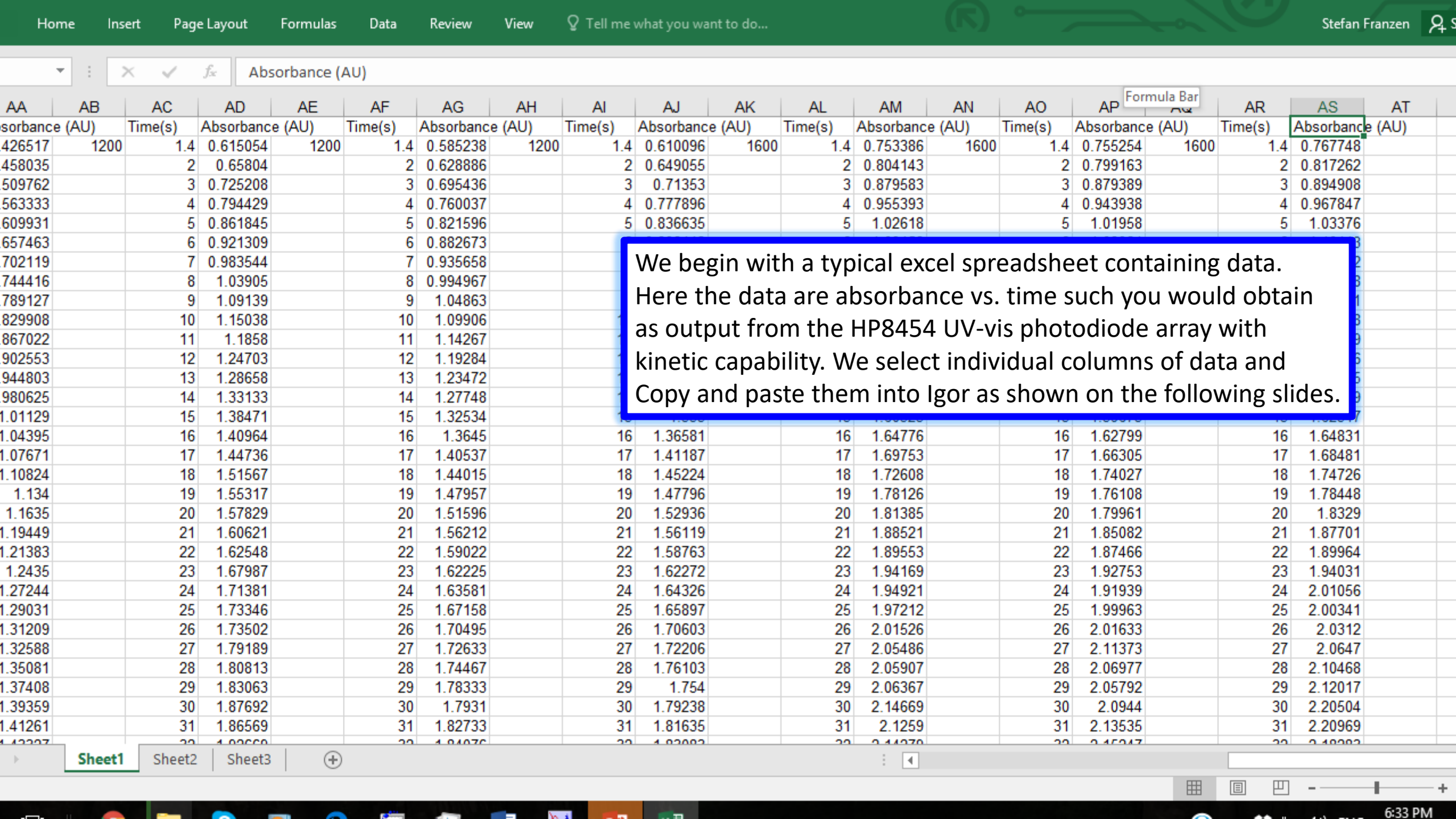
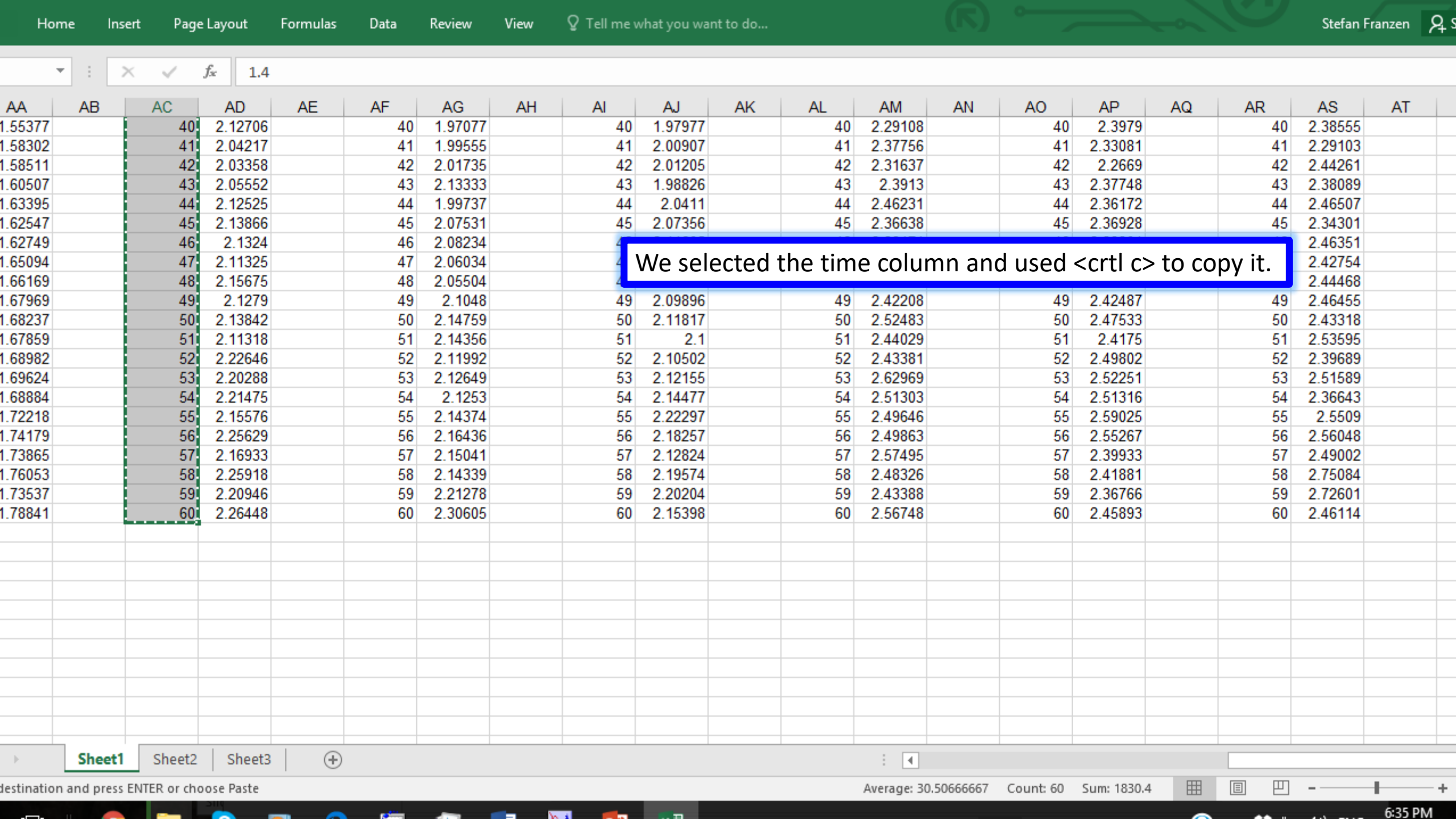
Using Igor

"At your service Master"

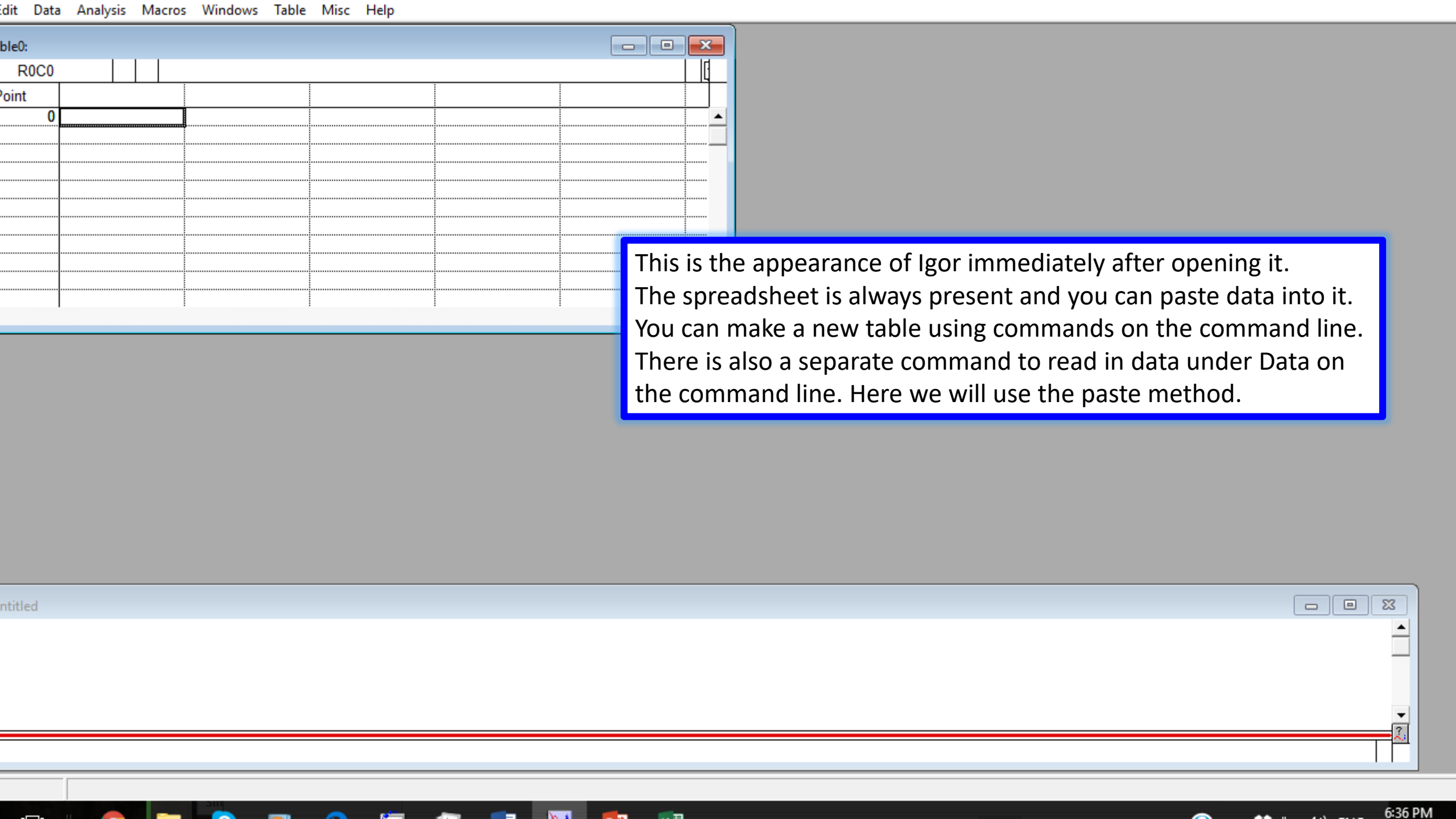
Data input, plotting and linear regression



AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
sorbance (AU)		Time(s)	Absorbance (AU)		Time(s)	Absorbance (AU)		Time(s)	Absorbance (AU)		Time(s)	Absorbance (AU)		Time(s)	Absorbance (AU)		Time(s)	Absorbance (AU)	
.426517	1200	1.4	0.615054	1200	1.4	0.585238	1200	1.4	0.610096	1600	1.4	0.753386	1600	1.4	0.755254	1600	1.4	0.767748	
.458035		2	0.65804		2	0.628886		2	0.649055		2	0.804143		2	0.799163		2	0.817262	
.509762		3	0.725208		3	0.695436		3	0.71353		3	0.879583		3	0.879389		3	0.894908	
.563333		4	0.794429		4	0.760037		4	0.777896		4	0.955393		4	0.943938		4	0.967847	
.609931		5	0.861845		5	0.821596		5	0.836635		5	1.02618		5	1.01958		5	1.03376	
.657463		6	0.921309		6	0.882673													
.702119		7	0.983544		7	0.935658													
.744416		8	1.03905		8	0.994967													
.789127		9	1.09139		9	1.04863													
.829908		10	1.15038		10	1.09906													
.867022		11	1.1858		11	1.14267													
.902553		12	1.24703		12	1.19284													
.944803		13	1.28658		13	1.23472													
.980625		14	1.33133		14	1.27748													
1.01129		15	1.38471		15	1.32534													
1.04395		16	1.40964		16	1.3645		16	1.36581		16	1.64776		16	1.62799		16	1.64831	
1.07671		17	1.44736		17	1.40537		17	1.41187		17	1.69753		17	1.66305		17	1.68481	
1.10824		18	1.51567		18	1.44015		18	1.45224		18	1.72608		18	1.74027		18	1.74726	
1.134		19	1.55317		19	1.47957		19	1.47796		19	1.78126		19	1.76108		19	1.78448	
1.1635		20	1.57829		20	1.51596		20	1.52936		20	1.81385		20	1.79961		20	1.8329	
1.19449		21	1.60621		21	1.56212		21	1.56119		21	1.88521		21	1.85082		21	1.87701	
1.21383		22	1.62548		22	1.59022		22	1.58763		22	1.89553		22	1.87466		22	1.89964	
1.2435		23	1.67987		23	1.62225		23	1.62272		23	1.94169		23	1.92753		23	1.94031	
1.27244		24	1.71381		24	1.63581		24	1.64326		24	1.94921		24	1.91939		24	2.01056	
1.29031		25	1.73346		25	1.67158		25	1.65897		25	1.97212		25	1.99963		25	2.00341	
1.31209		26	1.73502		26	1.70495		26	1.70603		26	2.01526		26	2.01633		26	2.0312	
1.32588		27	1.79189		27	1.72633		27	1.72206		27	2.05486		27	2.11373		27	2.0647	
1.35081		28	1.80813		28	1.74467		28	1.76103		28	2.05907		28	2.06977		28	2.10468	
1.37408		29	1.83063		29	1.78333		29	1.754		29	2.06367		29	2.05792		29	2.12017	
1.39359		30	1.87692		30	1.7931		30	1.79238		30	2.14669		30	2.0944		30	2.20504	
1.41261		31	1.86569		31	1.82733		31	1.81635		31	2.1259		31	2.13535		31	2.20969	



AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
1.55377		40	2.12706		40	1.97077		40	1.97977		40	2.29108		40	2.3979		40	2.38555	
1.58302		41	2.04217		41	1.99555		41	2.00907		41	2.37756		41	2.33081		41	2.29103	
1.58511		42	2.03358		42	2.01735		42	2.01205		42	2.31637		42	2.2669		42	2.44261	
1.60507		43	2.05552		43	2.13333		43	1.98826		43	2.3913		43	2.37748		43	2.38089	
1.63395		44	2.12525		44	1.99737		44	2.0411		44	2.46231		44	2.36172		44	2.46507	
1.62547		45	2.13866		45	2.07531		45	2.07356		45	2.36638		45	2.36928		45	2.34301	
1.62749		46	2.1324		46	2.08234												2.46351	
1.65094		47	2.11325		47	2.06034												2.42754	
1.66169		48	2.15675		48	2.05504												2.44468	
1.67969		49	2.1279		49	2.1048		49	2.09896		49	2.42208		49	2.42487		49	2.46455	
1.68237		50	2.13842		50	2.14759		50	2.11817		50	2.52483		50	2.47533		50	2.43318	
1.67859		51	2.11318		51	2.14356		51	2.1		51	2.44029		51	2.4175		51	2.53595	
1.68982		52	2.22646		52	2.11992		52	2.10502		52	2.43381		52	2.49802		52	2.39689	
1.69624		53	2.20288		53	2.12649		53	2.12155		53	2.62969		53	2.52251		53	2.51589	
1.68884		54	2.21475		54	2.1253		54	2.14477		54	2.51303		54	2.51316		54	2.36643	
1.72218		55	2.15576		55	2.14374		55	2.22297		55	2.49646		55	2.59025		55	2.5509	
1.74179		56	2.25629		56	2.16436		56	2.18257		56	2.49863		56	2.55267		56	2.56048	
1.73865		57	2.16933		57	2.15041		57	2.12824		57	2.57495		57	2.39933		57	2.49002	
1.76053		58	2.25918		58	2.14339		58	2.19574		58	2.48326		58	2.41881		58	2.75084	
1.73537		59	2.20946		59	2.21278		59	2.20204		59	2.43388		59	2.36766		59	2.72601	
1.78841		60	2.26448		60	2.30605		60	2.15398		60	2.56748		60	2.45893		60	2.46114	


Edit Data Analysis Macros Windows Table Misc Help
ble0:
R0C0
Point
0
This is the appearance of Igor immediately after opening it.
The spreadsheet is always present and you can paste data into it.
You can make a new table using commands on the command line.
There is also a separate command to read in data under Data on the command line. Here we will use the paste method.
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6:36 PM

Edit Data Analysis Macros Windows Table Misc Help

ble0:wave0

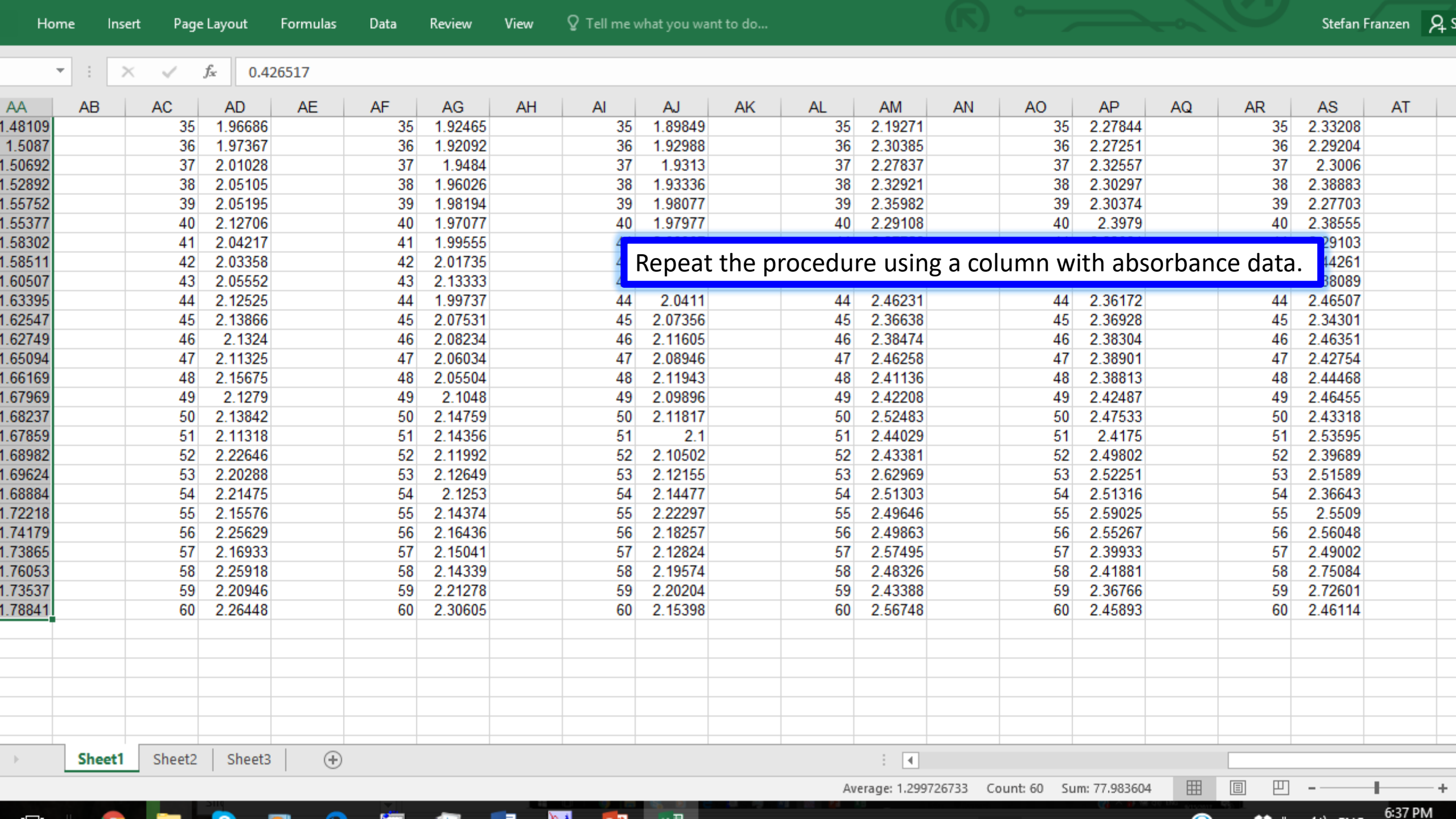
R0C0 | 1.4

Point	wave0
0	1.4
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	10
10	11

Now we paste the time column into Igor using <crtl v> to paste it.

ntitled

6:36 PM



AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
1.48109		35	1.96686		35	1.92465		35	1.89849		35	2.19271		35	2.27844		35	2.33208	
1.5087		36	1.97367		36	1.92092		36	1.92988		36	2.30385		36	2.27251		36	2.29204	
1.50692		37	2.01028		37	1.9484		37	1.9313		37	2.27837		37	2.32557		37	2.3006	
1.52892		38	2.05105		38	1.96026		38	1.93336		38	2.32921		38	2.30297		38	2.38883	
1.55752		39	2.05195		39	1.98194		39	1.98077		39	2.35982		39	2.30374		39	2.27703	
1.55377		40	2.12706		40	1.97077		40	1.97977		40	2.29108		40	2.3979		40	2.38555	
1.58302		41	2.04217		41	1.99555												29103	
1.58511		42	2.03358		42	2.01735												4261	
1.60507		43	2.05552		43	2.13333												38089	
1.63395		44	2.12525		44	1.99737		44	2.0411		44	2.46231		44	2.36172		44	2.46507	
1.62547		45	2.13866		45	2.07531		45	2.07356		45	2.36638		45	2.36928		45	2.34301	
1.62749		46	2.1324		46	2.08234		46	2.11605		46	2.38474		46	2.38304		46	2.46351	
1.65094		47	2.11325		47	2.06034		47	2.08946		47	2.46258		47	2.38901		47	2.42754	
1.66169		48	2.15675		48	2.05504		48	2.11943		48	2.41136		48	2.38813		48	2.44468	
1.67969		49	2.1279		49	2.1048		49	2.09896		49	2.42208		49	2.42487		49	2.46455	
1.68237		50	2.13842		50	2.14759		50	2.11817		50	2.52483		50	2.47533		50	2.43318	
1.67859		51	2.11318		51	2.14356		51	2.1		51	2.44029		51	2.4175		51	2.53595	
1.68982		52	2.22646		52	2.11992		52	2.10502		52	2.43381		52	2.49802		52	2.39689	
1.69624		53	2.20288		53	2.12649		53	2.12155		53	2.62969		53	2.52251		53	2.51589	
1.68884		54	2.21475		54	2.1253		54	2.14477		54	2.51303		54	2.51316		54	2.36643	
1.72218		55	2.15576		55	2.14374		55	2.22297		55	2.49646		55	2.59025		55	2.5509	
1.74179		56	2.25629		56	2.16436		56	2.18257		56	2.49863		56	2.55267		56	2.56048	
1.73865		57	2.16933		57	2.15041		57	2.12824		57	2.57495		57	2.39933		57	2.49002	
1.76053		58	2.25918		58	2.14339		58	2.19574		58	2.48326		58	2.41881		58	2.75084	
1.73537		59	2.20946		59	2.21278		59	2.20204		59	2.43388		59	2.36766		59	2.72601	
1.78841		60	2.26448		60	2.30605		60	2.15398		60	2.56748		60	2.45893		60	2.46114	

Edit Data Analysis Macros Windows Table Misc Help

ble0:wave0,wave1

R0C1 | 0.426517

Point	wave0	wave1
0	1.4	0.426517
1	2	0.458035
2	3	0.509762
3	4	0.563333
4	5	0.609931
5	6	0.657463
6	7	0.702119
7	8	0.744416
8	9	0.789127
9	10	0.829908
10	11	0.867022

Now we paste the absorbance column into Igor using <crtl v> to paste it.

ntitled

ell is in an unused column. Entering or pasting a number or text will create a new wave.

6:37 PM

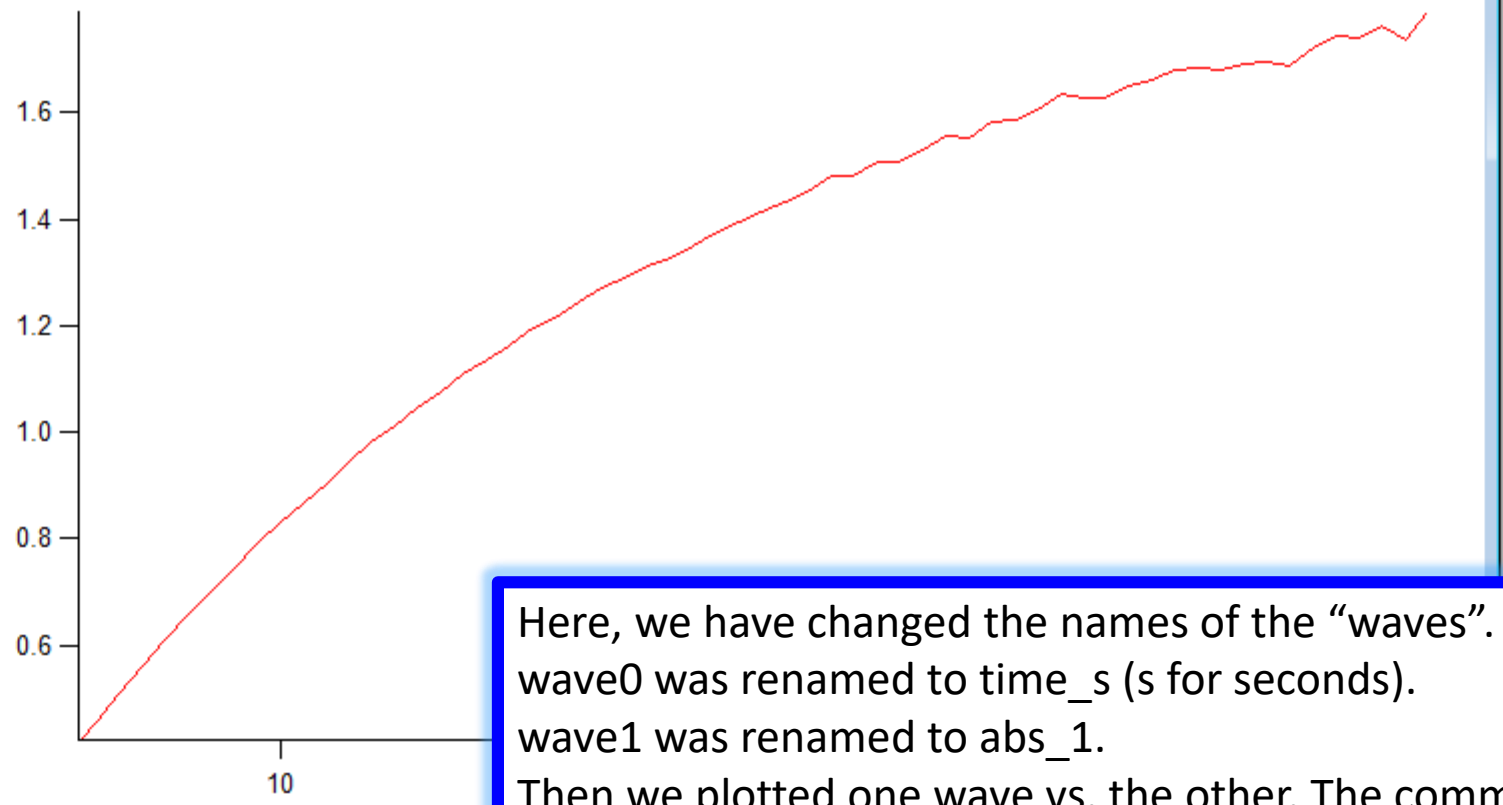
Edit Data Analysis Macros Windows Graph Misc Help

ble0:time_s,abs_1

R0C1 | 0.426517

Point	time_s	abs_1
0	1.4	0.426517
1	2	0.458035
2	3	0.509762
3	4	0.563333
4	5	0.609931
5	6	0.657463
6	7	0.702119
7	8	0.744416
8	9	0.789127
9	10	0.829908
10	11	0.867022

