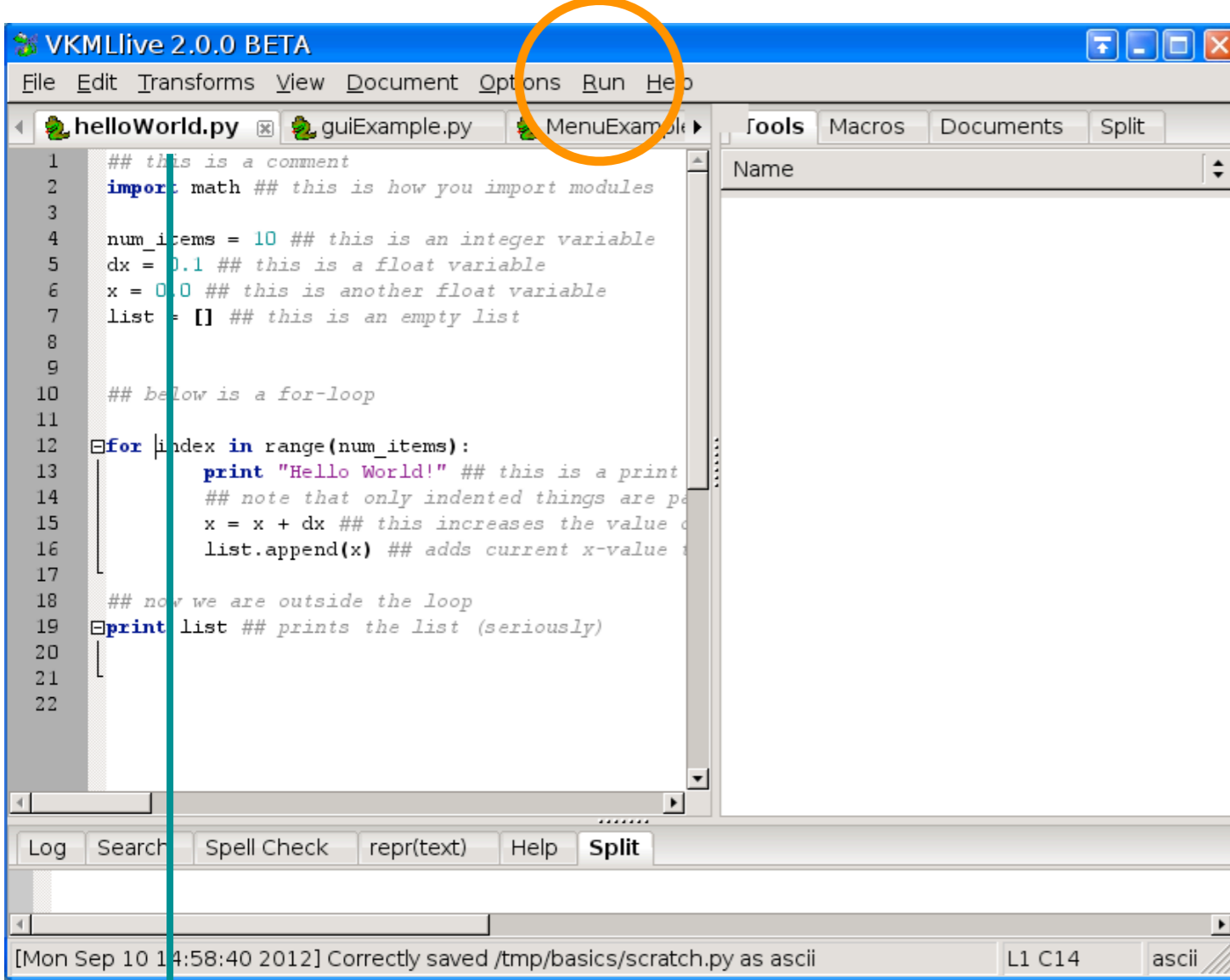


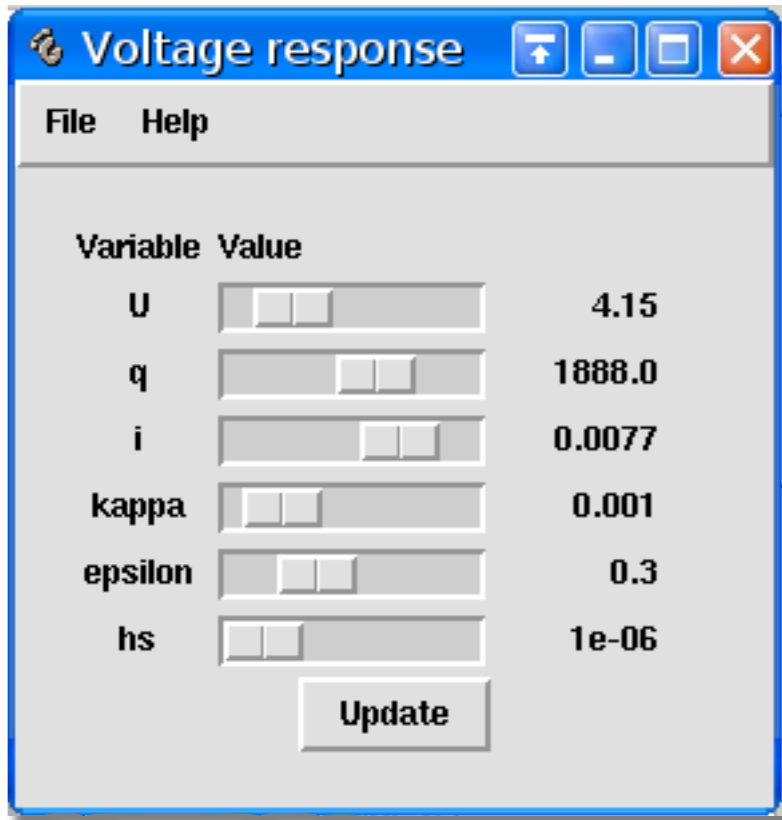
VKML- Live: Web-Enabled Interface



web interface allows to edit your scripts without having to ever install the supporting software

