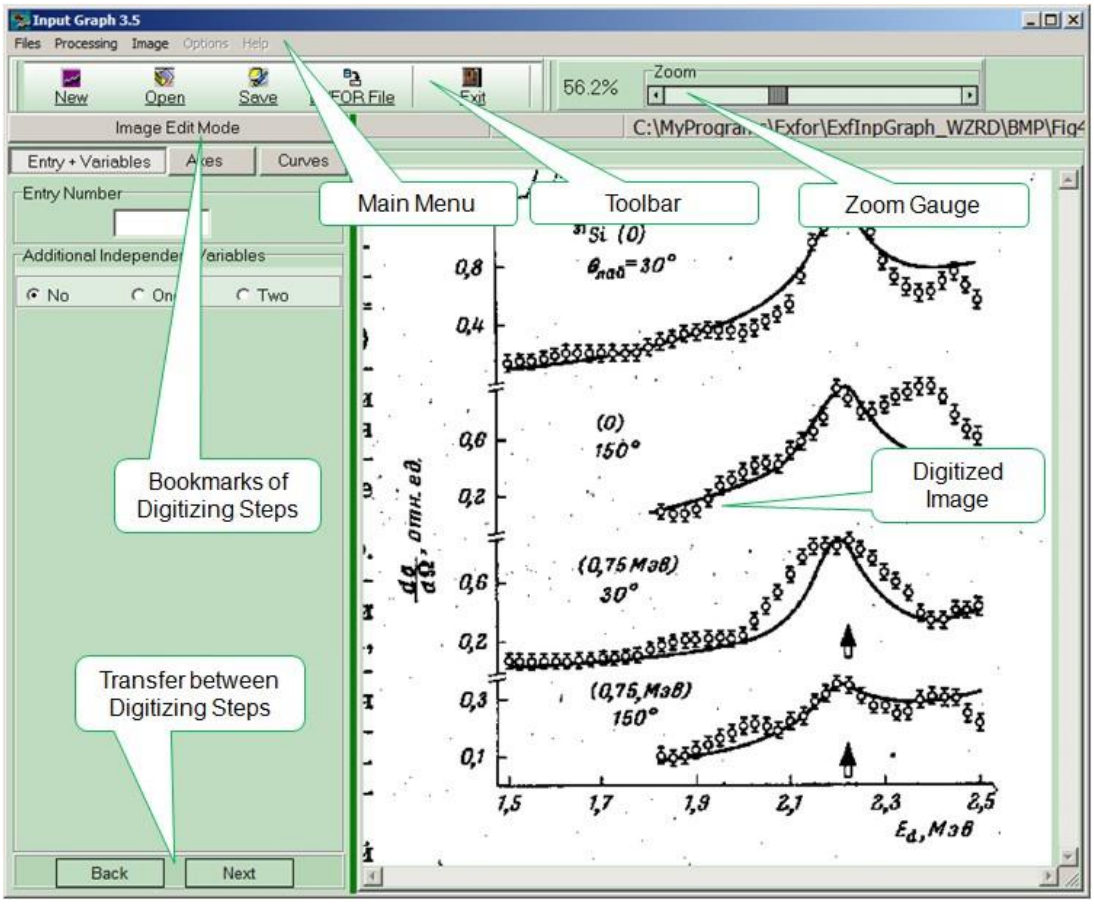
Notes:

It is not necessary to follow the order of digitizing procedures proposed below.

All exercises are performed with the **Fig4.bmp** file from the BMP folder of program **InpGraph** directory.

Load the **Fig4.bmp** file as it is described in the exercise 1.

Plot scale may be adjusted using the Zoom track bar.



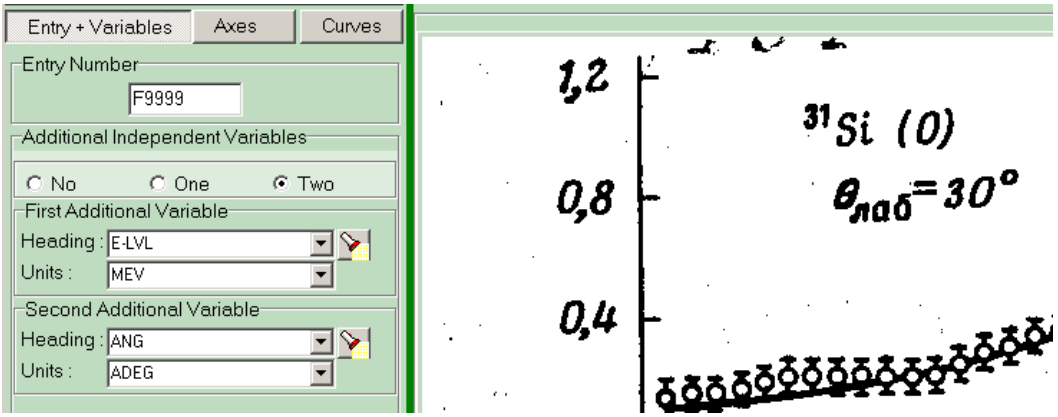
Exercise 2: Setting of additional independent variables

1. Select the **Entry+Variables** bookmark**.**
2. In the **Entry Number** field enter the entry number for digitized data.
3. In the **Additional Independent Variables** group box set the number of independent variables to be used.

*In the present example set **Two** – two additional independent variables are given on a plot.*

4. In group boxes **First Additional Variable** and **Second Additional Variable** enter the headings and units for additional independent variables.

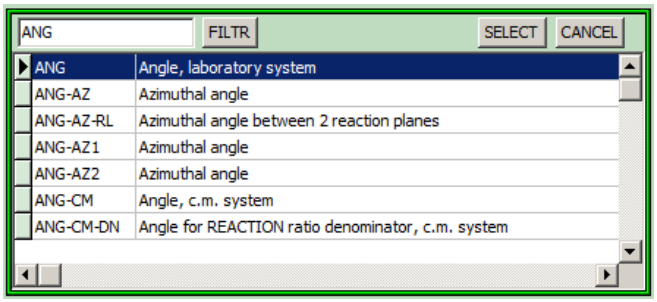
*In the present example set the values of **E-LVL, MEV** for the first variable and the values of **ANG, ADEG** for the second variable.*



Notes:

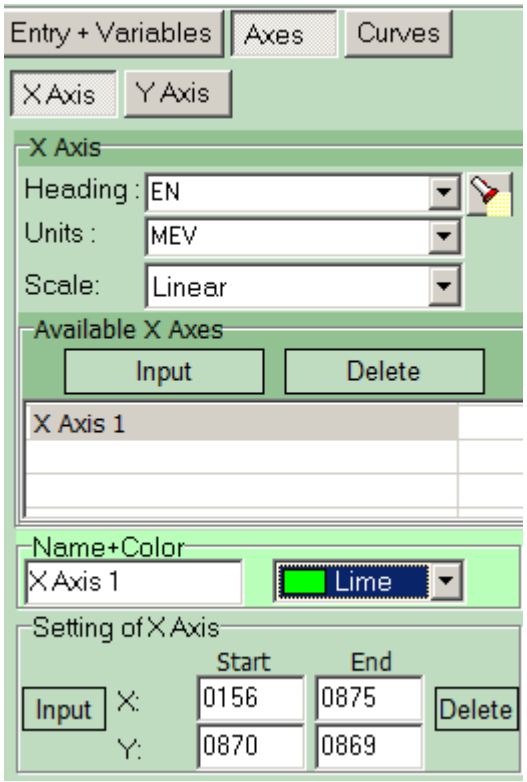
Use drop-down lists to search and select heading and units for independent variables. Lists include the values uploaded from EXFOR dictionaries.