Graph0:abs_1 vs time_s



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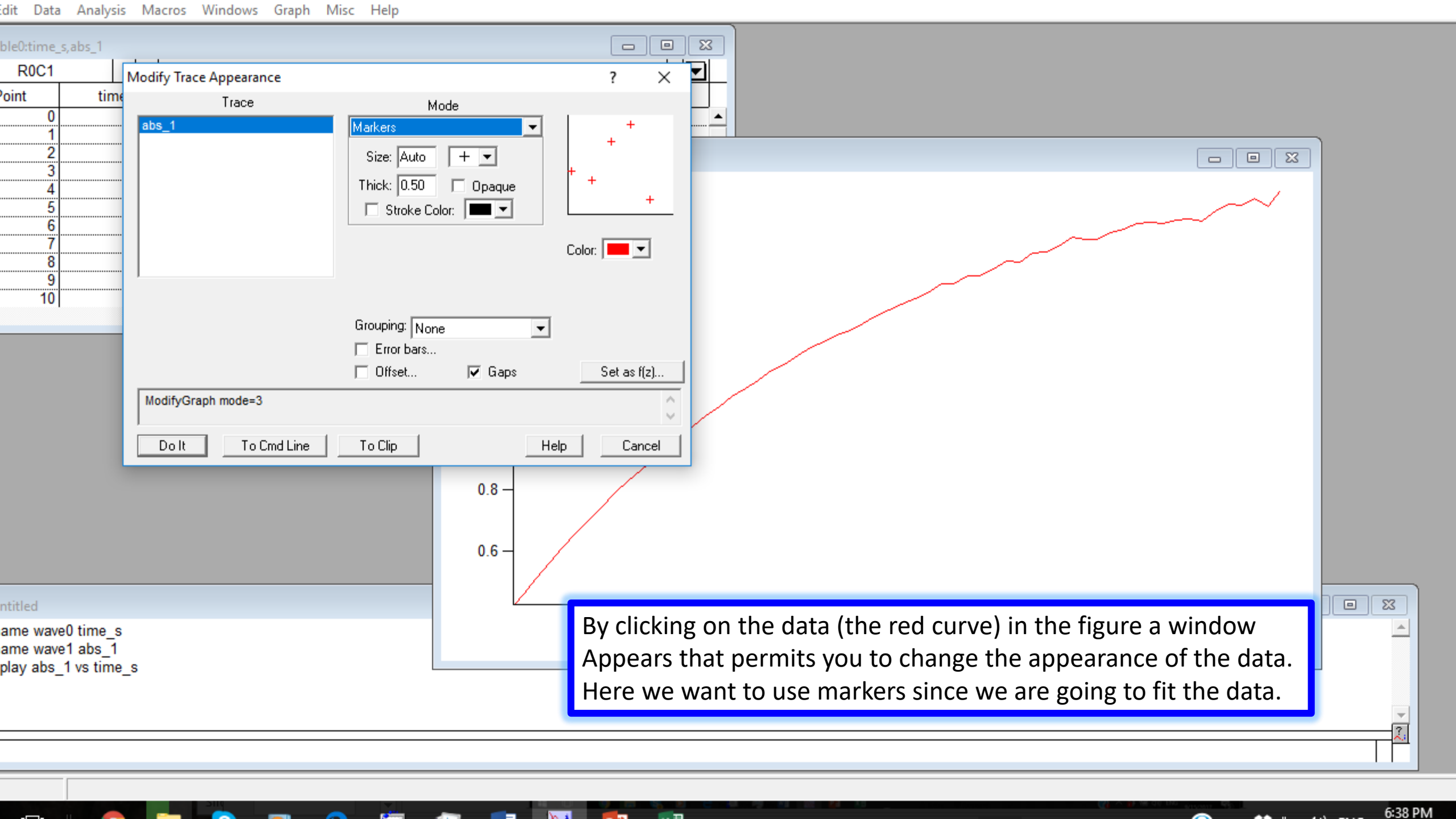
ame wave0 time_s
ame wave1 abs_1
play abs_1 vs time_s

Here, we have changed the names of the “waves”.
wave0 was renamed to time_s (s for seconds).
wave1 was renamed to abs_1.
Then we plotted one wave vs. the other. The command is “display”. So on the command line you type:
display y-wave vs. x-wave
as a general representation.

6:38 PM

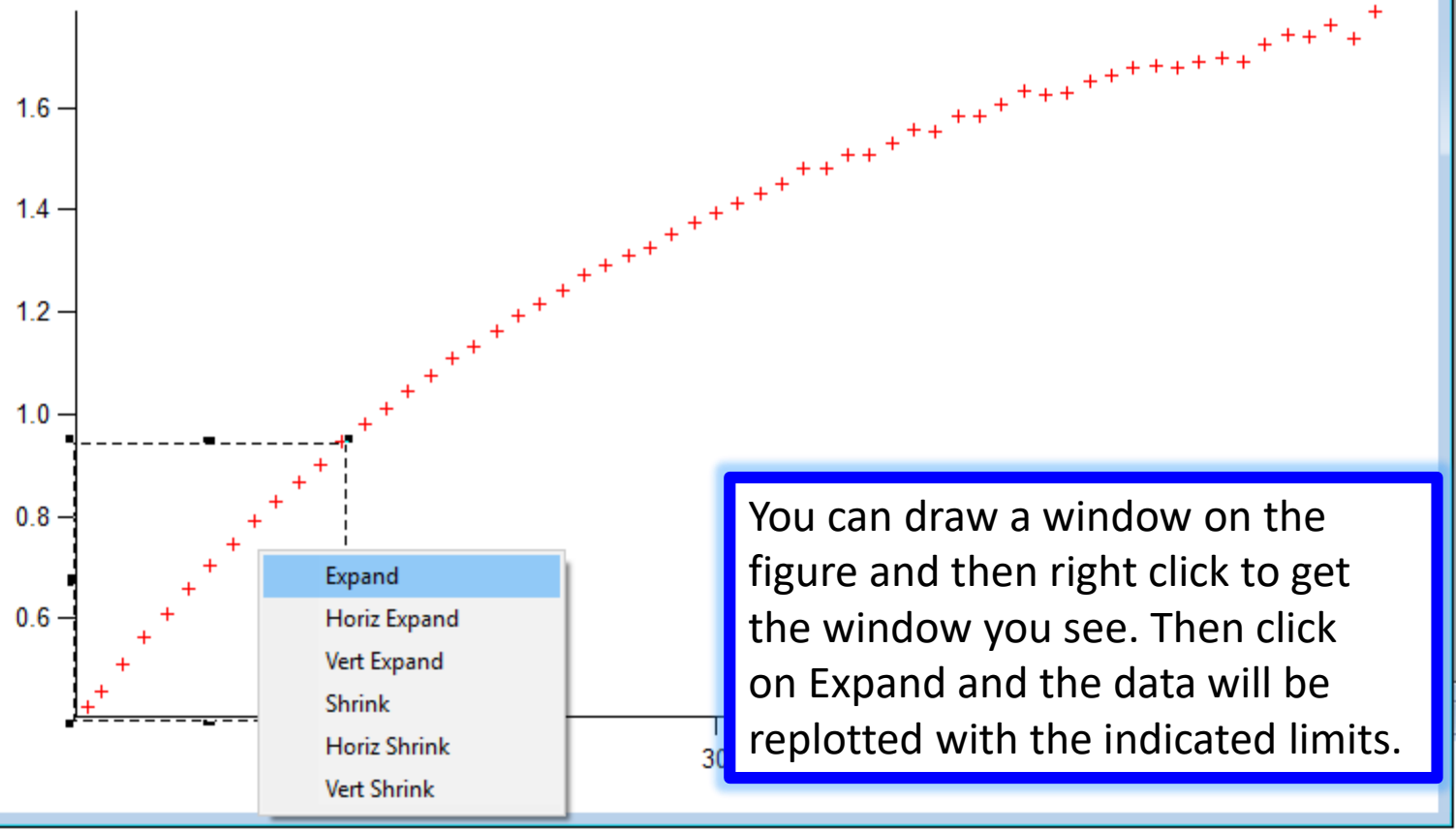

Edit Data Analysis Macros Windows Graph Misc Help
ble0:time_s,abs_1
R0C1
Point
time
0
1
2
3
4
5
6
7
8
9
10
Modify Trace Appearance
Trace
abs_1
Mode
Markers
Size: Auto
Thick: 0.50
Opaque
Stroke Color:
Color:
Grouping: None
Error bars...
Offset...
Gaps
Set as f(z)...
ModifyGraph mode=3
Do It
To Cmd Line
To Clip
Help
Cancel
0.8
0.6
ntitled
ame wave0 time_s
ame wave1 abs_1
play abs_1 vs time_s
By clicking on the data (the red curve) in the figure a window
Appears that permits you to change the appearance of the data.
Here we want to use markers since we are going to fit the data.
6:38 PM

Edit Data Analysis Macros Windows Graph Misc Help

ble0:time_s,abs_1

R0C1		0.426517
Point	time_s	abs_1
0	1.4	0.426517
1	2	0.458035
2	3	0.509762
3	4	0.563333
4	5	0.609931
5	6	0.657463
6	7	0.702119
7	8	0.744416
8	9	0.789127
9	10	0.829908
10	11	0.867022

Graph0:abs_1 vs time_s



You can draw a window on the figure and then right click to get the window you see. Then click on Expand and the data will be replotted with the indicated limits.

ntitled

ame wave0 time_s
ame wave1 abs_1
play abs_1 vs time_s
difyGraph mode=3

the range of the axes so that the area inside the marquee fills the graph.

6:39 PM

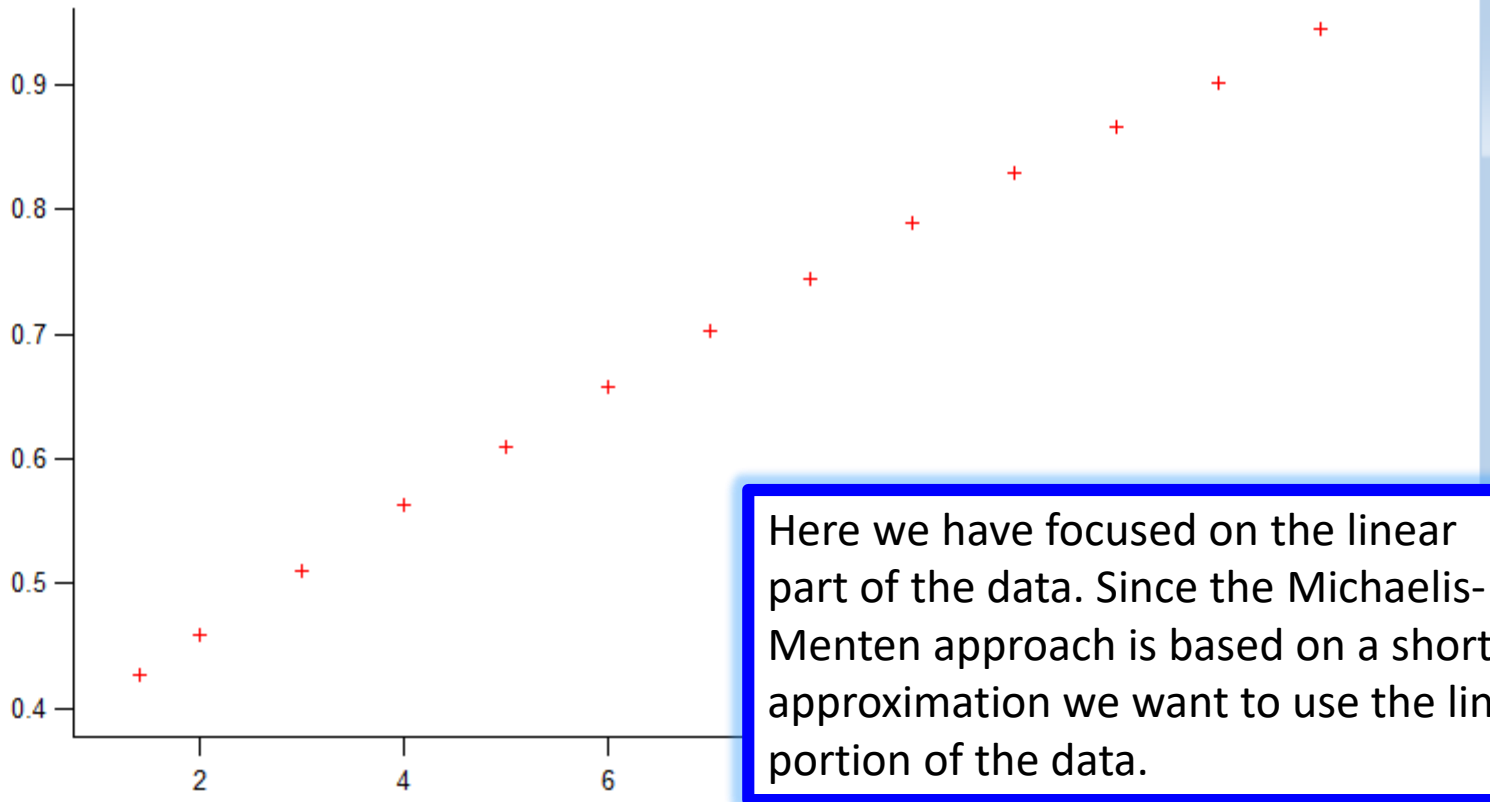
Edit Data Analysis Macros Windows Graph Misc Help

ble0:time_s,abs_1

R0C1 | 0.426517

Point	time_s	abs_1
0	1.4	0.426517
1	2	0.458035
2	3	0.509762
3	4	0.563333
4	5	0.609931
5	6	0.657463
6	7	0.702119
7	8	0.744416
8	9	0.789127
9	10	0.829908
10	11	0.867022

Graph0:abs_1 vs time_s



Here we have focused on the linear part of the data. Since the Michaelis-Menten approach is based on a short-time approximation we want to use the linear portion of the data.

