

Using Igor

Fitting Michaelis Menten Data

Using a Macro


```
Procedure
#pragma rtGlobals=1 // Use modern global access method.
```

```
Igor macros
```

```
michaelis - Notepad
File Edit Format View Help
Function michaelis(w,x)
  Wave w; Variable x

  Variable vmax, km, y

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

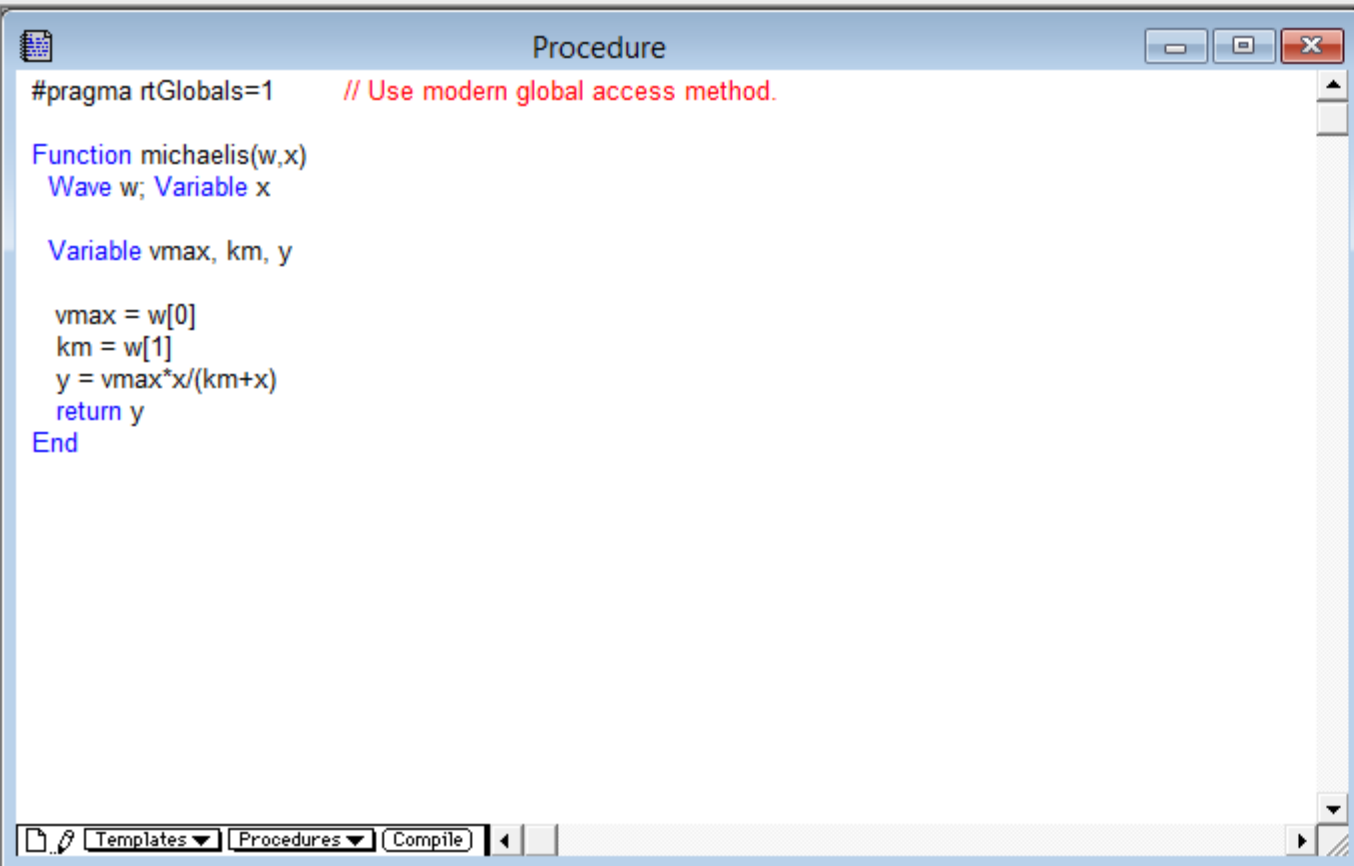
Find the Macro text and then paste it into
The Procedure Window

Select all
Select none
Invert selection
Select

Search Igo

Size

6 KB
23 KB
1 KB
16 KB
1 KB
1 KB
4 KB
1 KB
3 KB
19 KB
1 KB
1 KB
27 KB
16 KB
109 KB



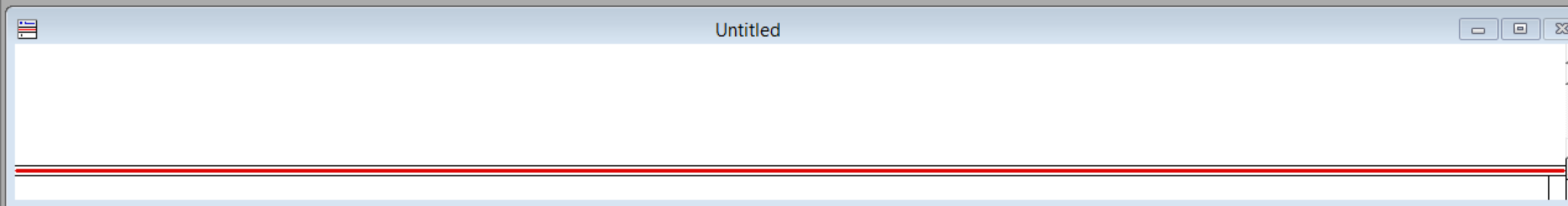
```
#pragma rtGlobals=1 // Use modern global access method.