Use context search to select the appropriate name of independent variable from EXFOR dictionaries.



Exercise 4: Settings parameters of X-axis

1. Select the **Axes|XAxis** bookmark.



2. In the **Heading** field of group box **X Axis** set the name of X-axis, in the **Units** field set the units, in the **Scale** field select the type of scale – linear or logarithmic (**Linear/Logarithmic**).

Notes:

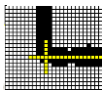
In the present example set the following values for X-axis: ***EN, MEV, Linear****.*

3. Click the **Input** button in group box **Active X Axes** to set X-axis.

4. In group box **Name+Color** edit axis's name and color, if necessary.

Use drop-down lists to select the required color.

5. To set the direction of X-axis click the **Input** button in group box **Setting of X Axis**.



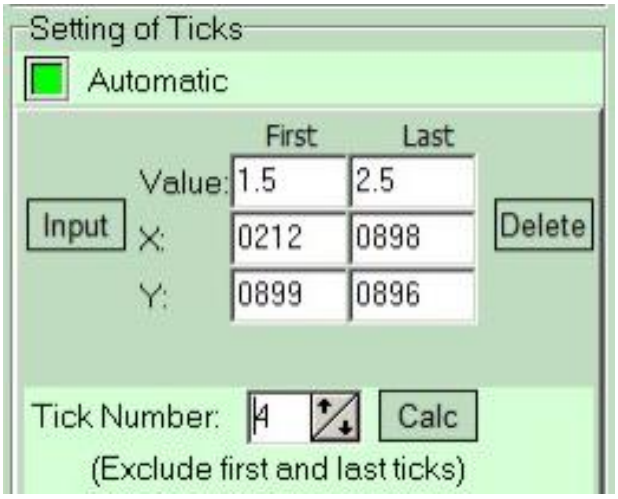
6. Click the right mouse button on the beginning of X-axis to magnify the image of the selected area (window of **Magnifier** mode) and then click the left mouse button to mark the beginning of X-axis.

7. Repeat the action from item 6 to mark the end of X-axis.

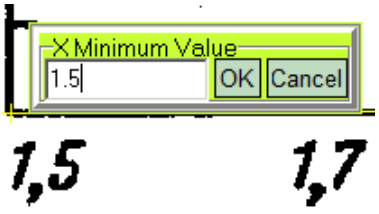
Exercise 5: Setting of ticks on X-axis.

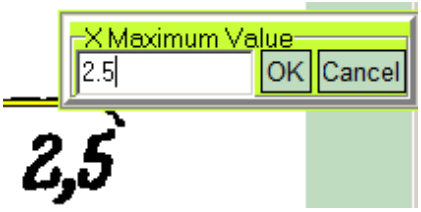
Procedure 1

1. In the **Setting of Ticks** group box select the mode of automatic input of ticks. To do this, activate the **Automatic** flag.



2. Click the **Input** button and then click the right mouse button on the first tick of X-axis. Set its exact position in the mode "Magnifier" using the left mouse button.





3. Enter the corresponding numeric value in the **X Minimum Value** field.

4. Repeat the actions 2 and 3 for the last tick.

5. In the **Tick Number** field set the number of ticks on X-axis between minimal and maximal values.

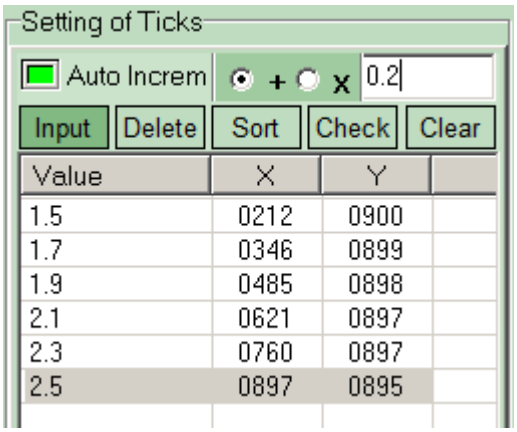
6. Click the **Calc** button.

Procedure 2

Notes:

1. The mode of manual input of ticks is a default mode.
2. Activate the **Auto Increm** flag in group box **Setting of Ticks**.
3. Set the type of tick increment: adding (for linear scale) or multiplying (for logarithmic scale). Set the increment value in the input field.

*In the present example select adding (set flag +) and enter the value **0.2**.*

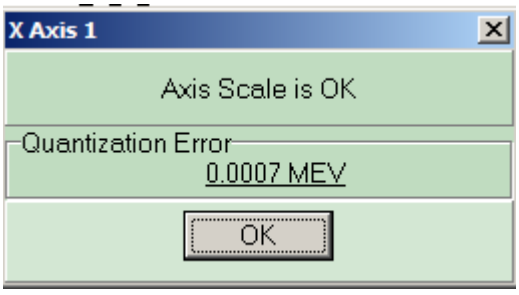


4. Click the right mouse button on the first tick of X-axis. Mark its exact position in the mode "Magnifier" using the left mouse button. Set the appropriate numeric value.
5. Set positions of all ticks on X-axis and corresponding numeric values according to item 3.