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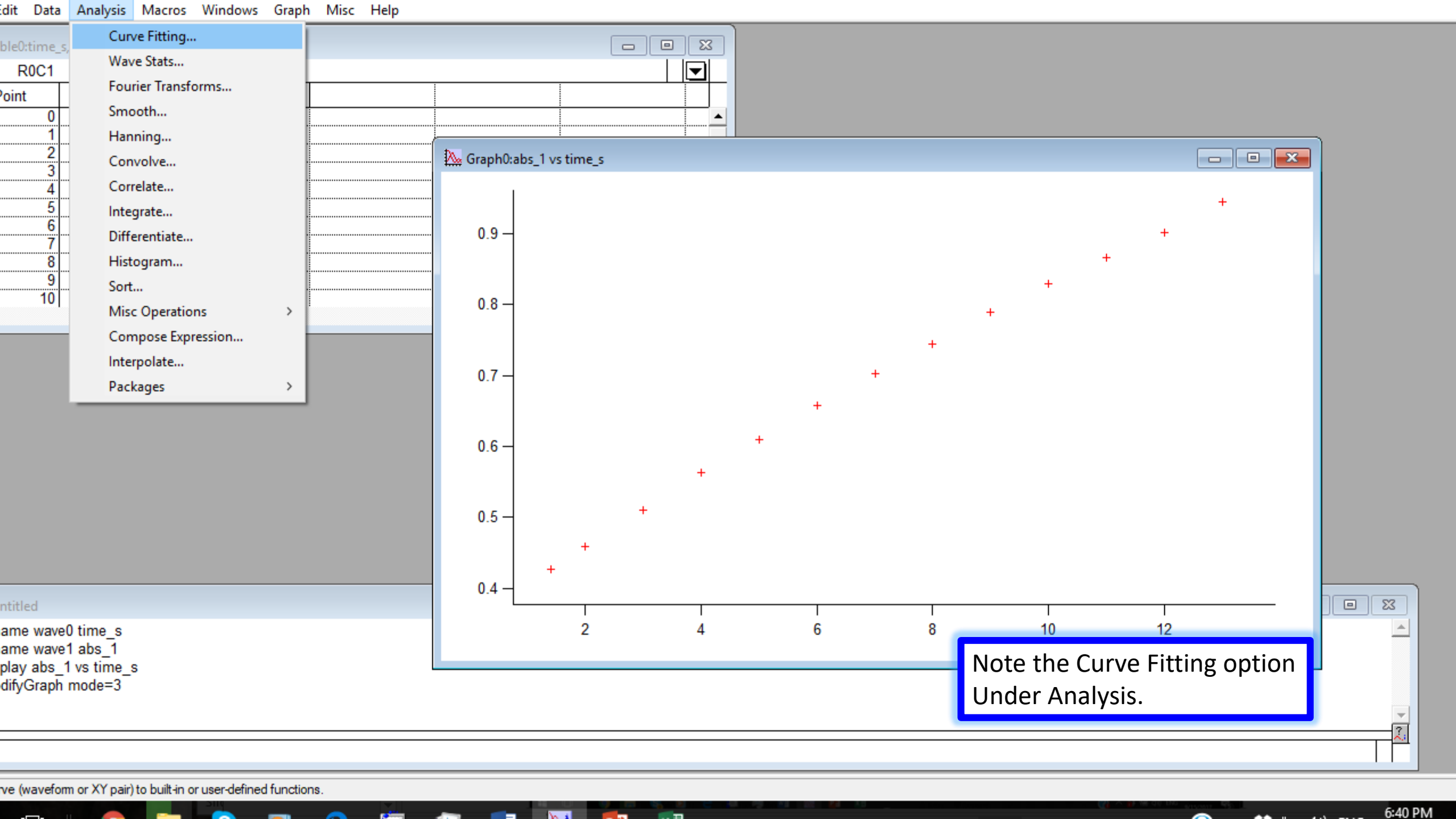
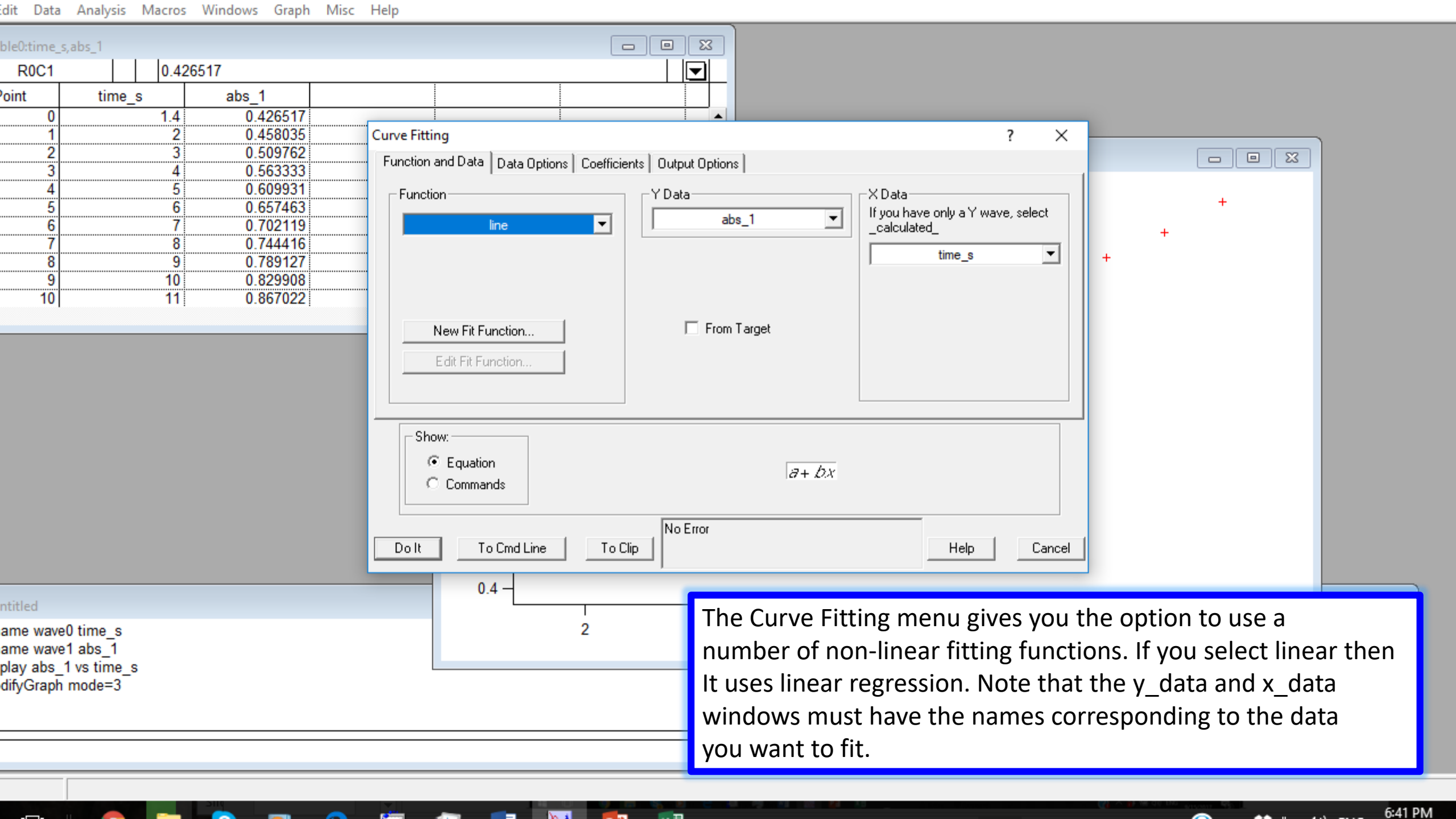
ame wave0 time_s
ame wave1 abs_1
play abs_1 vs time_s
difyGraph mode=3

6:40 PM


Edit Data Analysis Macros Windows Graph Misc Help
Curve Fitting...
Wave Stats...
Fourier Transforms...
Smooth...
Hanning...
Convolve...
Correlate...
Integrate...
Differentiate...
Histogram...
Sort...
Misc Operations
Compose Expression...
Interpolate...
Packages
R0C1
Point
0
1
2
3
4
5
6
7
8
9
10
Graph0:abs_1 vs time_s
0.9
0.8
0.7
0.6
0.5
0.4
2
4
6
8
10
12
ame wave0 time_s
ame wave1 abs_1
play abs_1 vs time_s
difyGraph mode=3
Note the Curve Fitting option
Under Analysis.
rve (waveform or XY pair) to built-in or user-defined functions.
6:40 PM



The Curve Fitting menu gives you the option to use a number of non-linear fitting functions. If you select linear then It uses linear regression. Note that the y_data and x_data windows must have the names corresponding to the data you want to fit.

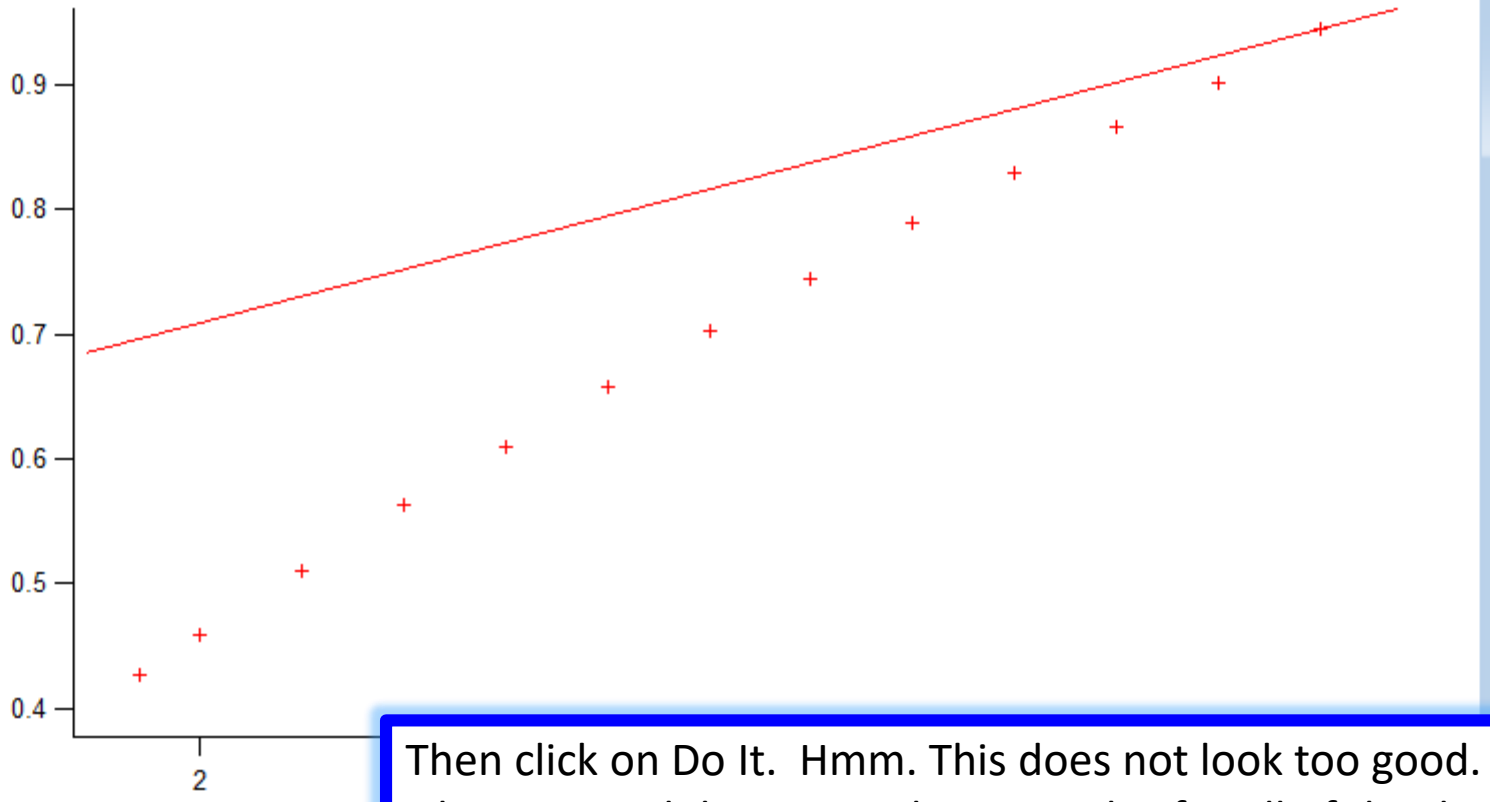
Edit Data Analysis Macros Windows Graph Misc Help

ble0:time_s,abs_1

R0C1 | 0.426517

Point	time_s	abs_1
0	1.4	0.426517
1	2	0.458035
2	3	0.509762
3	4	0.563333
4	5	0.609931
5	6	0.657463
6	7	0.702119
7	8	0.744416
8	9	0.789127
9	10	0.829908
10	11	0.867022

Graph0:abs_1 vs time_s;...



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startRow= 0; V_endRow= 59; V_startCol= 0; V_endCol= 0; V_q=
Rab= -84.4288; V_Pr= 0.966116;
_sigma={0.0258,0.000753}
efficient values ± one standard deviation
a = 0.66616 ± 0.0258
b = 0.021477 ± 0.000753

Then click on Do It. Hmm. This does not look too good. Oh wait, we did not put a limits on this fit. All of the data were fit to the line. We only want to fit the linear part to to the line.

6:41 PM

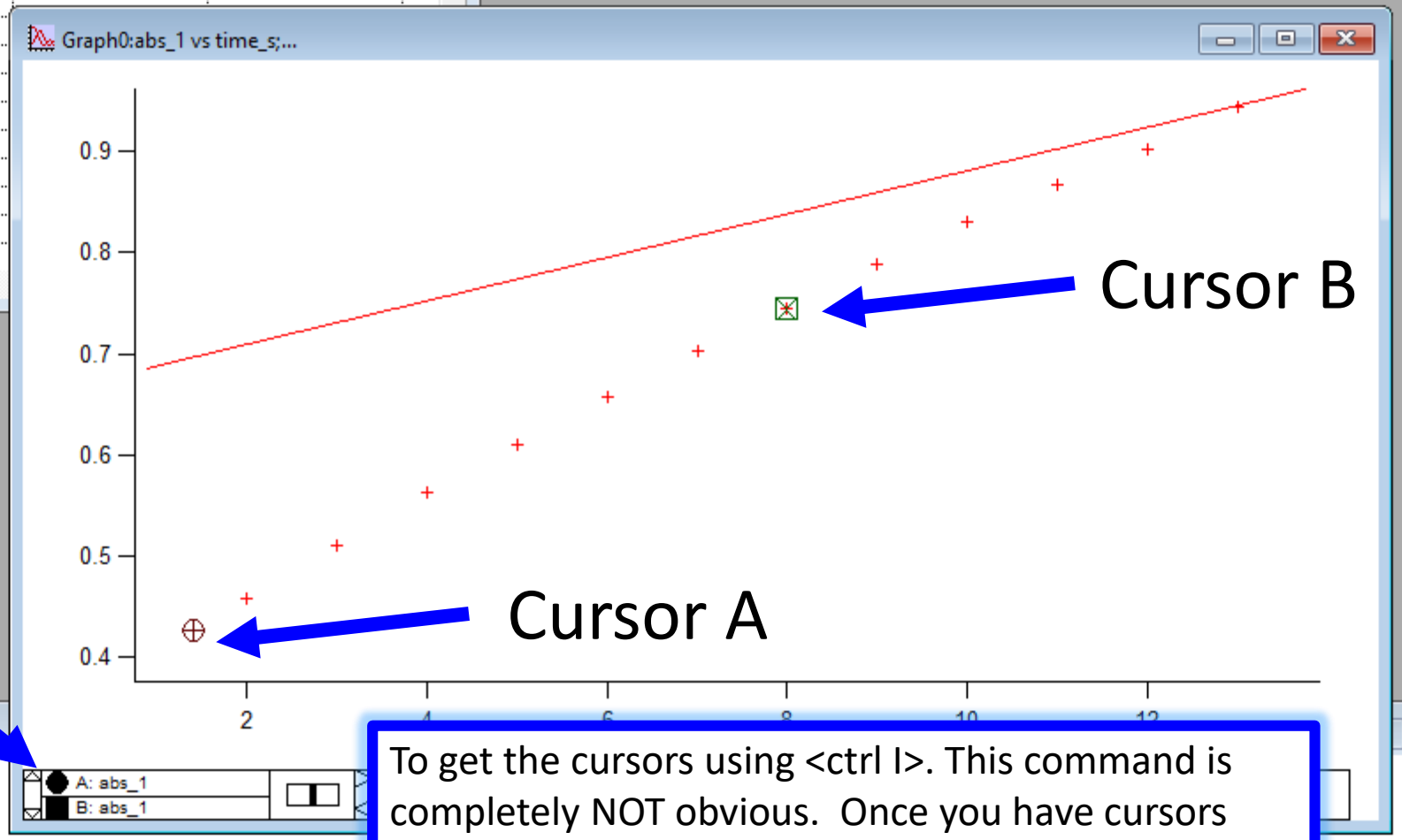
Edit Data Analysis Macros Windows Graph Misc Help

ble0:time_s,abs_1

R0C1 | 0.426517

Point	time_s	abs_1
0	1.4	0.426517
1	2	0.458035
2	3	0.509762
3	4	0.563333
4	5	0.609931
5	6	0.657463
6	7	0.702119
7	8	0.744416
8	9	0.789127
9	10	0.829908
10	11	0.867022

Graph0:abs_1 vs time_s;...