Function michaelis(w,x)
  Wave w; Variable x

  Variable vmax, km, y

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

Now it is ready to go.
You can just close this window
by clicking on the X.



Point	wave0
0	0.2
1	0.5
2	0.7
3	1.0

You can paste your data in the Igor Table or enter it the way you see I am doing.

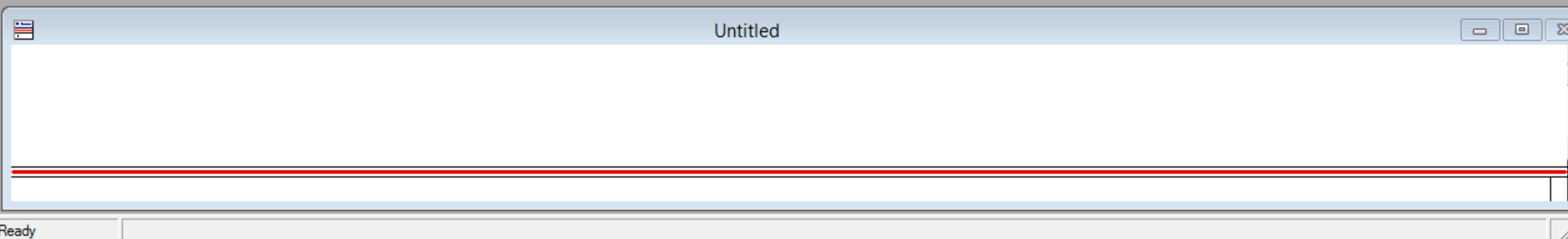
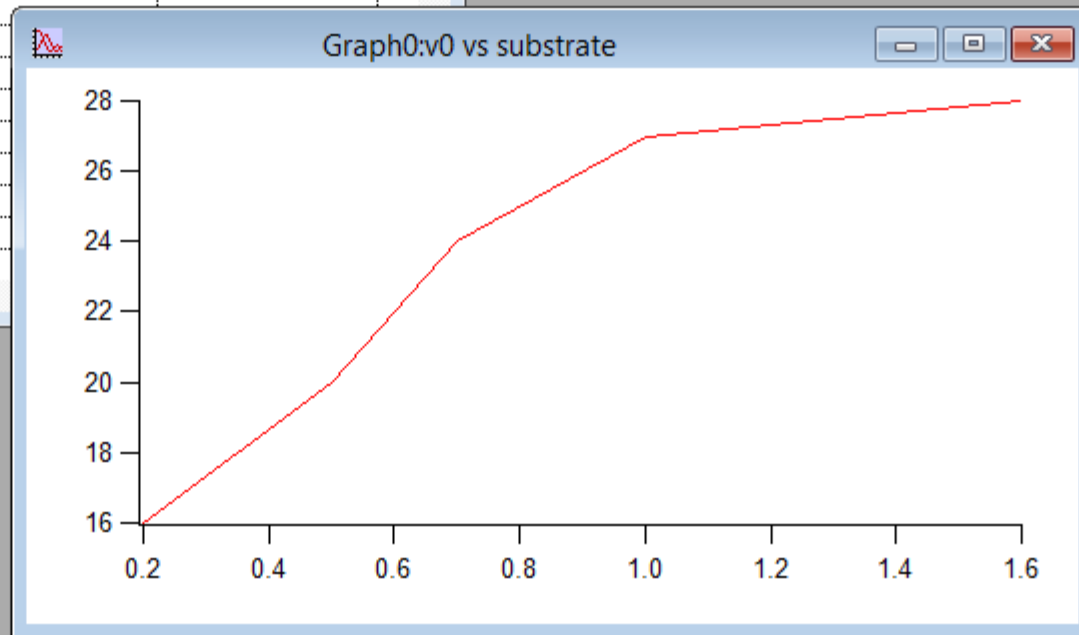