*Use the **Delete** button to delete the selected tick.*

*Use the **Sort** button to sort tick values on ascending order.*

*Use the **Check** button to check the tick values correct.*

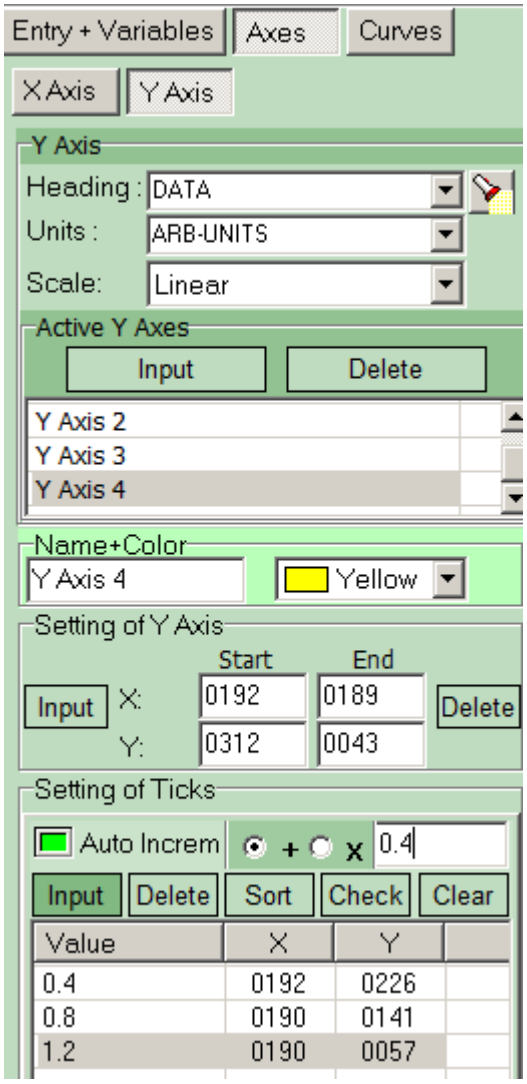


*Use the **Clear** button to clear the table with ticks.*

Exercise 6: Setting of ticks on Y-axis

Notes:

1. Select the **Axes|YAxis** bookmark
2. Repeat the actions mentioned in the exercises 4 и 5 for X-axis.



Note, for the given plot four Y-axes should be set. For this purpose repeat four times the actions 3-7 from the exercise 4 and all items from the exercise 5.

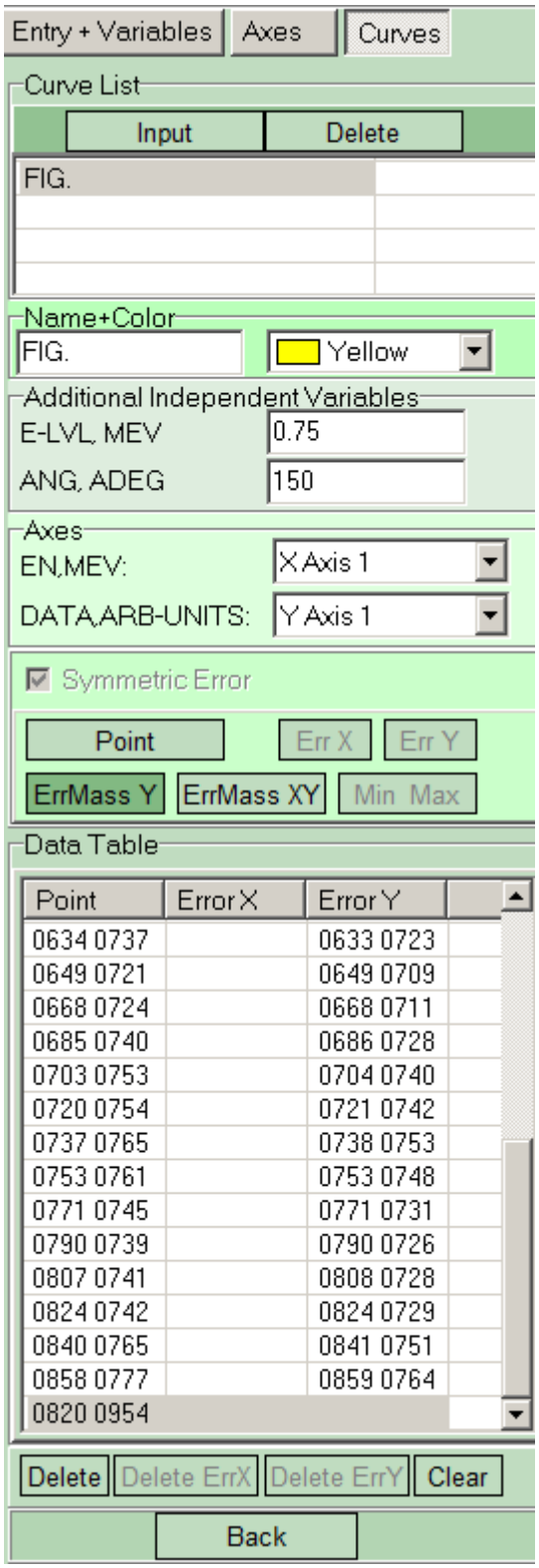
Exercise 7: Digitizing of curves

1. Select the **Curves** bookmark**.**
2. Click the **Input** button in group box **Curve List** to enter information regarding the new curve.
3. In the **Name+Color** group box edit the name of the curve and its color, if necessary.
4. In the **Additional Independent Variables** group box enter numeric values of additional independent variables for the selected curve.

*For the 1-st curve enter the value of **0.75** for variable **E** and **150** for variable **ANG**.*

5. In the **Axes** group box select X-axis and Y-axis from drop-down lists.

Notes:



For the 1-st curve set the following exes: ***X Axis 1*** *and* ***Y Axis 1****.*

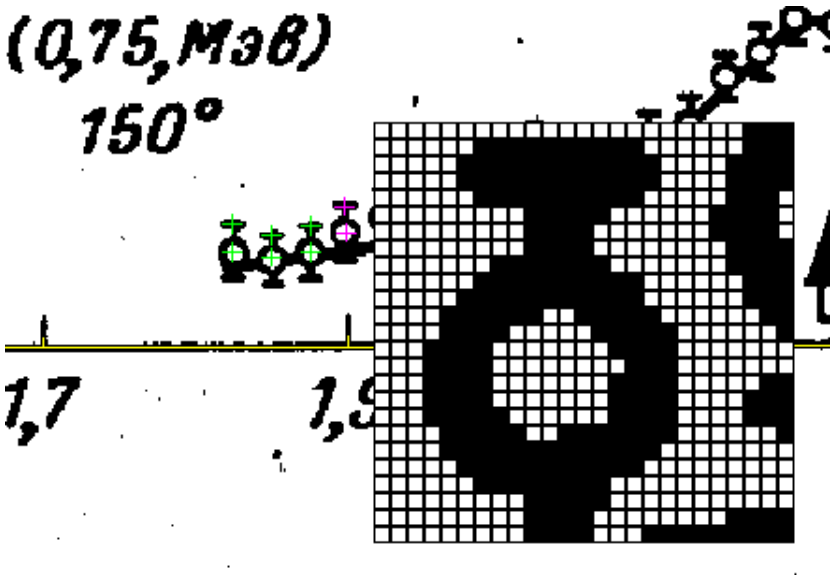
6. Define the type of errors on a plot: symmetric or unsymmetric. (Select or deselect check box **Symmetric Error)**.