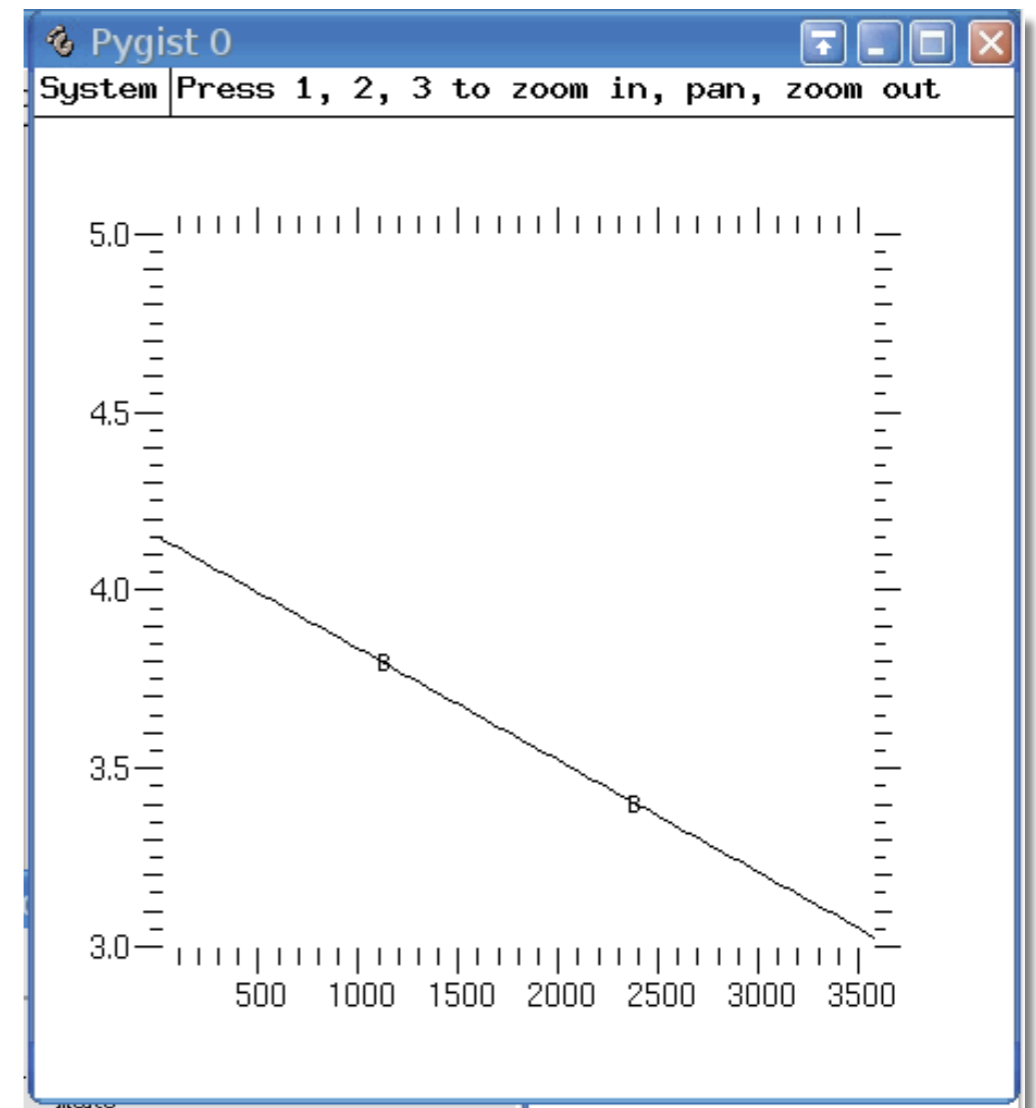
• large projects can be edited

<https://nanohub.org/tools/vkmllive/>



For Today

$$\phi = U - i \frac{h_s}{\kappa_s} - \frac{i^2 t}{\kappa_s \epsilon^{3/2} (1 - \epsilon) q}$$



$$U = 4.16 \text{ V}$$

$$q = 1888 \text{ C/m}^3$$

$$0 < i < 1 \times 10^{-3} \text{ A/m}^2$$

$$1 \times 10^{-5} < \kappa_s < 1 \times 10^{-2} \text{ S/m}$$

$$1 \times 10^{-5} < \epsilon < 1$$

Control current density, conductivity, porosity and separator thickness

VKML Tutorial/Python Crash Course

Lecture 8

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<https://nanohub.org/tools/vkmlive/>