Cursor B

Cursor A

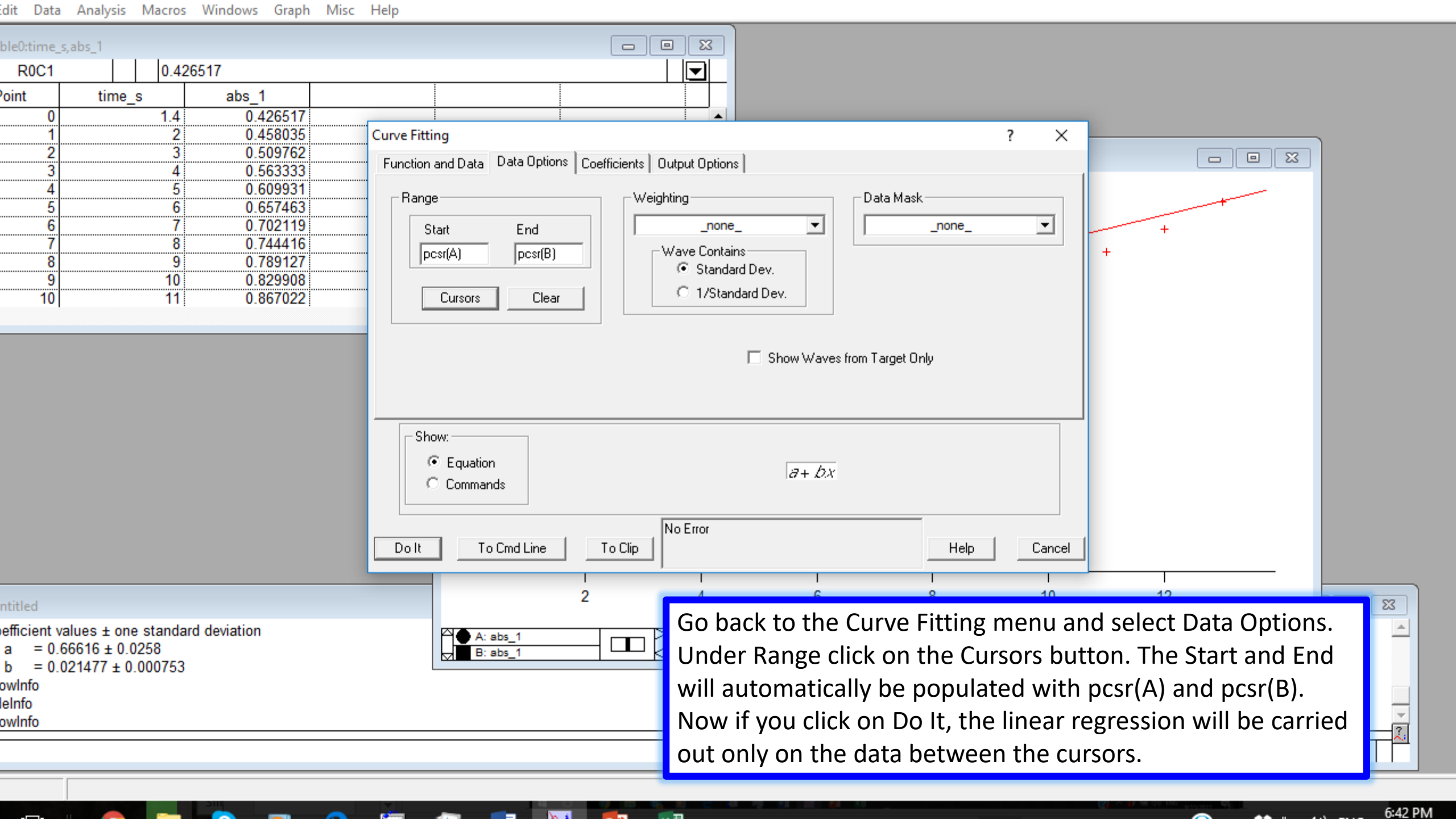
Cursors

ntitled

efficient values ± one standard deviation
a = 0.66616 ± 0.0258
b = 0.021477 ± 0.000753
owInfo
leInfo
owInfo

To get the cursors using <ctrl I>. This command is completely NOT obvious. Once you have cursors A and B you drag them to the portion of the data You want to use as limits. Note the circle and square (A is the circle and B is the square).

6:42 PM



Go back to the Curve Fitting menu and select Data Options. Under Range click on the Cursors button. The Start and End will automatically be populated with pcsr(A) and pcsr(B). Now if you click on Do It, the linear regression will be carried out only on the data between the cursors.

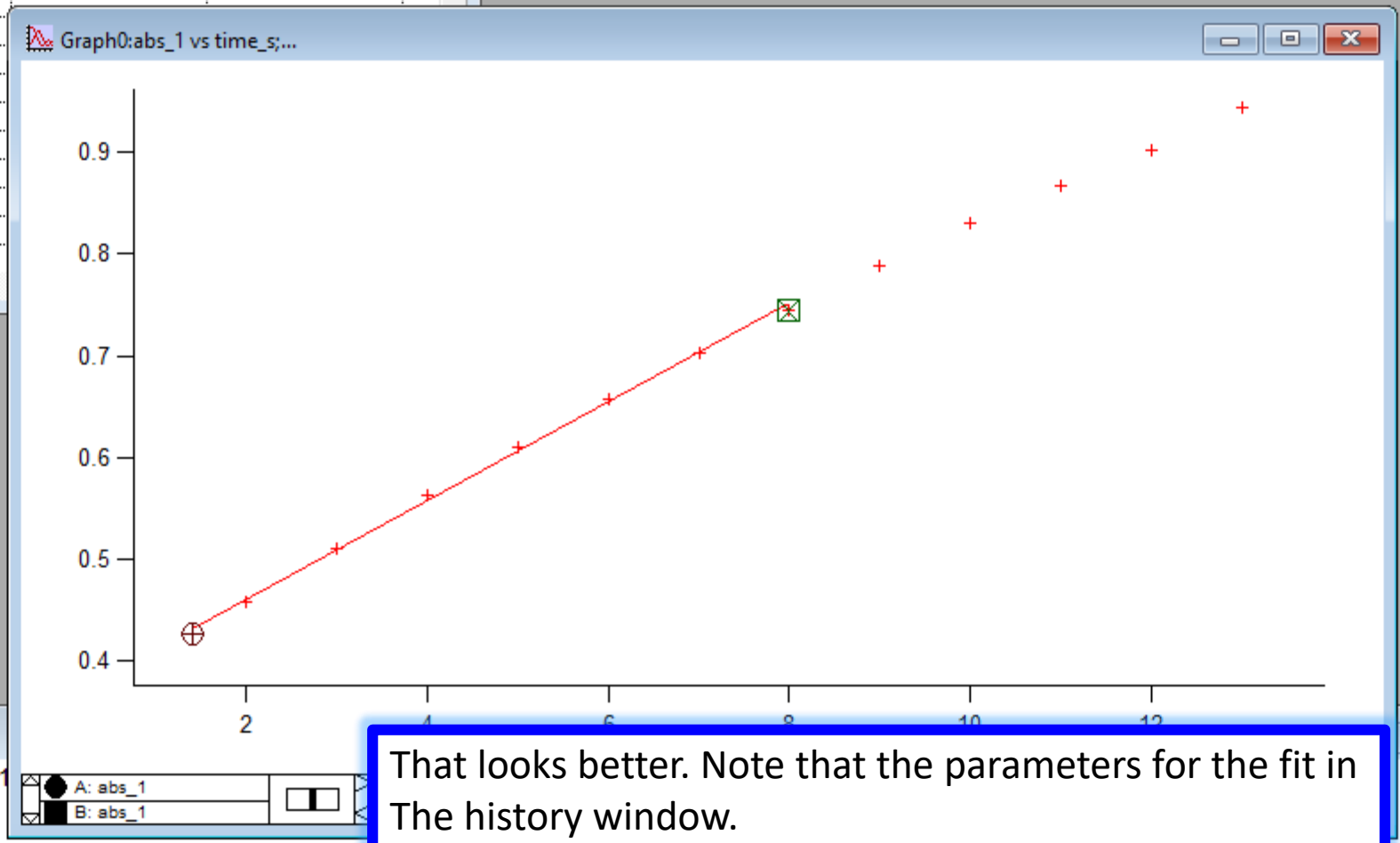
Edit Data Analysis Macros Windows Graph Misc Help

ble0:time_s,abs_1

R0C1 | 0.426517

Point	time_s	abs_1
0	1.4	0.426517
1	2	0.458035
2	3	0.509762
3	4	0.563333
4	5	0.609931
5	6	0.657463
6	7	0.702119
7	8	0.744416
8	9	0.789127
9	10	0.829908
10	11	0.867022

Graph0:abs_1 vs time_s;...



ntitled

_startRow= 0; V_endRow= 7; V_startCol= 0; V_endCol= 0; V_q= 1
_Rab= -38793.8; V_Pr= 0.999247;
_sigma={0.00388,0.000767}
efficient values ± one standard deviation
a = 0.36365 ± 0.00388
b = 0.048417 ± 0.000767

That looks better. Note that the parameters for the fit in The history window.
a is the intercept
b is the slope

6:42 PM

Using Igor

"At your service Master"

Data input, plotting and linear regression

Non-linear fitting of Michaelis-Menten data

Home Insert Page Layout Formulas Data Review View Tell me what you want to do... Stefan Franzen

0.1

A	B
0.1	0.022
0.2	0.046
0.3	0.062
0.5	0.104
0.7	0.167
1	0.217
1.2	0.227
1.5	0.225

(Ctrl)

This is a typical sample data set.
A = [S] in mM
B = V_0 in $M^{-1}s^{-1}$

Sheet1

Average: 0.410625 Count: 16 Sum: 6.57

6:50 PM

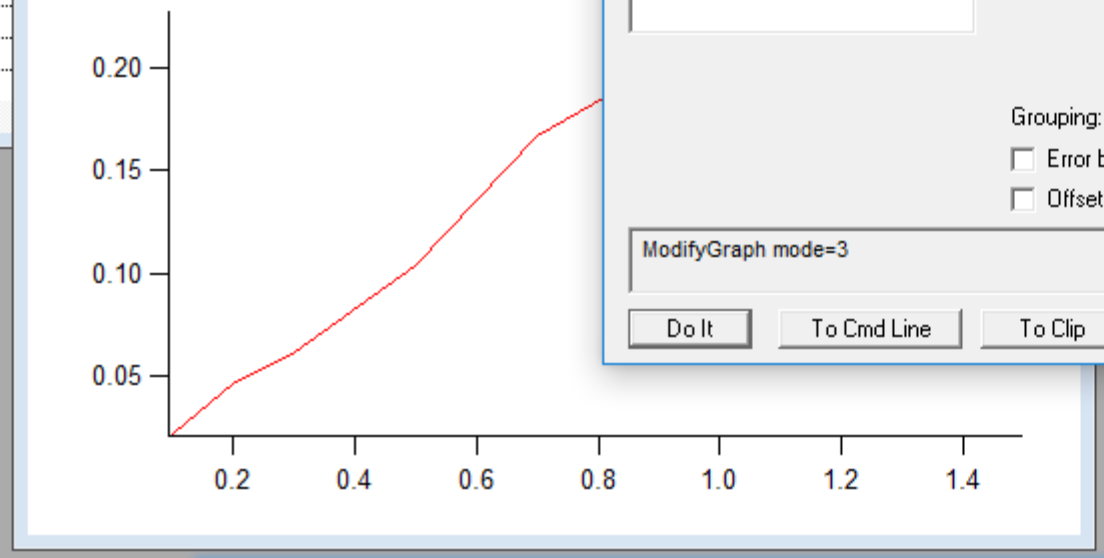
Edit Data Analysis Macros Windows Graph Misc Help

ble0:substrate,V0

R0C2

Point	substrate	V0
0	0.1	0.022
1	0.2	0.046
2	0.3	0.062
3	0.5	0.104
4	0.7	0.167
5	1	0.217
6	1.2	0.227
7	1.5	0.225
8		

Graph0:V0 vs substrate



Modify Trace Appearance

Trace

V0

Mode

Markers

Size: Auto

Thick: 0.50

Opaque

Stroke Color:

Color:

Grouping: None

Error bars...

Offset...

Gaps

Set as f(z)...

ModifyGraph mode=3

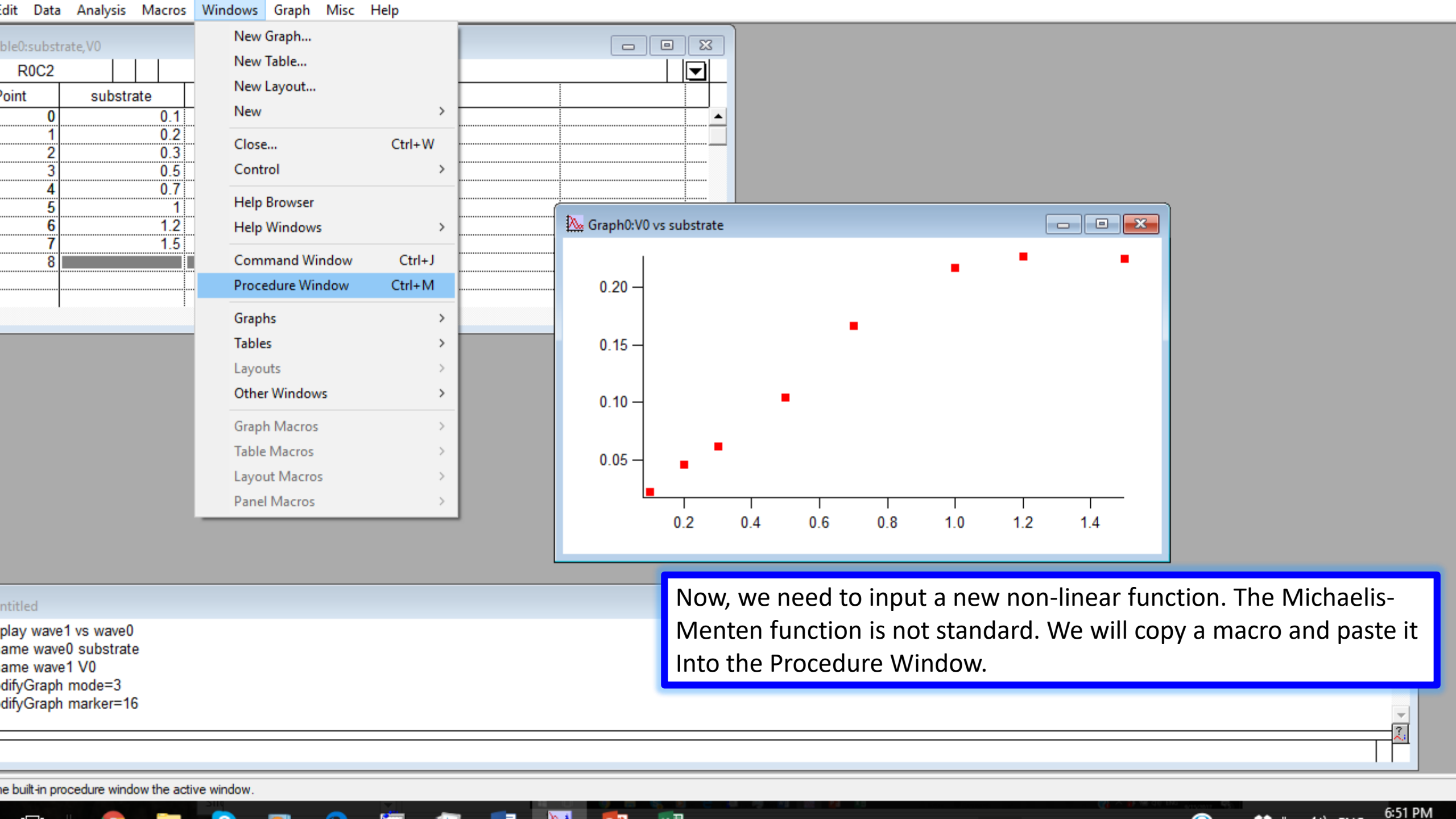
Do It | To Cmd Line | To Clip | Help | Cancel

ntitled

play wave1 vs wave0
ame wave0 substrate
ame wave1 V0

In this slide we have copied the data to the first two columns in a new Igor table. The data waves were renamed.
The data were plotted using the “display” command.
By clicking on the data trace in the figure the Modify Trace appearance window appears. The data can be changed to markers.

6:51 PM


Edit Data Analysis Macros Windows Graph Misc Help
New Graph...
New Table...
New Layout...
New
Close... Ctrl+W
Control
Help Browser
Help Windows
Command Window Ctrl+J
Procedure Window Ctrl+M
Graphs
Tables
Layouts
Other Windows
Graph Macros
Table Macros
Layout Macros
Panel Macros
ble0:substrate,V0
R0C2
Point substrate
0 0.1
1 0.2
2 0.3
3 0.5
4 0.7
5 1
6 1.2
7 1.5
8
Graph0:V0 vs substrate
0.20
0.15
0.10
0.05
0.2
0.4
0.6
0.8
1.0
1.2
1.4
ntitled
play wave1 vs wave0
ame wave0 substrate
ame wave1 V0
difyGraph mode=3
difyGraph marker=16
Now, we need to input a new non-linear function. The Michaelis-Menten function is not standard. We will copy a macro and paste it Into the Procedure Window.
he built-in procedure window the active window.
6:51 PM

Edit Data Analysis Macros Windows Procedure Misc Help

ocedure

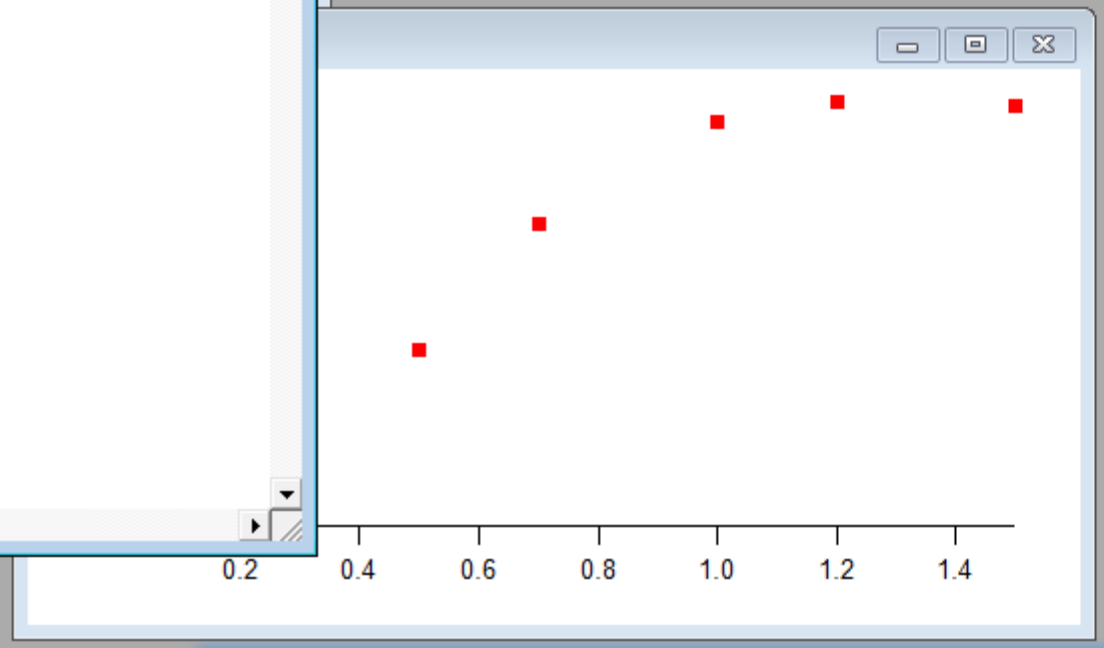
```
gma rtGlobals=1        // Use modern global access method.

ction michaelis(w,x)
ve w; Variable x

riable vmax, km, y

ax = w[0]
 = w[1]
= vmax*x/(km+x)
urn y
```

Templates Procedures Compile



ntitled

```
play wave1 vs wave0
ame wave0 substrate
ame wave1 V0
difyGraph mode=3
difyGraph marker=16
```

The macro can be seen in the window. This is a standard macro that I wrote many years ago. It is available for you to input.

6:54 PM

Edit Data Analysis Macros Windows Graph Misc Help

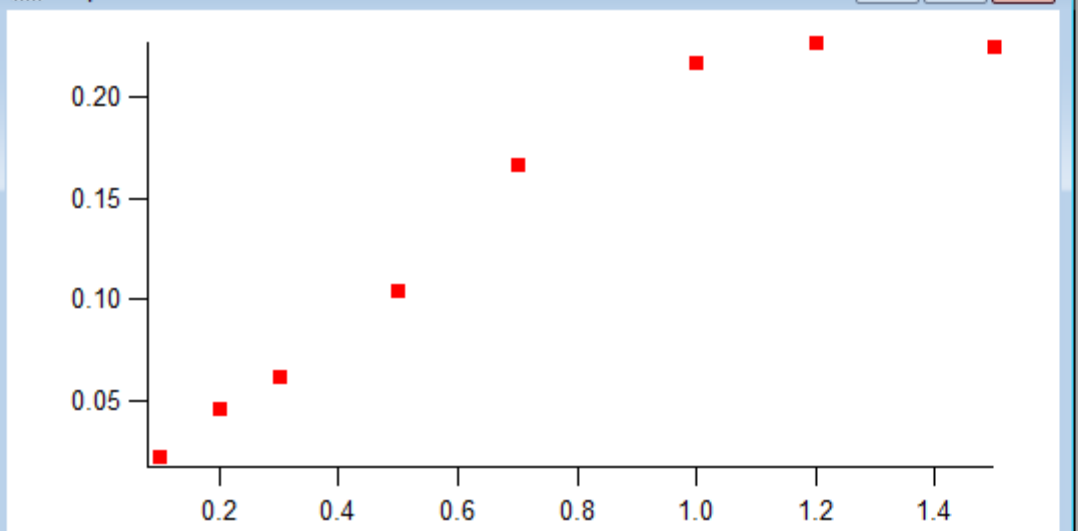
- Curve Fitting...
- Wave Stats...
- Fourier Transforms...
- Smooth...
- Hanning...
- Convolve...
- Correlate...
- Integrate...
- Differentiate...
- Histogram...
- Sort...
- Misc Operations ›
- Compose Expression...
- Interpolate...
- Packages ›

ble0:substra

R0C2

Point	
0	
1	
2	
3	
4	
5	
6	
7	
8	

Graph0:V0 vs substrate



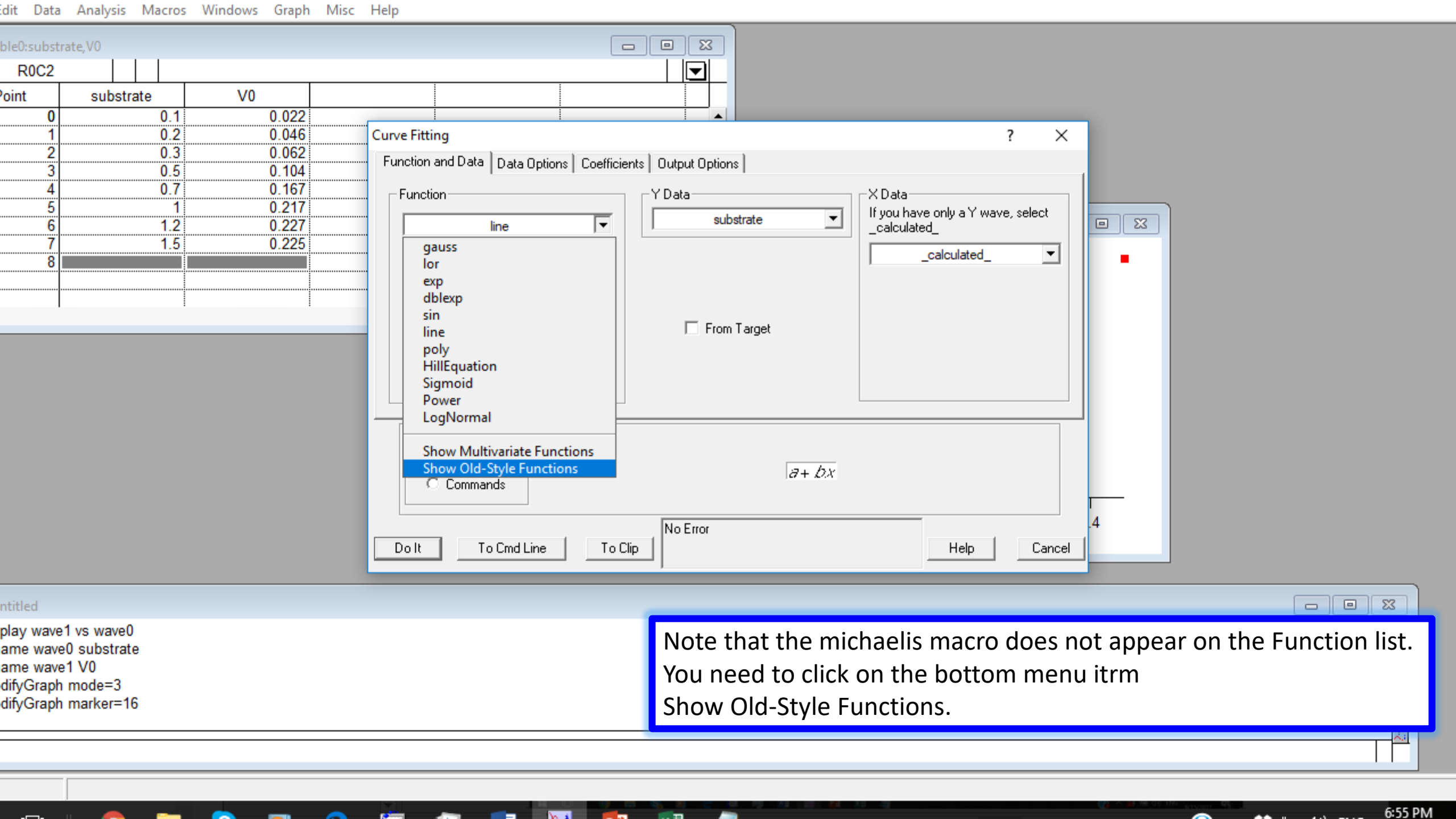
ntitled

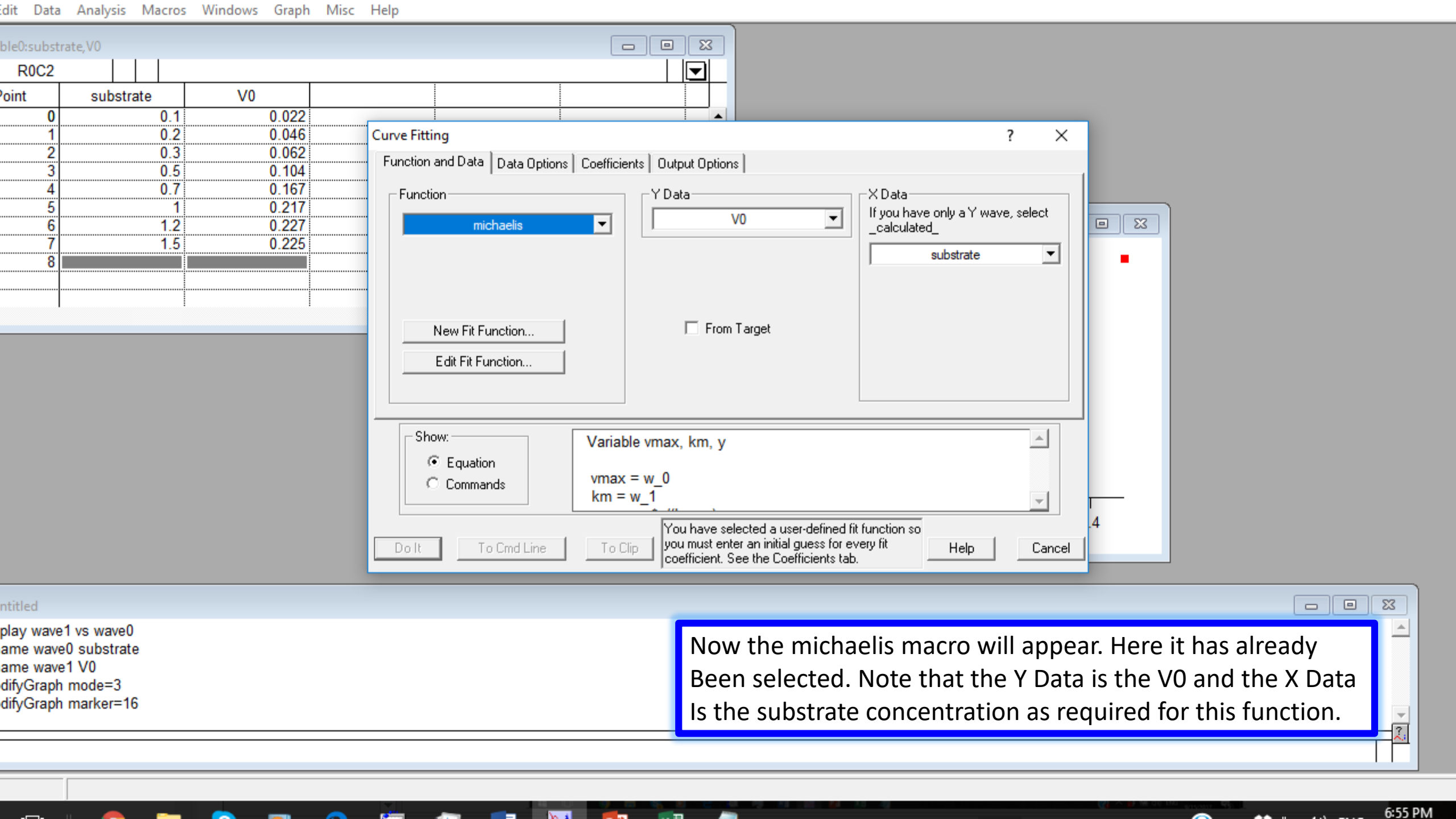
```
play wave1 vs wave0
ame wave0 substrate
ame wave1 V0
difyGraph mode=3
difyGraph marker=16
```

Now we want to fit the data to the Michaelis fitting function. Return to Analysis/Curve Fitting.

rve (waveform or XY pair) to built-in or user-defined functions.

6:54 PM


Edit Data Analysis Macros Windows Graph Misc Help
ble0:substrate,V0
R0C2
Point substrate V0
0 0.1 0.022
1 0.2 0.046
2 0.3 0.062
3 0.5 0.104
4 0.7 0.167
5 1 0.217
6 1.2 0.227
7 1.5 0.225
8
Curve Fitting
Function and Data
Data Options
Coefficients
Output Options
Function
line
gauss
lor
exp
dblexp
sin
line
poly
HillEquation
Sigmoid
Power
LogNormal
Show Multivariate Functions
Show Old-Style Functions
Commands
Y Data
substrate
From Target
X Data
If you have only a Y wave, select _calculated_
calculated
a+ bx
No Error
Do It
To Cmd Line
To Clip
Help
Cancel
ntitled
play wave1 vs wave0
ame wave0 substrate
ame wave1 V0
difyGraph mode=3
difyGraph marker=16
Note that the michaelis macro does not appear on the Function list.
You need to click on the bottom menu itrm
Show Old-Style Functions.
6:55 PM


Edit Data Analysis Macros Windows Graph Misc Help
ble0:substrate,V0
R0C2
Point substrate V0
0 0.1 0.022
1 0.2 0.046
2 0.3 0.062
3 0.5 0.104
4 0.7 0.167
5 1 0.217
6 1.2 0.227
7 1.5 0.225
8
Curve Fitting
Function and Data
Data Options
Coefficients
Output Options
Function
michaelis
New Fit Function...
Edit Fit Function...
Y Data
V0
From Target
X Data
If you have only a Y wave, select _calculated_
substrate
Show:
Equation
Commands
Variable vmax, km, y
vmax = w_0
km = w_1
Do It
To Cmd Line
To Clip
You have selected a user-defined fit function so you must enter an initial guess for every fit coefficient. See the Coefficients tab.
Help
Cancel
ntitled
play wave1 vs wave0
ame wave0 substrate
ame wave1 V0
difyGraph mode=3
difyGraph marker=16
Now the michaelis macro will appear. Here it has already Been selected. Note that the Y Data is the V0 and the X Data Is the substrate concentration as required for this function.
6:55 PM

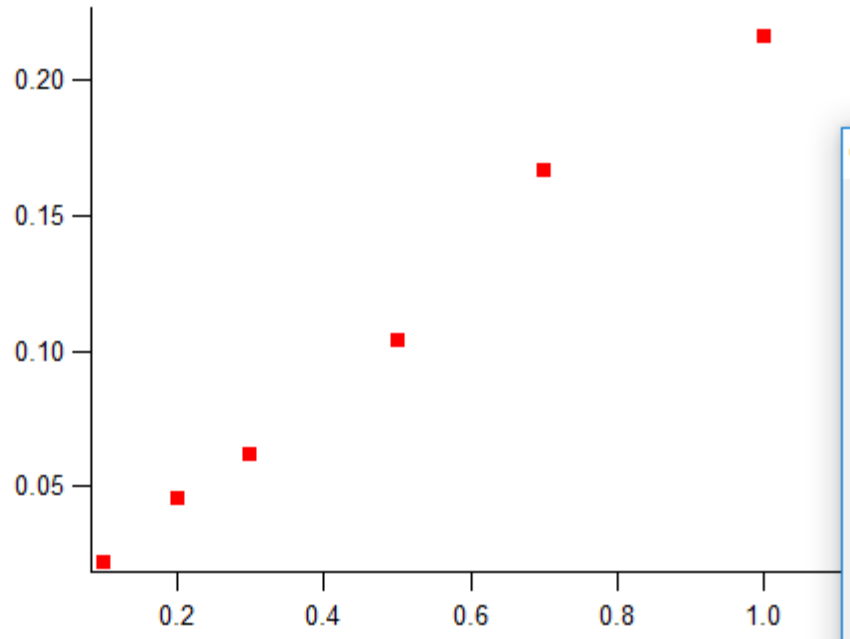
Edit Data Analysis Macros Windows Graph Misc Help

ble0:substrate,V0

R0C2

Point	substrate	V0
0	0.1	0.022
1	0.2	0.046
2	0.3	0.062
3	0.5	0.104
4		
5		
6		
7		
8		

Graph0:V0 vs substrate



Return to the Curve Fitting menu and now go to the Coefficients tab. This is the place where you input values For non-linear fitting. Here we make a guess. Looking at The data it appears to be leveling off at about 0.24.
If Vmax = 0.24 then half that value is 0.12 and the value of [S] is approximately 0.5 at that value. So I guess that Km = 0.5

Curve Fitting

Function and Data | Data Options | Coefficients | Output Options

Coefficient Wave: _default_ Graph Now Epsilon Wave: _none_

Coef Name	Initial Guess	Hold?	Epsilon	Constraints: _none_	
w_0	0.24			< w_0 <	
w_1	0.5			< w_1 <	

Show: Equation Commands

Variable vmax, km, y

vmax = w_0
km = w_1

You have selected a user-defined fit function so you must enter an initial guess for every fit coefficient.

Do It | To Cmd Line | To Clip | Help | Cancel

ntitled

play wave1 vs wave0
ame wave0 substrate
ame wave1 V0
difyGraph mode=3
difyGraph marker=16

6:57 PM

Edit Data Analysis Macros Windows Graph Misc Help

ble0:substrate,V0

R0C2

Point	substrate	V0
0	0.1	0.022
1	0.2	0.046
2	0.3	0.062
3	0.5	0.104
4		
5		
6		
7		
8		

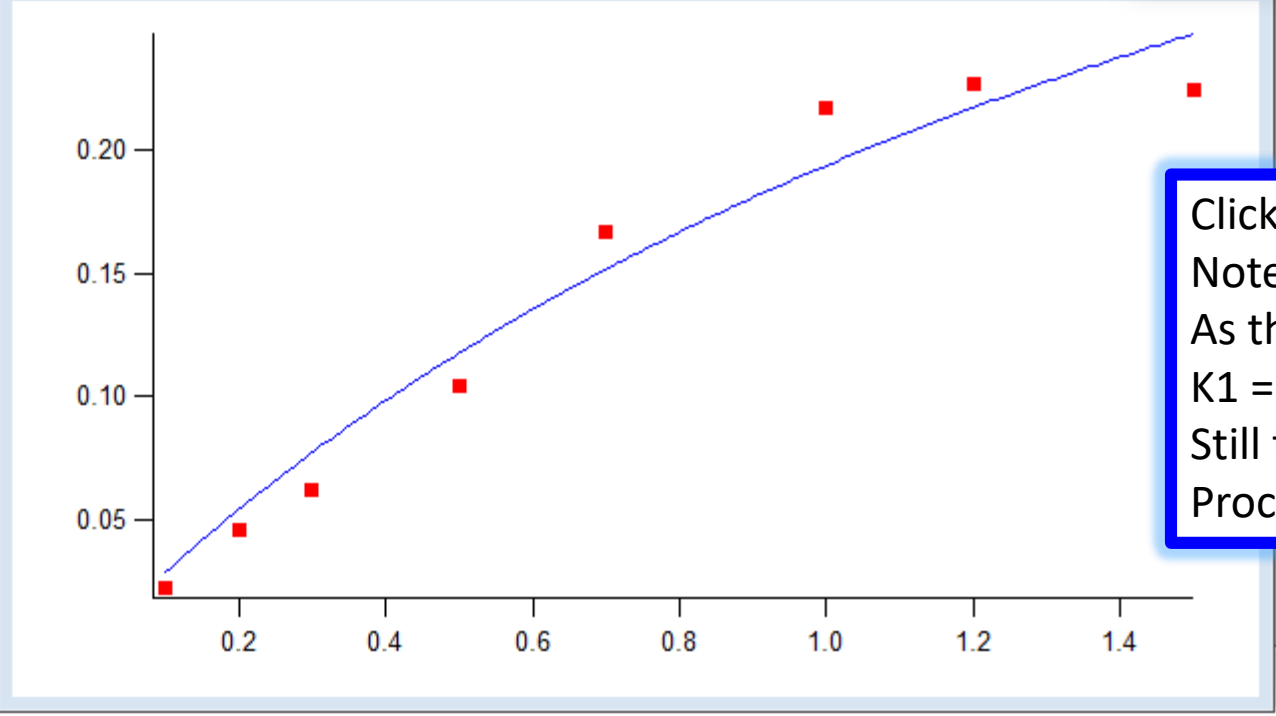
Curve Fit

Fitting to: michaelis(W_coef,x)

Pass	chi square	K0	K1
4	0.00187846	0.552702	1.85102

Quit OK

Graph0:V0 vs substrate;fit_V0



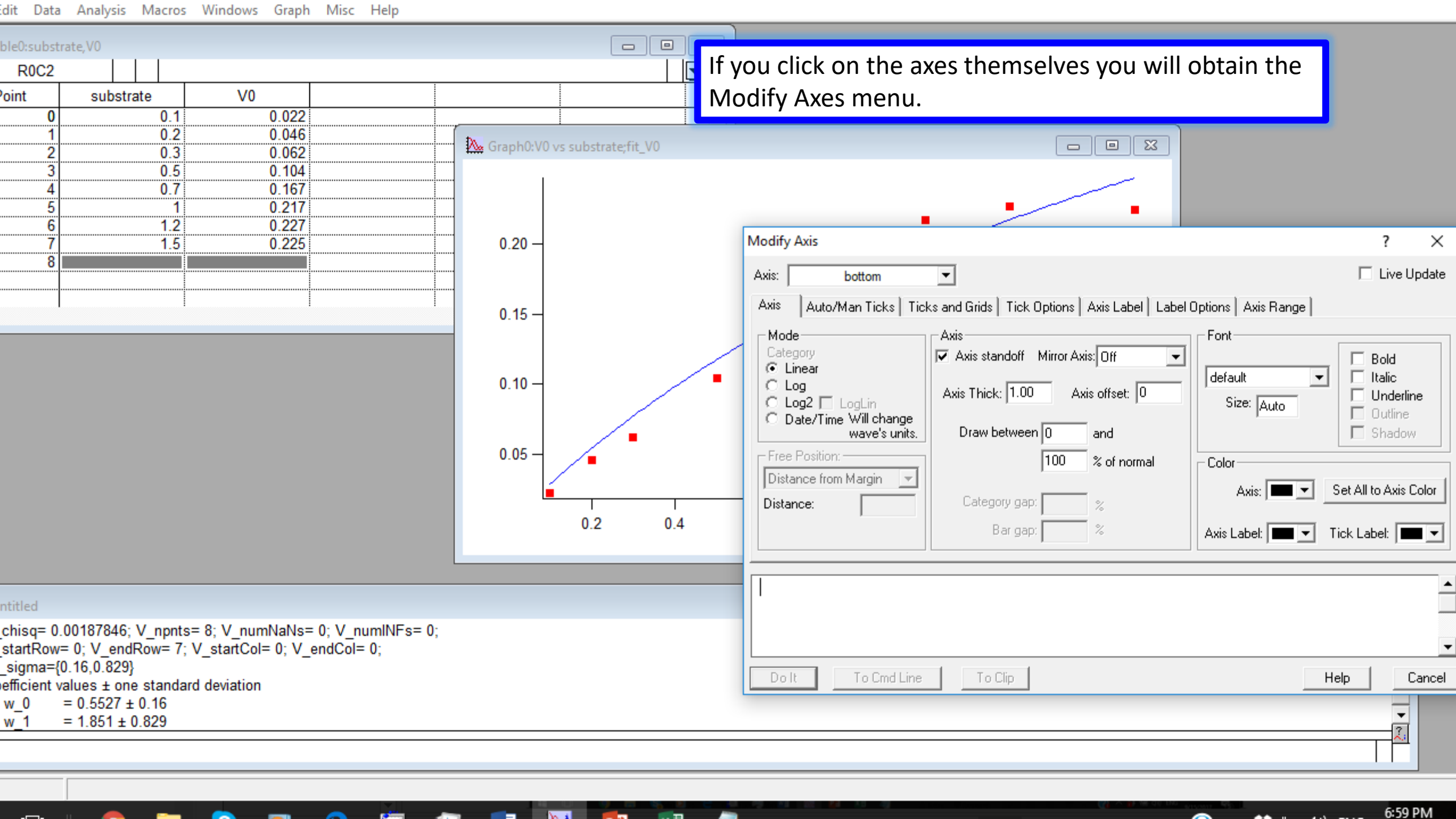
Click Do It. The data are fit in 4 iterations.
Note that Vmax is 0.55. That is twice as much
As the initial guess. But, the guess was good enough.
K1 = 1.85 which is nearly 4 times the initial guess.
Still the guess was adequate for the fitting
Procedure.

ntitled

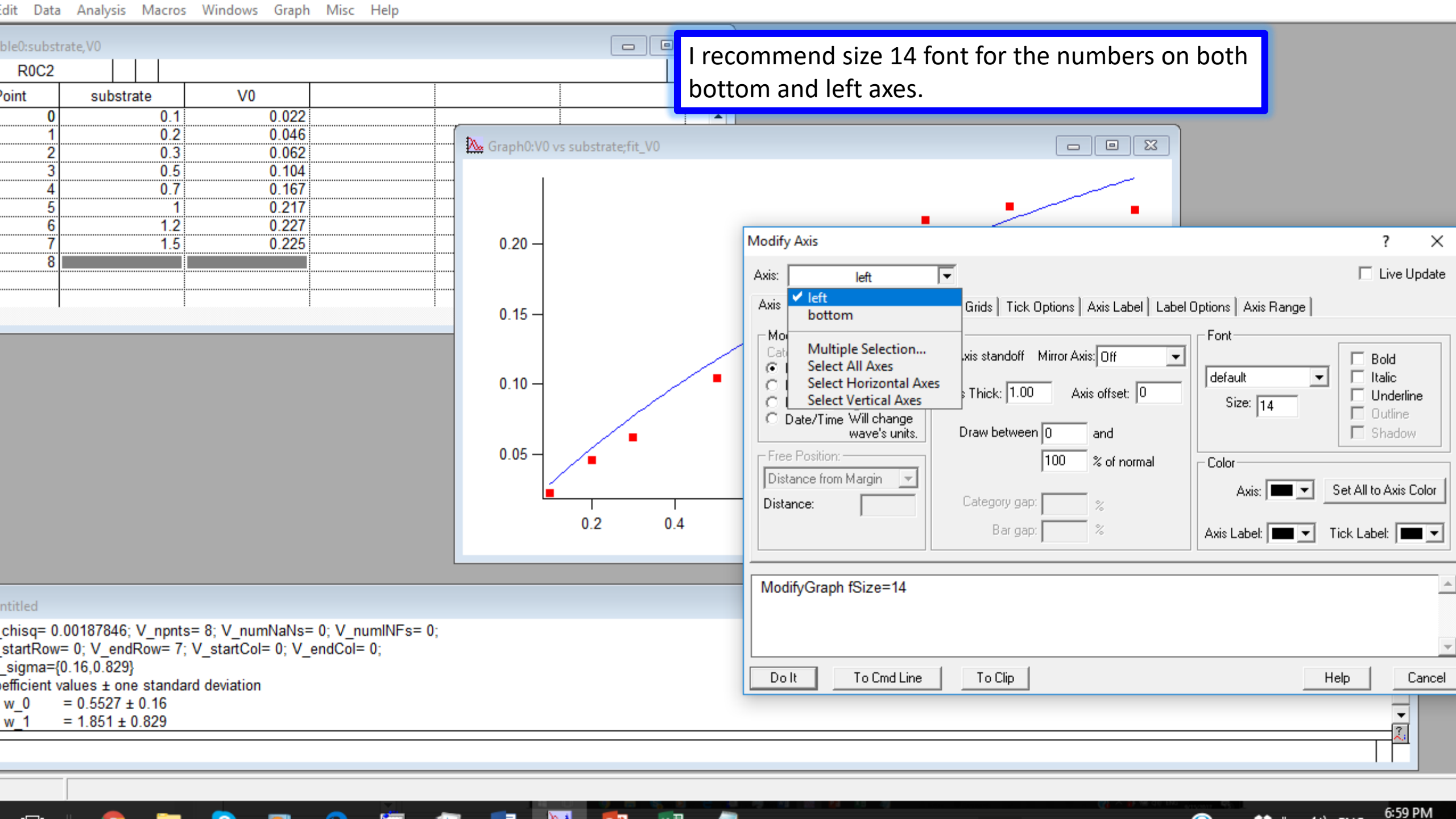
ame wave1 V0
difyGraph mode=3
difyGraph marker=16
ke/D/N=2/O W_coef
_coef[0] = {0.24,0.5}
converged properly

cFit michaelis W_coef V0 /X=substrate /D

6:58 PM


Edit Data Analysis Macros Windows Graph Misc Help
ble0:substrate,V0
R0C2
Point substrate V0
0 0.1 0.022
1 0.2 0.046
2 0.3 0.062
3 0.5 0.104
4 0.7 0.167
5 1 0.217
6 1.2 0.227
7 1.5 0.225
8
If you click on the axes themselves you will obtain the Modify Axes menu.
Graph0:V0 vs substrate;fit_V0
0.20
0.15
0.10
0.05
0.2
0.4
Modify Axis
Axis: bottom
Live Update
Axis | Auto/Man Ticks | Ticks and Grids | Tick Options | Axis Label | Label Options | Axis Range
Mode
Category
Linear
Log
Log2 LogLin
Date/Time Will change wave's units.
Free Position:
Distance from Margin
Distance:
Axis
Axis standoff Mirror Axis: Off
Axis Thick: 1.00 Axis offset: 0
Draw between 0 and
100 % of normal
Category gap: %
Bar gap: %
Font
default
Size: Auto
Bold
Italic
Underline
Outline
Shadow
Color
Axis: Set All to Axis Color
Axis Label: Tick Label:
Do It
To Cmd Line
To Clip
Help
Cancel
ntitled
_chisq= 0.00187846; V_npnts= 8; V_numNaNs= 0; V_numINFs= 0;
_startRow= 0; V_endRow= 7; V_startCol= 0; V_endCol= 0;
_sigma={0.16,0.829}
efficient values ± one standard deviation
w_0 = 0.5527 ± 0.16
w_1 = 1.851 ± 0.829
6:59 PM

I recommend size 14 font for the numbers on both bottom and left axes.



Edit Data Analysis Macros Windows Graph Misc Help

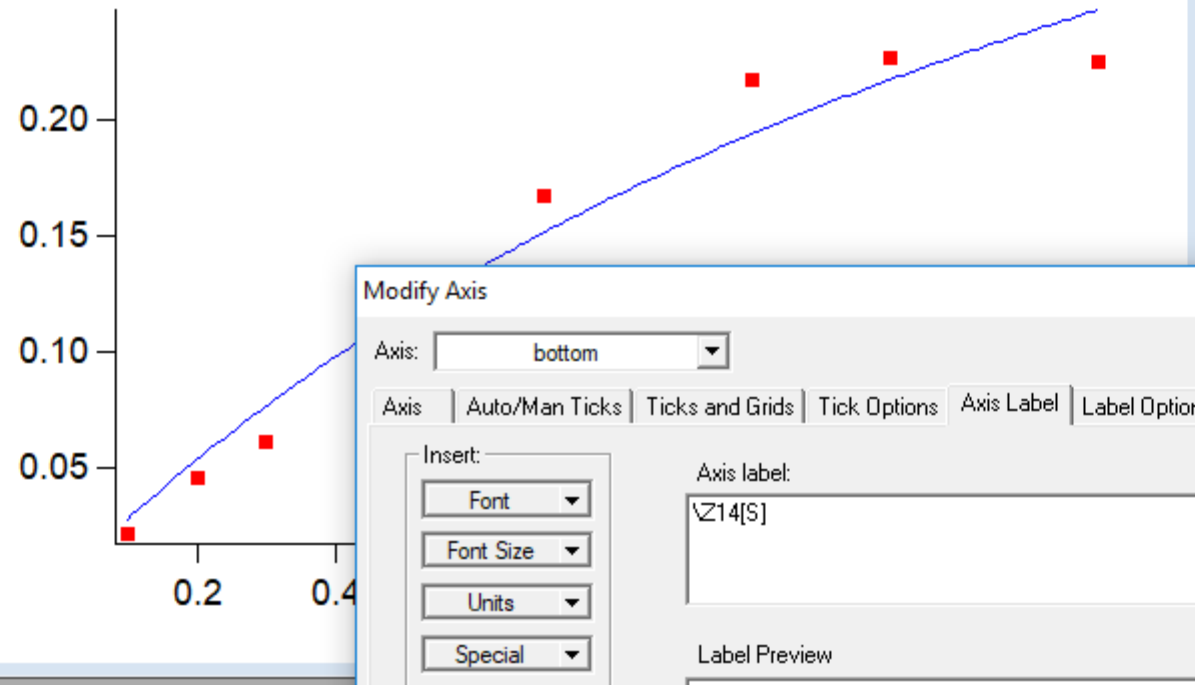
ble0:substrate,V0

R0C2

Point	substrate	V0
0	0.1	0.022
1	0.2	0.046
2	0.3	0.062
3	0.5	0.104
4	0.7	0.167
5	1	0.217
6	1.2	0.227
7	1.5	0.225
8		

Note that the axes are changed (after clicking on Do It).
Click on the axes again and get the Modify Axis menu.
Note the syntax of the Axis label. \Z14 means (size 14 font).

Graph0:V0 vs substrate;fit_V0



Modify Axis

Axis: bottom

Live Update

Axis | Auto/Man Ticks | Ticks and Grids | Tick Options | Axis Label | Label Options | Axis Range

Insert:
Font
Font Size
Units
Special

Trial Exponent
Zero
Six

Axis label:
\Z14[S]

Label Preview
[S]

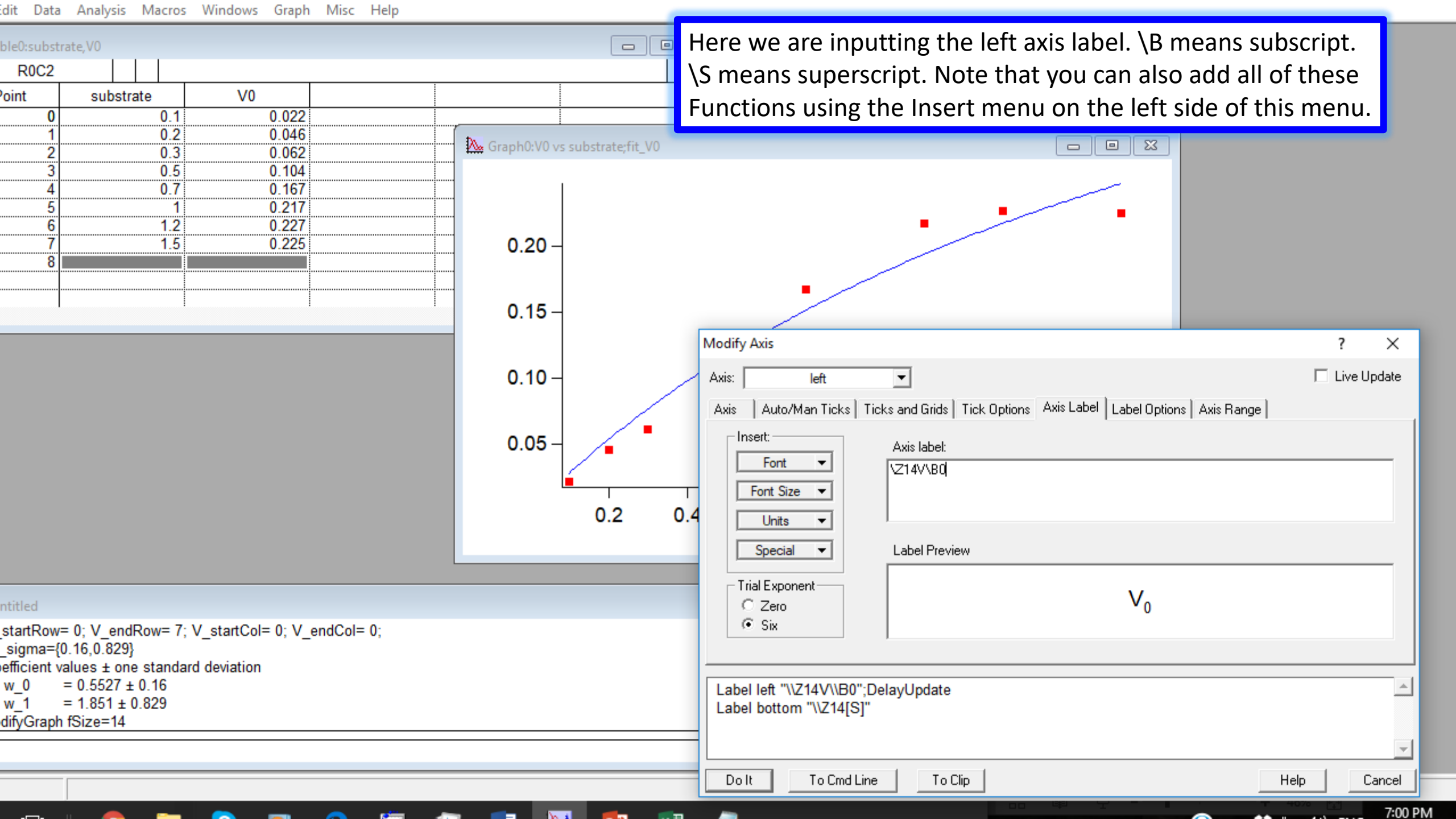
Label bottom "\\Z14[S]"

Do It | To Cmd Line | To Clip | Help | Cancel

ntitled

_startRow= 0; V_endRow= 7; V_startCol= 0; V_endCol= 0;
_sigma={0.16,0.829}
efficient values ± one standard deviation
w_0 = 0.5527 ± 0.16
w_1 = 1.851 ± 0.829
difyGraph fSize=14

7:00 PM


Here we are inputting the left axis label. \B means subscript. \S means superscript. Note that you can also add all of these Functions using the Insert menu on the left side of this menu.
Edit Data Analysis Macros Windows Graph Misc Help
ble0:substrate,V0
R0C2
Point substrate V0
0 0.1 0.022
1 0.2 0.046
2 0.3 0.062
3 0.5 0.104
4 0.7 0.167
5 1 0.217
6 1.2 0.227
7 1.5 0.225
8
Graph0:V0 vs substrate;fit_V0
0.20
0.15
0.10
0.05
0.2
0.4
Modify Axis
Axis: left
Live Update
Axis
Auto/Man Ticks
Ticks and Grids
Tick Options
Axis Label
Label Options
Axis Range
Insert:
Font
Font Size
Units
Special
Trial Exponent
Zero
Six
Axis label:
\Z14V\B0
Label Preview
V0
Label left "\\Z14V\\B0";DelayUpdate
Label bottom "\\Z14[S]"
Do It
To Cmd Line
To Clip
Help
Cancel
ntitled
_startRow= 0; V_endRow= 7; V_startCol= 0; V_endCol= 0;
_sigma={0.16,0.829}
efficient values ± one standard deviation
w_0 = 0.5527 ± 0.16
w_1 = 1.851 ± 0.829
difyGraph fSize=14
7:00 PM

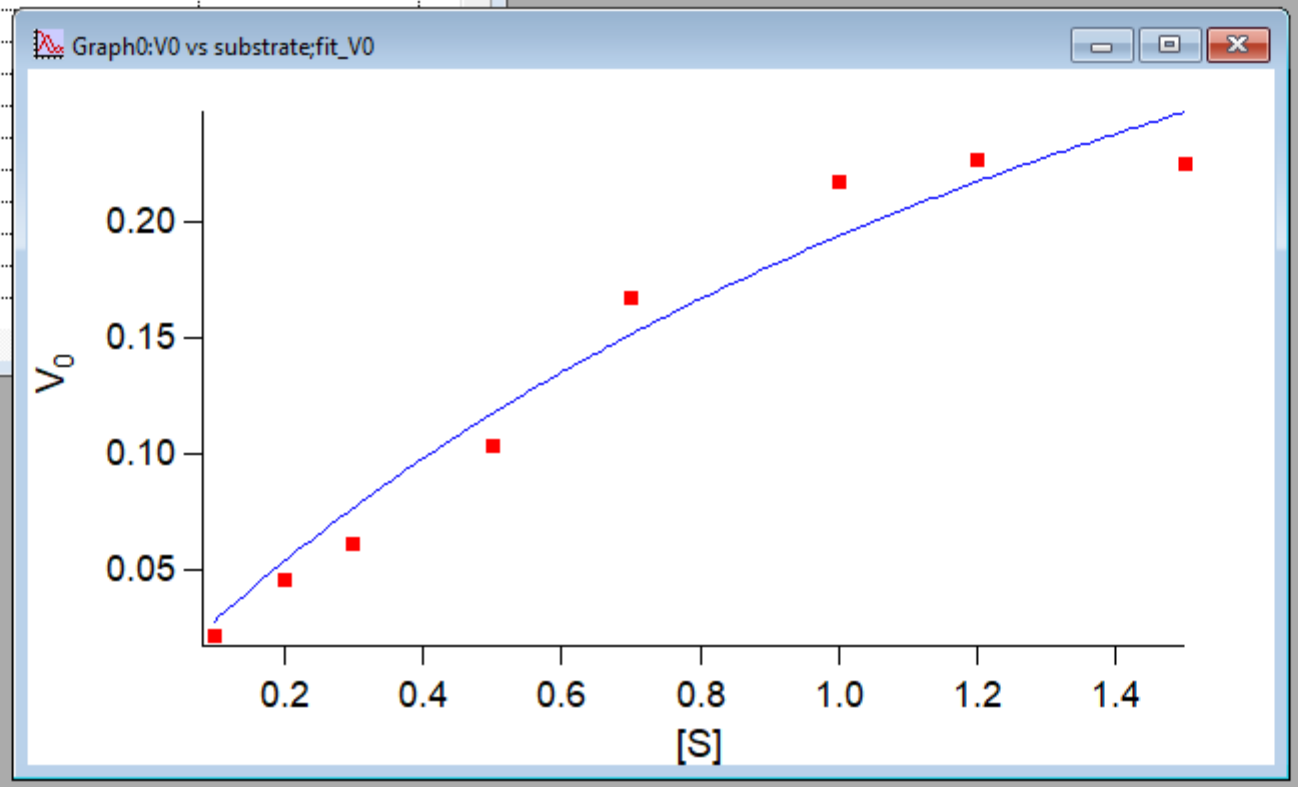
Edit Data Analysis Macros Windows Graph Misc Help

This illustrates some of the capabilities for plotting.

ble0:substrate,V0

R0C2

Point	substrate	V0
0	0.1	0.022
1	0.2	0.046
2	0.3	0.062
3	0.5	0.104
4	0.7	0.167
5	1	0.217
6	1.2	0.227
7	1.5	0.225
8		



ntitled

efficient values ± one standard deviation
w_0 = 0.5527 ± 0.16
w_1 = 1.851 ± 0.829
difyGraph fSize=14
bel left "\\Z14V\\B0";DelayUpdate
bel bottom "\\Z14[S]"

7:01 PM