Note, error type is set at the beginning of curve digitizing only. It can not be changed during the process.

For the 1-st curve set symmetric errors – select check box ***Symmetric Error*** *.*

Notes:

7. Click the **ErrMassY** button to facilitate digitizing process.
8. Click the right mouse button on the first point of a curve. Mark the exact point center in window “Magnifier” using the left mouse button.
9. Click the right mouse button on the upper error bar of the first point. Mark its exact position in the window “Magnifier” using the left mouse button.



10. Repeat the actions 8 and 9 for all points of the curve.
11. Digitize other three curves of the plot repeating the actions 2-11 for each curve.

Note, you may interrupt digitizing process at any stage. To do this save changes in the Project file using the Save button on the toolbar or the Files ►Save Project menu item, and close program InpGraph.

Table 1 – Function of buttons used at digitizing

Button	Function
Input mode for symmetric errors	
Point	Input of points. Click again to cancel the mode.
Err X	Input of errors on X-axis. Mode is canceled automatically after entering.
Err Y	Input of errors on Y-axis. Mode is canceled automatically after entering.
ErrMass Y	Input of array of points and errors on Y-axis. After entering a point an error on Y-axis should be entered next. Click again to cancel the mode.

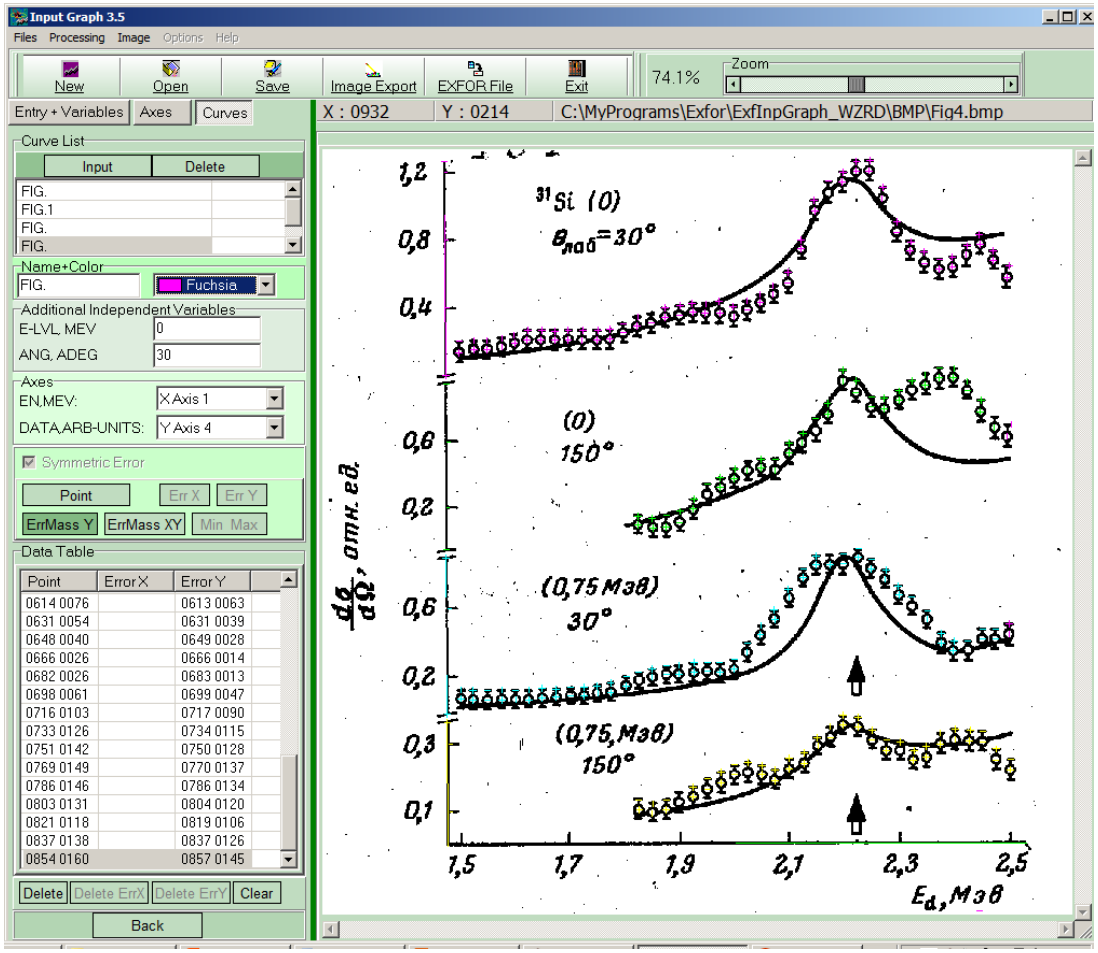
Button	Function
ErrMass XY	Input of array of points and errors on X and Y axes. After entering a point the errors on X-axis and then on Y-axis are entered on the spot. Click again to cancel the mode.
Min Max	Input of array of points including minimal and maximal error values on Y-axis. Click again to cancel the mode.
Delete	Deletion of the selected point with its errors.
Delete ErrX	Deletion of error on X-axis only.
Delete ErrY	Deletion of error on X-axis only.
Clear	Deletion of all points and errors.
Input mode for unsymmetric errors	
Point	Input of points. Click again to cancel the mode.
Err X-/+	Input of unsymmetric errors on X-axis. First the minimal value is entered and then the maximal one. Mode is canceled automatically after entering.
Err Y-/+	Input of unsymmetric errors on Y-axis. First the minimal value is entered and then the maximal one. Mode is canceled automatically after entering.
ErrMass Y -/+	Input of array of points and unsymmetric errors on Y-axis. After entering a point the errors on Y-axis are entered on the spot: first - minimal value, then maximal value. Click again to cancel the mode.
ErrMass XY -/+	Input of array of points and unsymmetric errors on X and Y axes. After entering a point the errors on X and Y axes are entered on the spot: first - minimal and maximal values on X-axis then minimal and maximal values on Y-axis. Click again to cancel the mode.