Table0:substrate,v0

Point	substrate	v0
0	0.2	16
1	0.5	20
2	0.7	24
3	1	27
4	1.6	28
5		



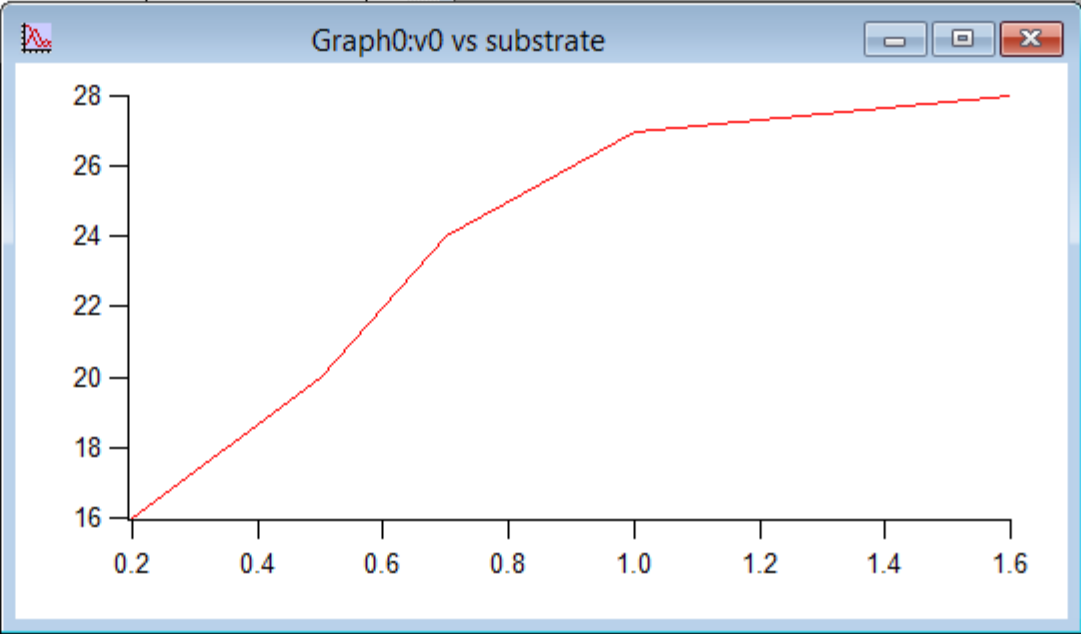
- rename wave0 substrate
- rename wave1 v0
- display v0 vs substrate

You can rename the waves for convenience.

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

Table0:substrate,v0

	v0	
0.2	16	
0.5	20	
0.7	24	
1	27	
1.6	28	



Untitled

- rename wave0 substrate
- rename wave1 v0
- display v0 vs substrate

Using the Curve Fitting submenu under Analysis.

Point	substrate	v0
0	0.2	16
1	0.5	20
2	0.7	24
3	1	27
4	1.6	28
5		

Curve Fitting

Function and Data | Data Options | Coefficients | Output Options

Function: **gauss**

- gauss
- lor
- exp
- dblexp
- sin
- line
- poly
- HillEquation
- Sigmoid
- Power
- LogNormal

Show Multivariate Functions
Show Old-Style Functions
 Commands

Y Data: **substrate**

X Data: **_calculated_**

If you have only a Y wave, select _calculated_

From Target

$$y_0 + A \exp \left[- \left(\frac{x - x_0}{width} \right)^2 \right]$$

No Error

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

Untitled

- rename wave0 substrate
- rename wave1 v0
- display v0 vs substrate

To find a Macro you must first select
 Show Old-Style Functions

Table0:substrate,v0			
Point	substrate	v0	
0	0.2	16	
1	0.5	20	
2	0.7	24	
3	1	27	
4	1.6	28	
5			

Curve Fitting

Function and Data | Data Options | Coefficients | Output Options

Function:

Y Data:

X Data:

From Target

$y_0 + A \exp \left[- \left(\frac{x - x_0}{width} \right)^2 \right]$

Show Multivariate Functions
 Show Old-Style Functions

Do It | To Cmd Line | To Clip | No Error | Help | Cancel

Untitled

- rename wave0 substrate
- rename wave1 v0
- display v0 vs substrate

Now the michaelis macro appears. Select it.



Table0:substrate,v0



Point	substrate	v0
0	0.2	16
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2	0.7	24
3	1	27
4	1.6	28
5		

Curve Fitting

? [X]

Function and Data | Data Options | Coefficients | Output Options

Function: michaelis

Show Data Folders

- substrate
- v0

From Target

X Data: If you have only a Y wave, select _calculated_

New Fit Function...
Edit Fit Function...

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. See the Coefficients tab.

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



Untitled



- rename wave0 substrate
- rename wave1 v0
- display v0 vs substrate

Table0:substrate,v0

Point	substrate	v0
0	0.2	16
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4	1.6	28
5		

Curve Fitting

Function and Data | Data Options | Coefficients | Output Options

Function: michaelis

Y Data: v0

X Data: substrate

From Target

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. See the Coefficients tab.

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

- rename wave0 substrate
- rename wave1 v0
- display v0 vs substrate

Make sure that both x- and y-data are selected properly.

Table0:substrate,v0

Point	substrate	v0
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2	0.7	24
3	1	27
4	1.6	28
5		

Curve Fitting

Function and Data | Data Options | Coefficients | Output Options

Coefficient Wave: Epsilon Wave:

Coef Name	Initial Guess	Hold?	Epsilon	Constraints:
w_0	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<w_0 < <input type="text"/>
w_1	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<w_1 < <input type="text"/>

Constraints:

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.

```

rename wave0 substrate
rename wave1 v0
display v0 vs substrate
    
```

To do non-linear least squares fitting you need to make an initial guess of the parameters.

Table0:substrate,v0

Point	substrate	v0
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2	0.7	24
3	1	27
4	1.6	28
5		

Curve Fitting

Function and Data | Data Options | Coefficients | Output Options

Coefficient Wave: Epsilon Wave:

Coef Name	Initial Guess	Hold?	Epsilon	Constraints:
w_0	<input type="text" value="28"/>	<input type="checkbox"/>	<input type="text"/>	<w_0 < <input type="text"/>
w_1	<input type="text" value="0.3"/>	<input type="checkbox"/>	<input type="text"/>	<w_1 < <input type="text"/>

Constraints:

Show: Equation Commands

Variable vmax, km, y

vmax = w_0
km = w_1

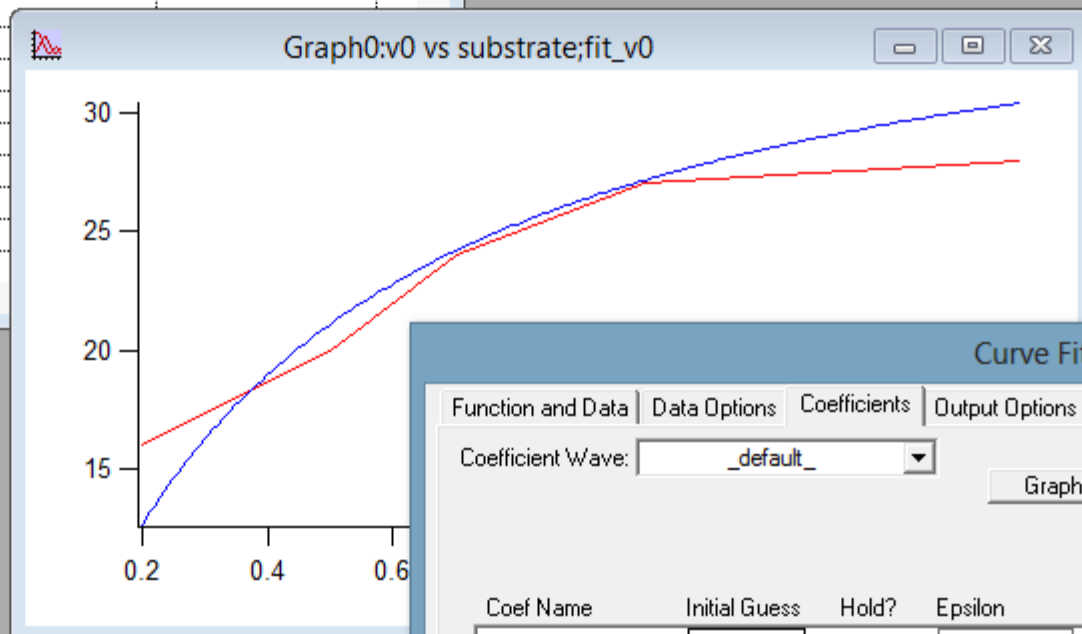
You have selected a user-defined fit function so you must enter an initial guess for every fit coefficient.

```

rename wave0 substrate
rename wave1 v0
display v0 vs substrate
    
```