Running Something Simple: helloWorld.py

```
## this is a comment
import math ## this is how you import modules

num_items = 10 ## this is an integer variable
dx = 0.1 ## this is a float (real) variable
x = 0 ## this is another float variable
array = [ ] ## this is an empty array

## next is a for loop
for index in range(num_items):
    print "Hello World!" ## this is a print statement
    ## note that only indented things are part of the
    ## for loop
    x = x+ dx ## this increases the value of x by dx
    array.append(x) ## this adds x to the list

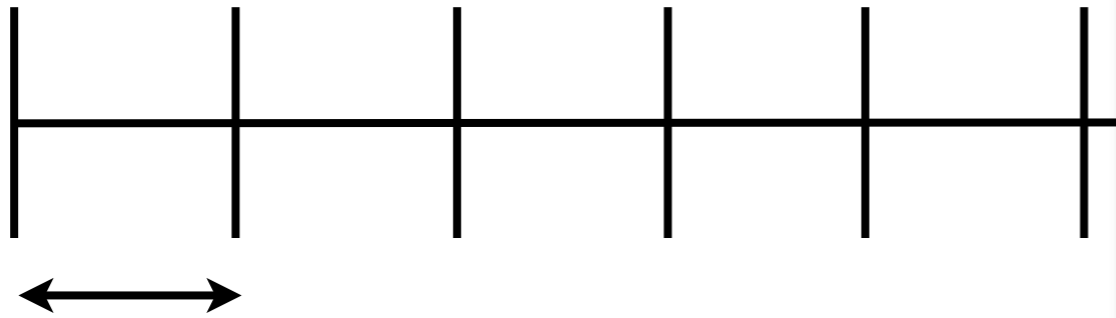
print "array=", array ## this prints the list
```