Notes:

Data compilation into Exfor format

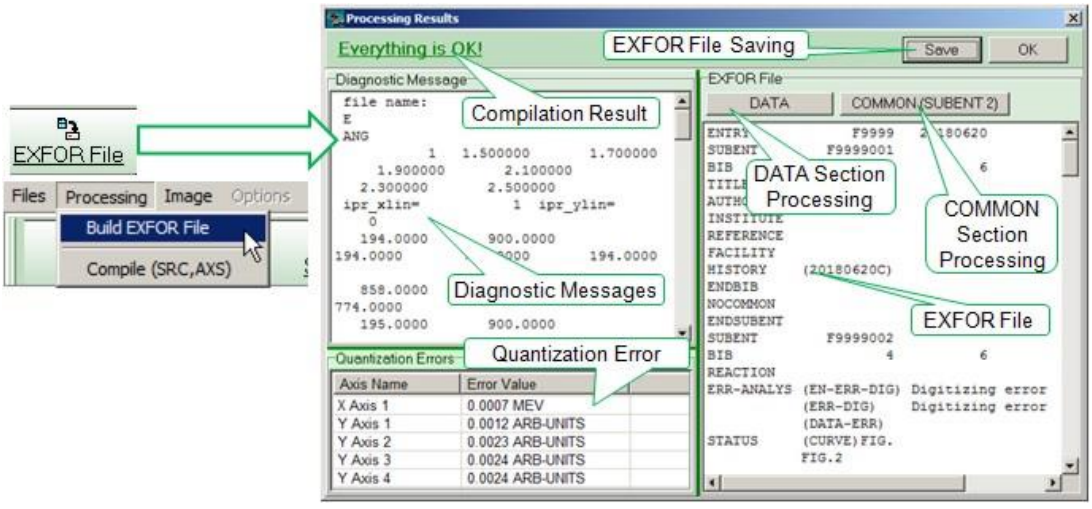
Notes:

After digitizing of all curves, conversion of obtained data to the coordinates of physical process is performed.



Exercise 8: Generation of Exfor file

1. Click the **EXFOR File** button or use the **Processing ►Build EXFOR File** menu item.

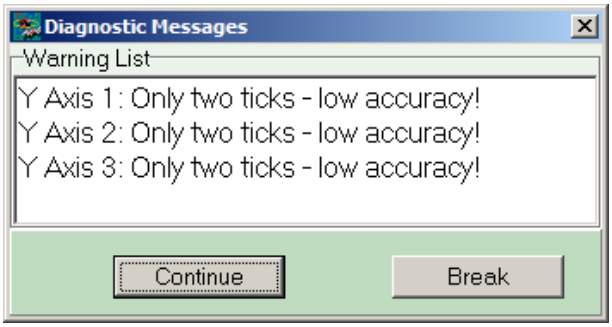


2. Take into account diagnostic messages that appear on the screen during compilation process.

In the present example there are messages informing of a lack of ticks on Y-axis. It leads to increase of digitizing error.

It is recommended to set a maximal number of ticks for each axis to increase the accuracy of digitization.

Notes:



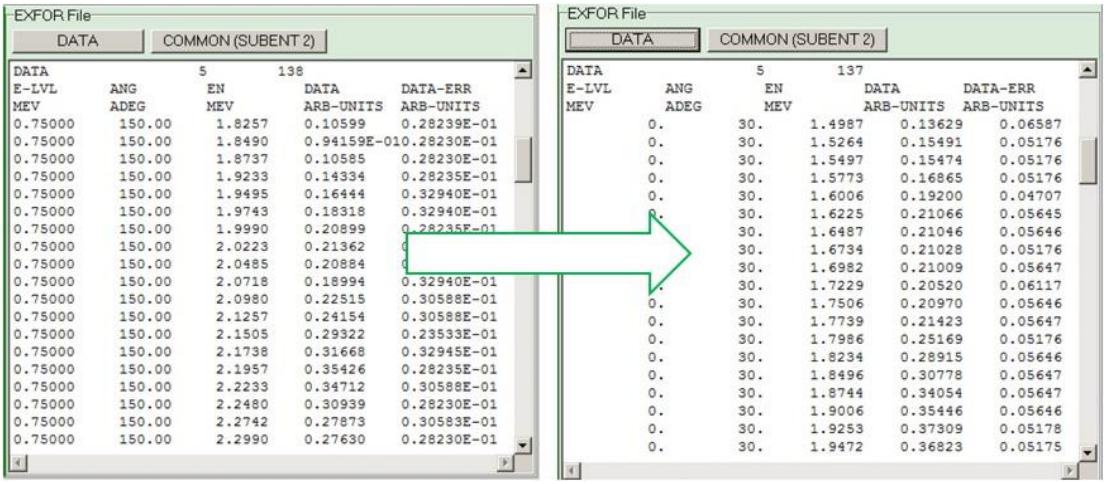
3. In a dialogue window with the results of compilation pay attention to the table of quantization errors that appear due to the image discretization. Specify these values in error description, if necessary (keyword **ERR-ANALYS)**.

4. Click the **Save** button to save changes in Exfor file.

Numeric data treatment in EXFOR format

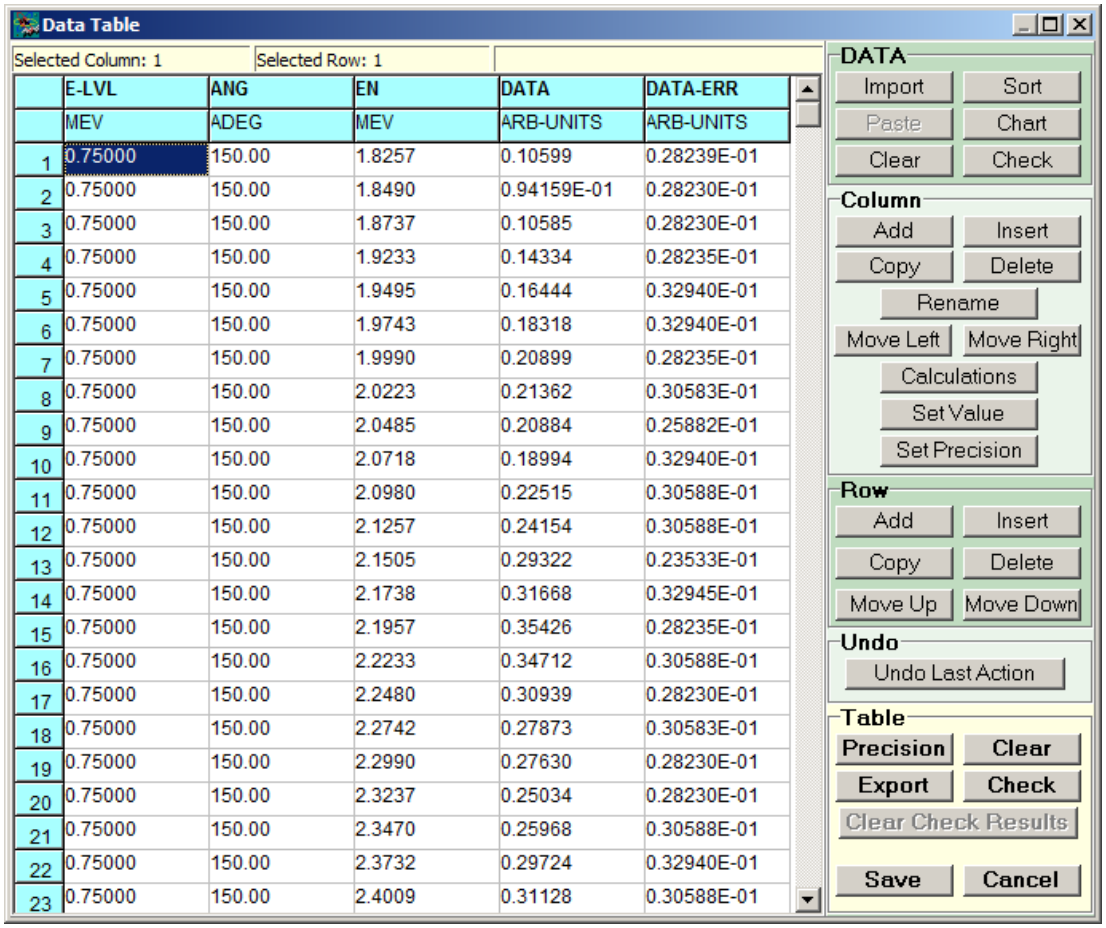
Notes:

Arrange the format of numeric data in accordance with the rules of Exfor library.



Exercise 9: Data section treatment within DataTable mode

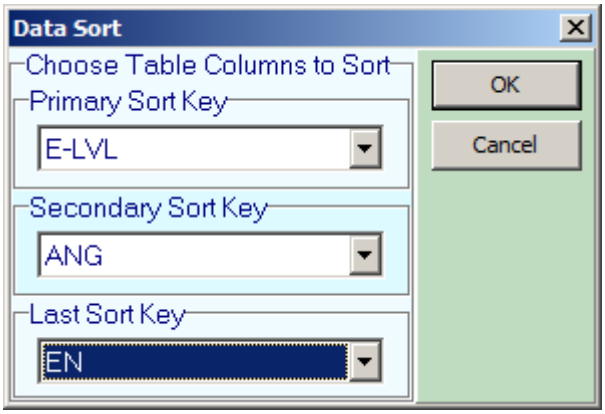
1. Click the **DATA** button in group box **EXFOR File**.

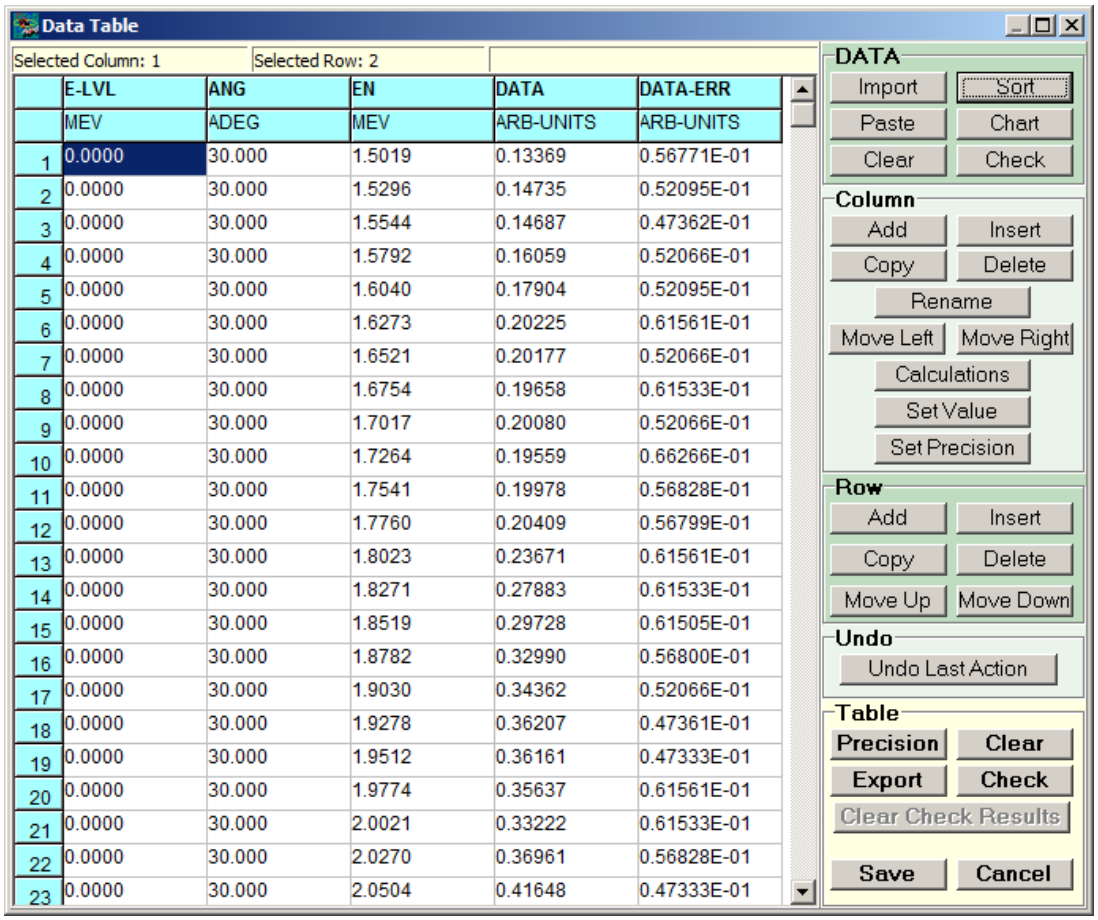


Notes:

2. Sort numeric data in a table by three columns. Click the **Sort** button in group box **Data**.

3. Select key columns for sorting from drop-down lists.

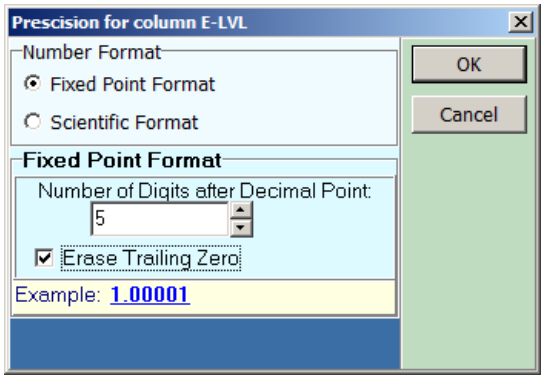


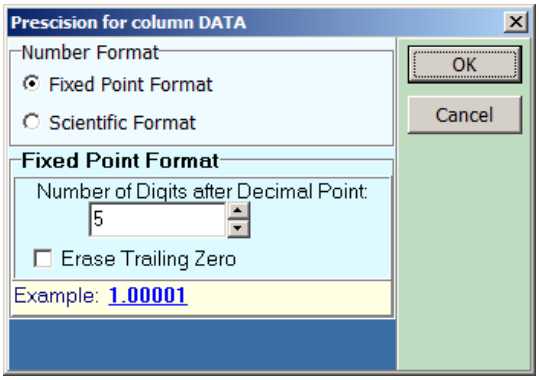


	E-LVL	ANG	EN	DATA	DATA-ERR
	MEV	ADEG	MEV	ARB-UNITS	ARB-UNITS
1	0.0000	30.000	1.5019	0.13369	0.56771E-01
2	0.0000	30.000	1.5296	0.14735	0.52095E-01
3	0.0000	30.000	1.5544	0.14687	0.47362E-01
4	0.0000	30.000	1.5792	0.16059	0.52066E-01
5	0.0000	30.000	1.6040	0.17904	0.52095E-01
6	0.0000	30.000	1.6273	0.20225	0.61561E-01
7	0.0000	30.000	1.6521	0.20177	0.52066E-01
8	0.0000	30.000	1.6754	0.19658	0.61533E-01
9	0.0000	30.000	1.7017	0.20080	0.52066E-01
10	0.0000	30.000	1.7264	0.19559	0.66266E-01
11	0.0000	30.000	1.7541	0.19978	0.56828E-01
12	0.0000	30.000	1.7760	0.20409	0.56799E-01
13	0.0000	30.000	1.8023	0.23671	0.61561E-01
14	0.0000	30.000	1.8271	0.27883	0.61533E-01
15	0.0000	30.000	1.8519	0.29728	0.61505E-01
16	0.0000	30.000	1.8782	0.32990	0.56800E-01
17	0.0000	30.000	1.9030	0.34362	0.52066E-01
18	0.0000	30.000	1.9278	0.36207	0.47361E-01
19	0.0000	30.000	1.9512	0.36161	0.47333E-01
20	0.0000	30.000	1.9774	0.35637	0.61561E-01
21	0.0000	30.000	2.0021	0.33222	0.61533E-01
22	0.0000	30.000	2.0270	0.36961	0.56828E-01
23	0.0000	30.000	2.0504	0.41648	0.47333E-01

4. Set the accuracy of data presentation in accordance with Exfor rules. Select column **E-LVL** in data table and click the **Set Precision** button in group box **Column**.

5. Activate the **Erase Trailing Zero** flag in group box **Fixed Point Format**.





6. Repeat the actions 4 and 5 for column **ANG**.

7. Select the **Fixed Point Format** for columns **DATA** and the **DATA-ERR**, as it is more appropriate in this case. Set the same data precision for both columns.

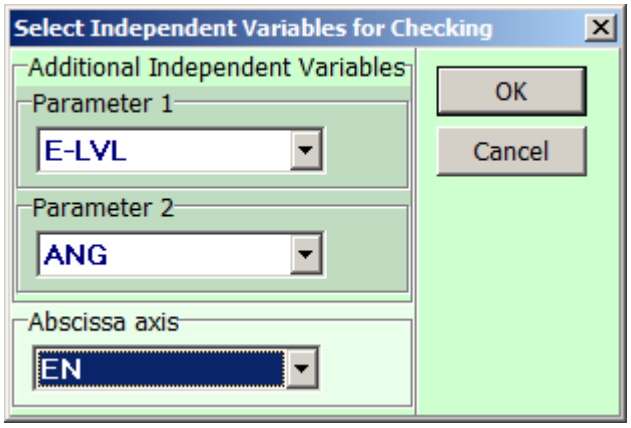
8. Select the **DATA** column in the data table and click the **Set Precision** button in group box **Column**. Activate a flag in position **Fixed Point Format** in group box **Number Format**. Set the necessary number of digits after decimal point in field **Number of Digits after Decimal Point** in group box **Fixed Point Format**.

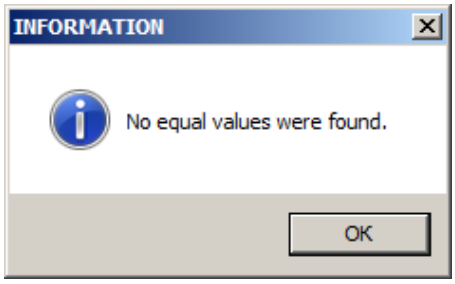
9. Repeat the action 8 for the **DATA-ERR** column.

Exercise 10: Check of numeric data

1. Check numeric data on coincidence over all independent variables. Click the **Check** button in group box **Table**.

2. Select columns with independent variables from drop-down lists to check on value coincidence.



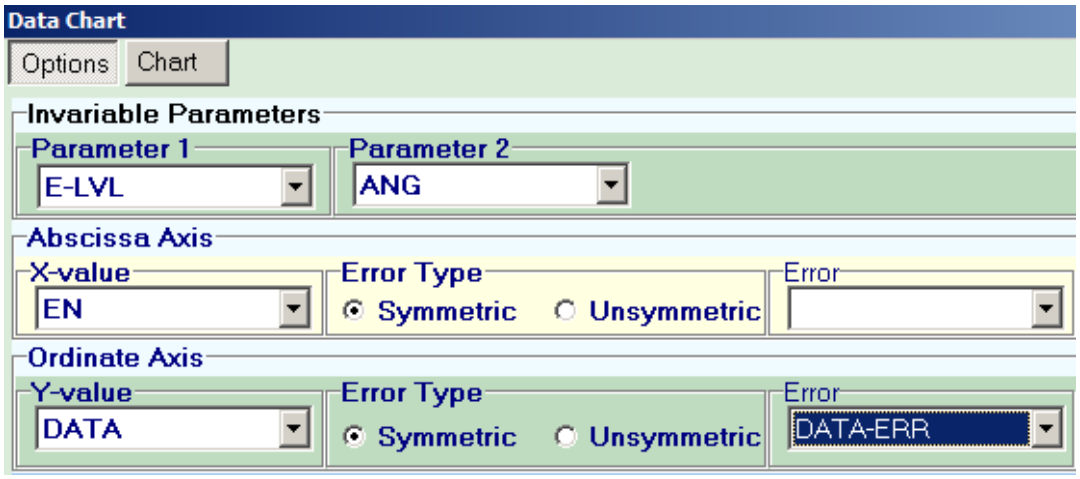


3. Correct data and repeat check, if necessary.

4. Check data correctness using graphic presentation. Click the **Chart** button in group box **Data**.

Notes:

Notes:



5. In the **Options** bookmark select the columns of additional independent variables from drop-down lists: fields **Parameter1** and **Parameter2** in group box **Invariable Parameters** (columns **E** and **ANG**, correspondingly).