Table0:substrate,v0

Point	substrate	v0
0	0.2	16
1	0.5	20
2	0.7	24
3	1	27
4	1.6	28
5		



Curve Fitting

Function and Data | Data Options | Coefficients | Output Options

Coefficient Wave: Epsilon Wave:

Coef Name	Initial Guess	Hold?	Epsilon	Constraints:
w_0	<input type="text" value="38"/>	<input type="checkbox"/>	<input type="text"/>	<w_0 < <input type="text"/>
w_1	<input type="text" value="0.4"/>	<input type="checkbox"/>	<input type="text"/>	<w_1 < <input type="text"/>

Constraints:

Show: Equation Commands

Variable vmax, km, y

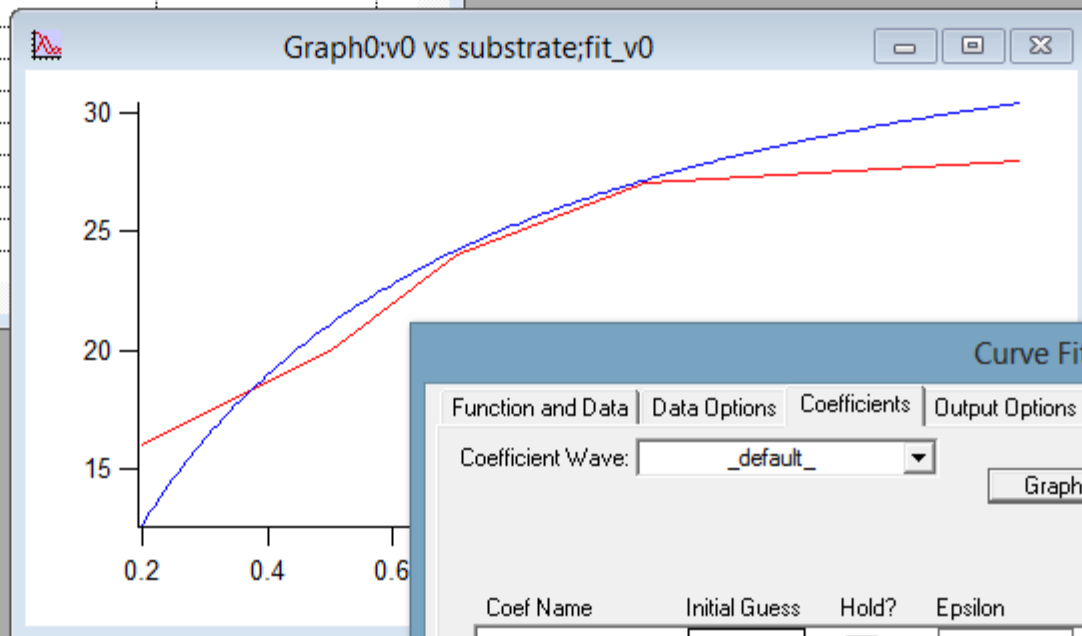
vmax = w_0
km = w_1

No Error

- rename wave0 substrate
- rename wave1 v0
- display v0 vs substrate

Table0:substrate,v0

Point	substrate	v0
0	0.2	16
1	0.5	20
2	0.7	24
3	1	27
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Curve Fitting

Function and Data | Data Options | Coefficients | Output Options

Coefficient Wave: Epsilon Wave:

Coef Name	Initial Guess	Hold?	Epsilon	Constraints:
w_0	<input type="text" value="38"/>	<input type="checkbox"/>	<input type="text"/>	<w_0 < <input type="text"/>
w_1	<input type="text" value="0.4"/>	<input type="checkbox"/>	<input type="text"/>	<w_1 < <input type="text"/>

Constraints:

Show: Equation Commands

Variable vmax, km, y

vmax = w_0
km = w_1

No Error

- rename wave0 substrate
- rename wave1 v0
- display v0 vs substrate

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