Creating

Example Application:

$$y = a(x)$$

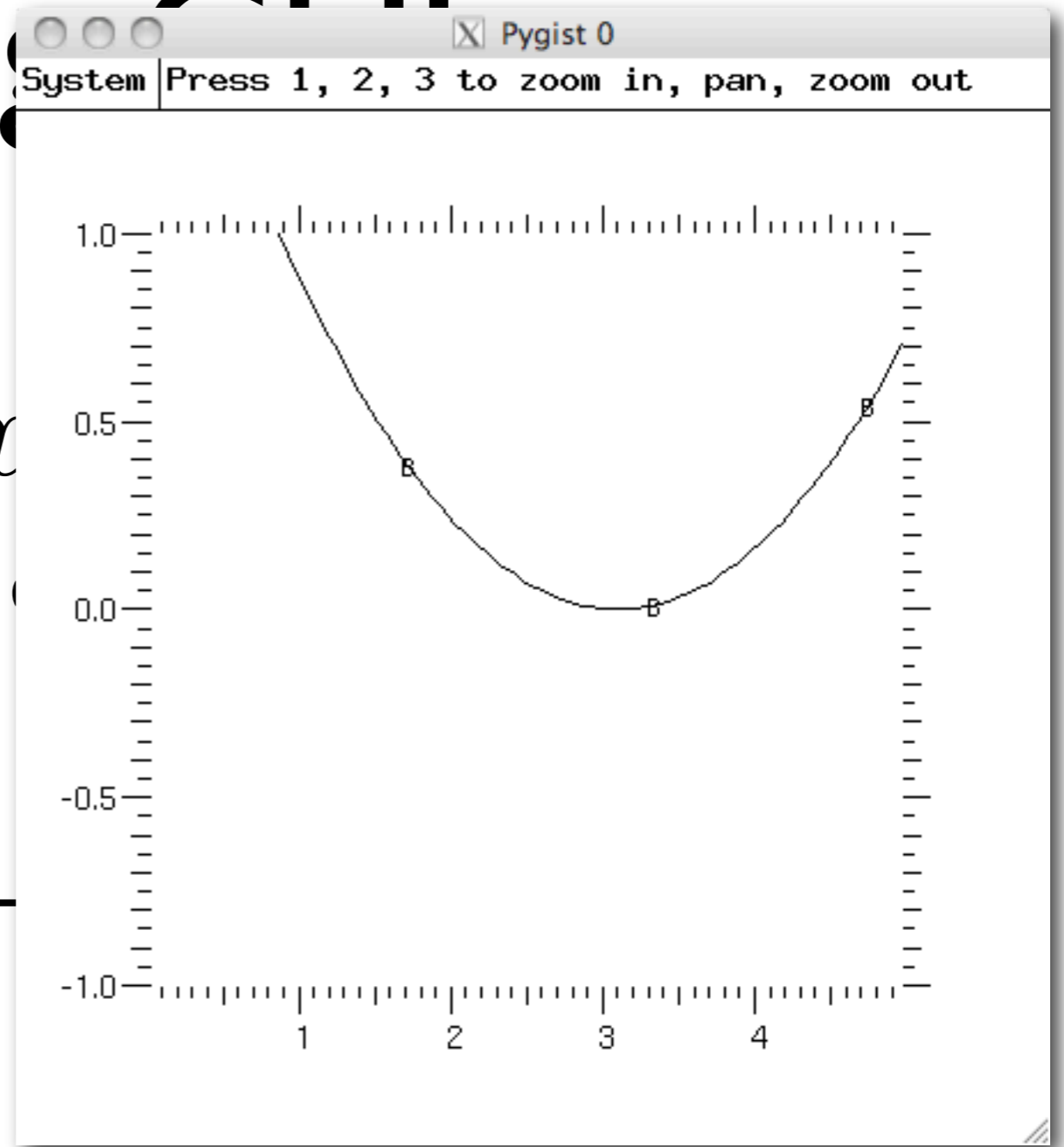
Create a mesh where we can
interval



$$dx = \text{width}/nx$$



width



Creating GUIs

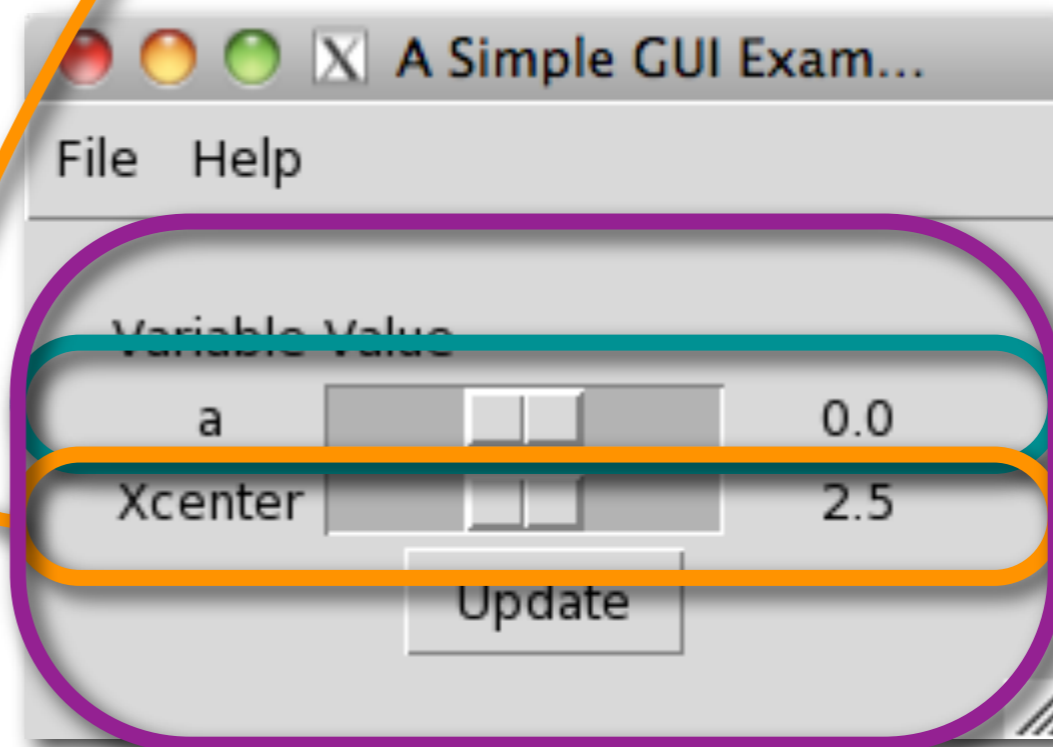
Example Application:

$$y = a(x - x_0)^2$$

Parameter

Parser

Parameter



```
p = Parser(title='A Simple GUI Example', interactive=1)
```

```
Parameter(name='a', parser=p, variable=float, default=0.0, interval = (-2, 2), precision=1)
```

```
Parameter(name='Xcenter', parser=p, variable=float, default=width/2.0, interval = (0, width), precision=1)
```

```
from fipy import CellVariable, viewers, GridID
from VKML.gui import Parameter, Parser
```

```
### first we create a mesh
```

```
nx = 100
width = 5.0
dx = width/nx
mesh=GridID(nx=nx, dx = dx)
y=CellVariable(mesh=mesh,value=0.,hasOld=1)
viewer=viewers.gistViewer.make(y,limits={'datamin':-1.0,'datamax':1.0})
viewer.plot()
```

```
### we are going to be plotting  $y = a*(x-Xcenter)^2$ 
```

```
Xcenter = width/2.0
a = 0.0
```

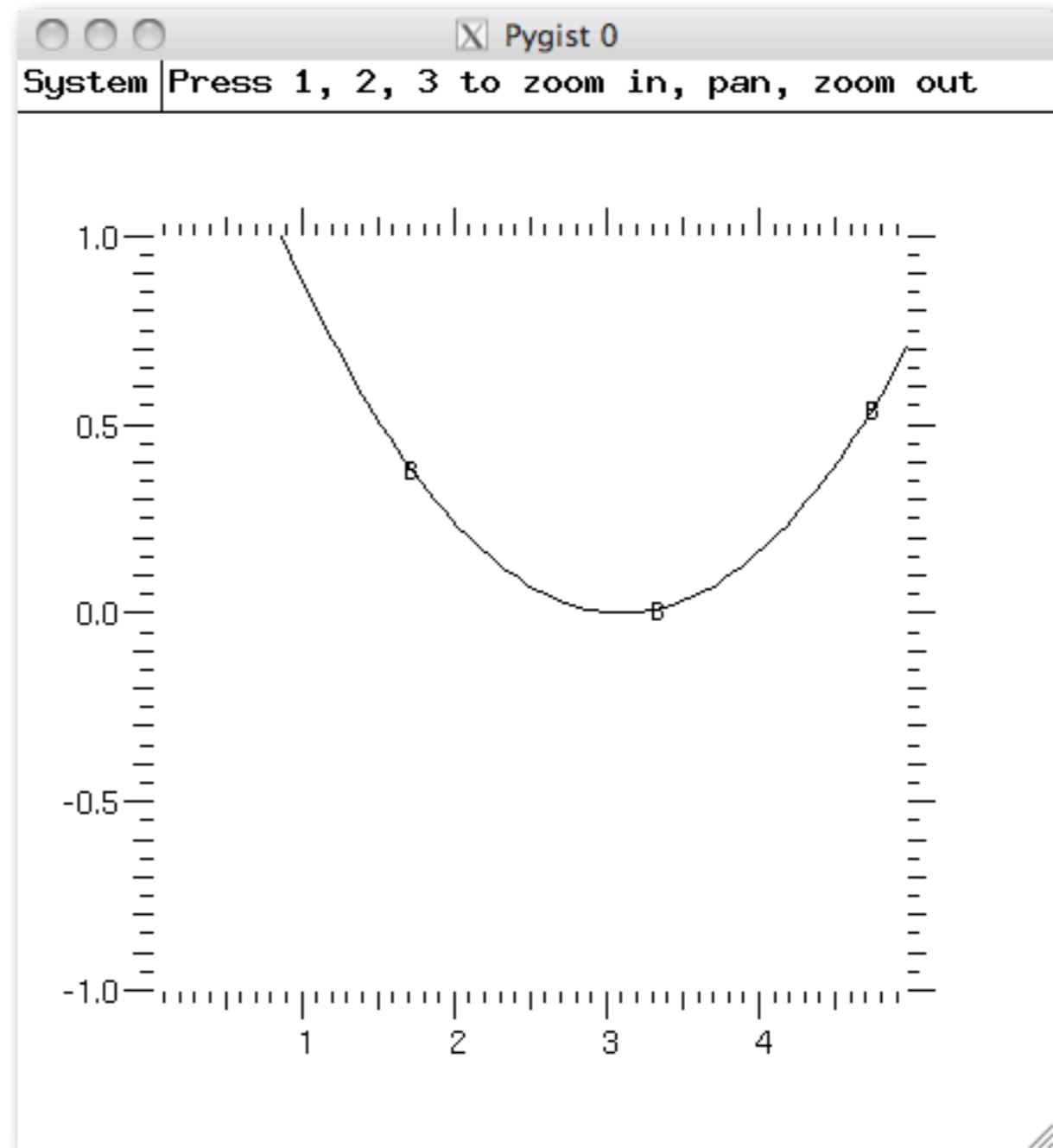
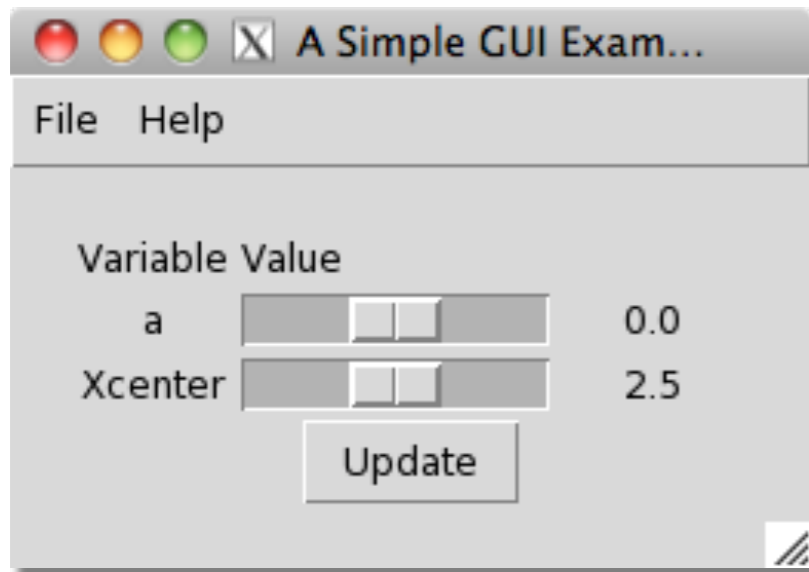
```
def callback(a, Xcenter):
    Xpos = mesh.getCellCenters() [0]
    y.setValue(a*(Xpos-Xcenter)*(Xpos-Xcenter))
    viewer.plot()
```

```
### we are going to create a GUI where a and Xcenter are the parameters
```

```
p = Parser(title='A Simple GUI Example', interactive=1)
Parameter(name='a', parser=p, variable=float, default=0.0, interval = (-2, 2), precision=1)
Parameter(name='Xcenter', parser=p, variable=float, default=width/2.0, interval = (0, width),
precision=1)
p.add_command(callback)
p()
```

Exercise 1

$$y = a(x - x_0)^2 + y_0$$



How do you add a vertical control knob?


```
from fiipy import CellVariable, viewers, GridID
from VKML.gui import Parameter, Parser
```

```
## first we create a mesh
```

```
nx = 100
width = 5.0
dx = width/nx
mesh=GridID(nx=nx, dx = dx)
y=CellVariable(mesh=mesh,value=0.,hasOld=1)
viewer=viewers.gistViewer.make(y,limits={'datamin':-1.0,'datamax':1.0})
viewer.plot()
```

```
## we are going to be plotting  $y = a*(x-Xcenter)^2$ 
```

```
Xcenter = width/2.0
```

```
a = 0.0
```

```
Ycenter = 0
```

```
def callback(a, Xcenter, Ycenter):
    Xpos = mesh.getCellCenters() [0]
    y.setValue(a*(Xpos-Xcenter)*(Xpos-Xcenter) + Ycenter)
    viewer.plot()
```

```
## we are going to create a GUI where a and Xcenter are the parameters
```

```
p = Parser(title='A Simple GUI Example', interactive=1)
```

```
Parameter(name='a', parser=p, variable=float, default=0.0, interval = (-2, 2), precision=1)
```

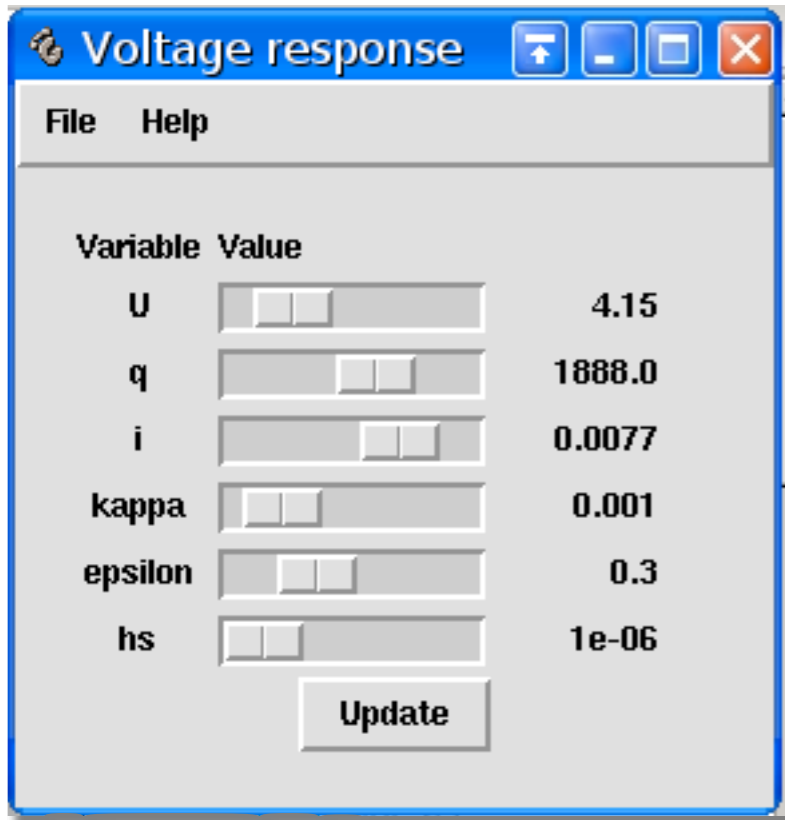
```
Parameter(name='Xcenter', parser=p, variable=float, default=width/2.0, interval = (0, width), precision=1)
```

```
Parameter(name='Ycenter', parser=p, variable=float, default=0, interval = (-1,1), precision=1)
```

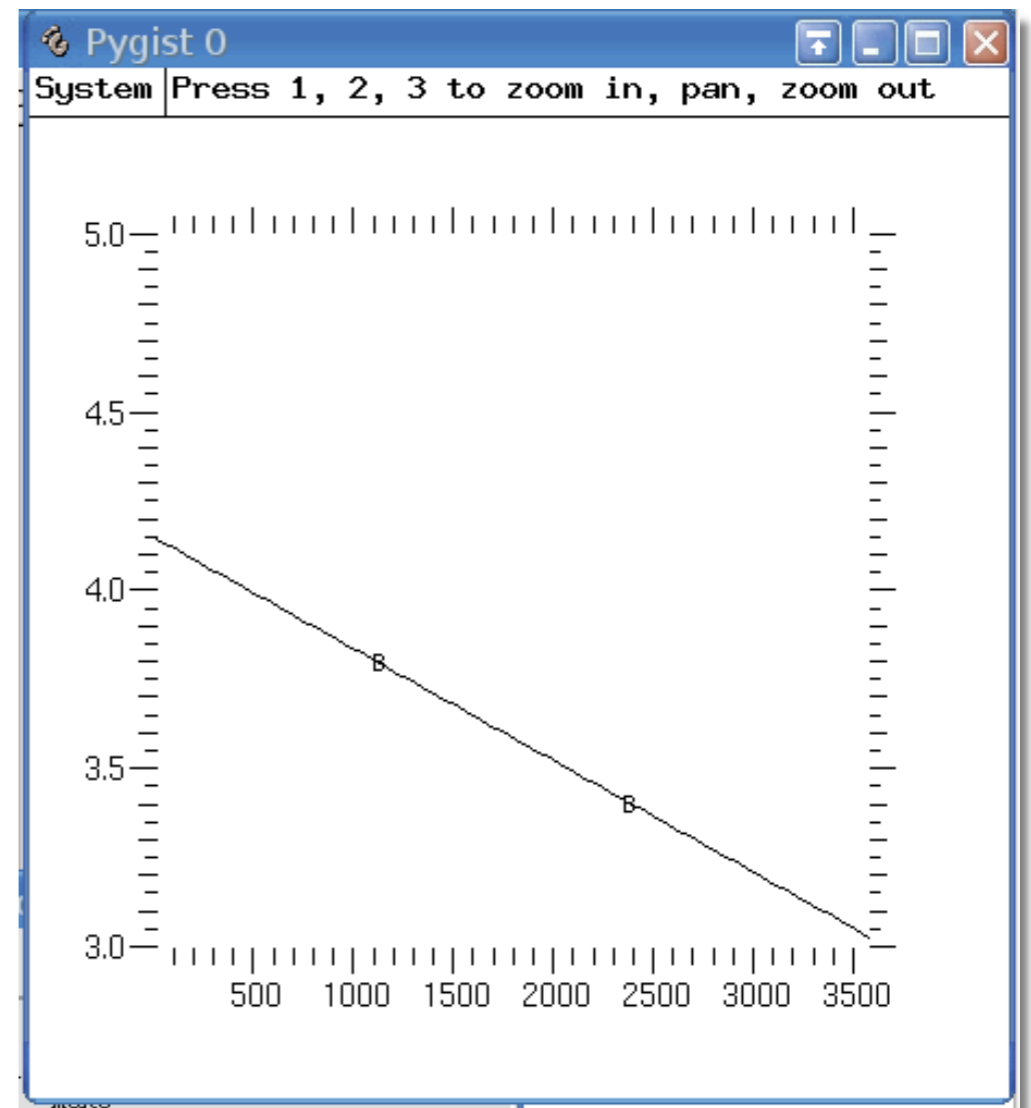
```
p.add_command(callback)
```

```
p()
```

Exercise 2



$$\phi = U - i \frac{h_s}{\kappa_s} - \frac{i^2 t}{\kappa_s \epsilon^{3/2} (1 - \epsilon) q}$$



$$U = 4.16 \text{ V}$$

$$q = 1888 \text{ C/m}^3$$

$$0 < i < 1 \times 10^{-3} \text{ A/m}^2$$

$$1 \times 10^{-5} < \kappa_s < 1 \times 10^{-2} \text{ S/m}$$

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Control current density, conductivity, porosity and separator thickness