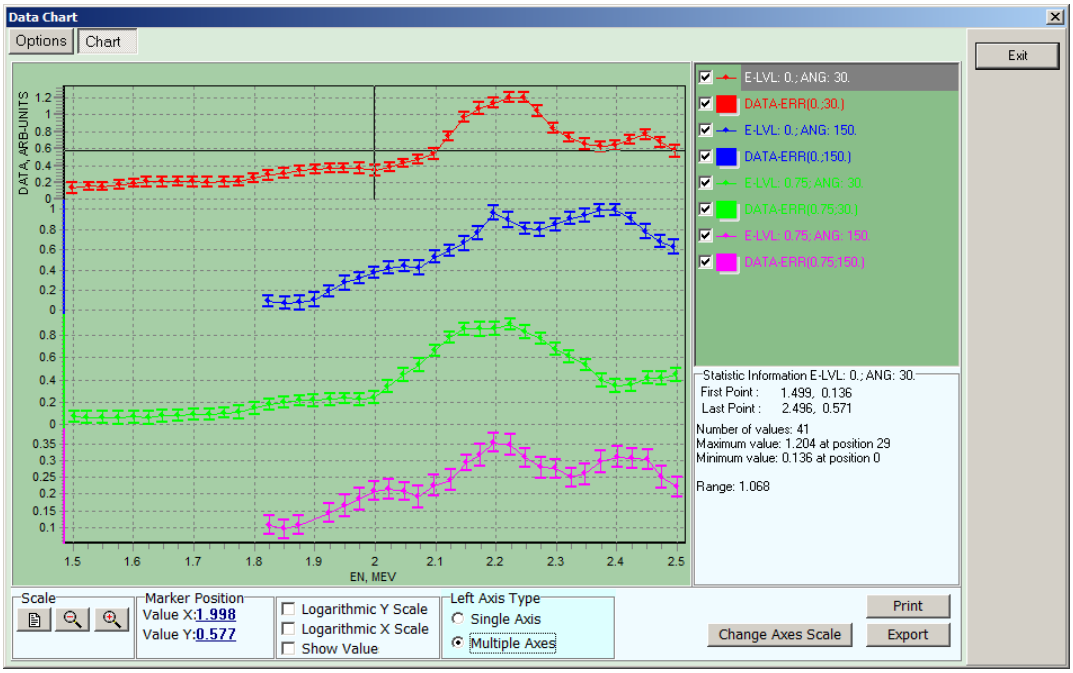
6. Select X-axis column in the **X-value** drop-down list of group box **Abscissa Axis** (column **EN**).

7. Select Y-axis column in the **Y-value** drop-down list of group box **Ordinate Axis** (column **DATA**). Activate the **Symmetric** flag in group box **ErrorType**. Select column with data errors in field **Error** (column **DATA-ERR**).

8. Go to the **Chart** bookmark.

9. Activate the **Multiple Axes** flag in group box **Left Axis Type**.

10. Check the correctness of digitizing procedure taking into account statistic information in group box **Statistic Information**.

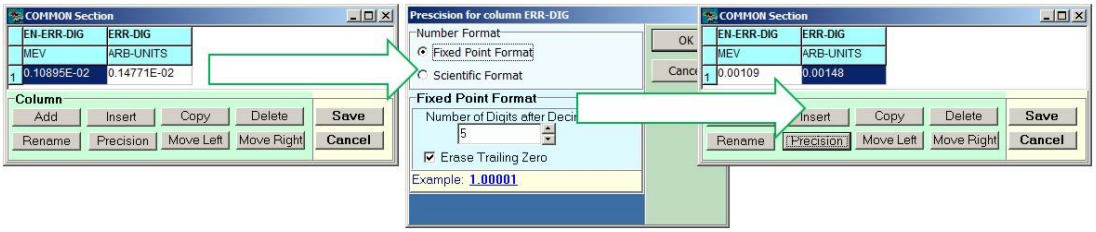


Don't forget to click the Save button in group box Table when closing the DataTable mode.

Exercise 11. Treatment of a COMMON section

Notes:

1. Click the **COMMON** button in group box **EXFOR File**.
2. Select each column of COMMON table and set numeric data precision with the **Precision** button.



Don't forget to click the Save button to save changes in Exfor file when closing window Processing Results.

Table 2 – Function of buttons used to work with DataTable mode

Button	Function
*Group box **DATA***	
Import	Import of data table from text, Microsoft Word or Microsoft Excel files.
Paste	Import of data table from Paste buffer.
Clear	Deletion of all rows and columns containing numeric data.
Sort	Sort of table rows on columns.
Chart	Graphic presentation of numeric data.
Check	Check of numeric data correctness.
*Group box **Column***	
Add	Addition of an empty column to the end of the table.
Copy	Insertion of an empty column near the selected one and copying of its content to a new column.
Insert	Insertion of an empty column near the selected one.
Delete	Deletion of the selected column.
Rename	Renaming of the selected column.
Move Left	Left shift of the selected column.

Button	Function
Move Right	Right shift of the selected column.
Calculations	Mathematical operations with columns.
Set Value	Filling in a column with a specified numeric value.
Set Precision	Setting of data precision of a selected column.
Group box ***Column***	
Add	Addition of an empty row to the end of the table.
Copy	Insertion of an empty row near the selected one and copying of its content to the new row.
Insert	Insertion of an empty row near the selected one.
Delete	Deletion of the selected row.
Move Up	Shift up of the selected row.
Move Down	Shift down of the selected row.
Group box ***Undo***	
Undo Last Action	Cancel of the last procedure on editing the data table.
Group box ***Table***	
Precision	Setting of data precision for all columns.
Export	Export of data table from text, Microsoft Word or Microsoft Excel files.
Clear	Total clearing of a table.
Check	Check of the table numeric values on independent variable coincidence.
Clear Check Results	Deletion of the check results on independent variable coincidence.
Save	Write-in of data table into the Exfor file.
Cancel	Exit from DataTable mode without saving the changes.

Notes:

Table 3 – Function of buttons used to work with COMMON section

Button	Function
Add	Addition of an empty column to the end of the table.
Insert	Insertion of an empty column near the selected one.
Copy	Insertion of an empty column near the selected one and copying of its content to the new column.
Delete	Deletion of the selected column.
Rename	Renaming of the selected column.
Precision	Setting of data precision of the selected column.
Move Left	Shift left of the selected column.
Move Right	Shift right of the selected column.
Save	Write-in of COMMON section into the Exfor file.
Cancel	Exit from Editing mode of COMMON section without saving the changes.

Notes: