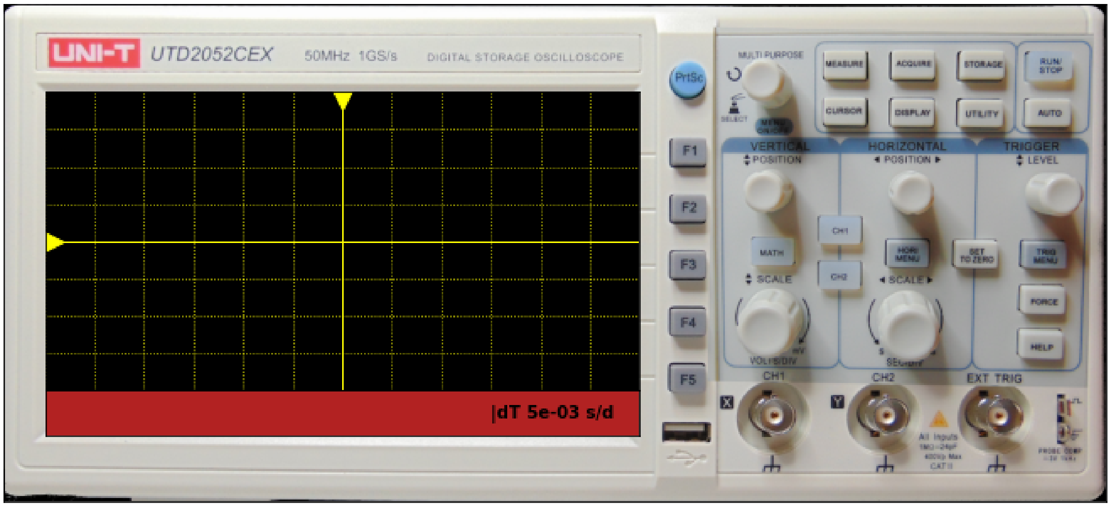
# OsciDemo

March 29, 2021

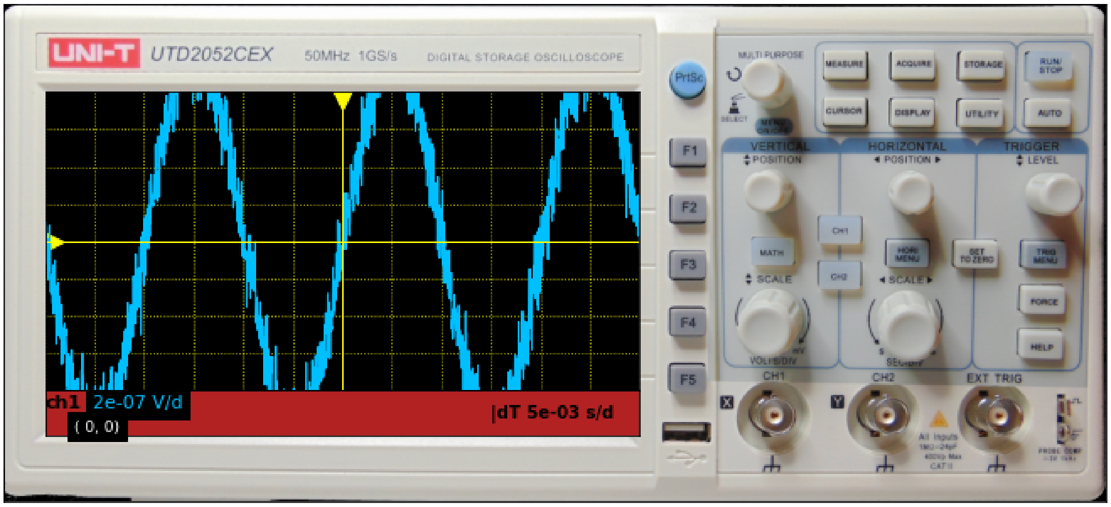
[1]:
```
import numpy as np
import matplotlib.pyplot as plt
from pyElab import osci
```

[2]:
```
## channel color scheme; yellow for no channel
osci.Channel.colors = ['yellow',  'deepskyblue',  'orangered', 'lawngreen', ␣
 ↪'magenta', 'dodgerblue']
```

[3]:
```
o = osci.Oscilloscope()

## no channels connected - no signal shown
o.show()



## null signal to show base (cofigurable) background noise
null_sig = osci.Signal()
c1 = osci.Channel(null_sig)  ## noise is additional channel signal noise;
                                                    ##ind of osci noise
o.add_channel(c1)
o.show()
```

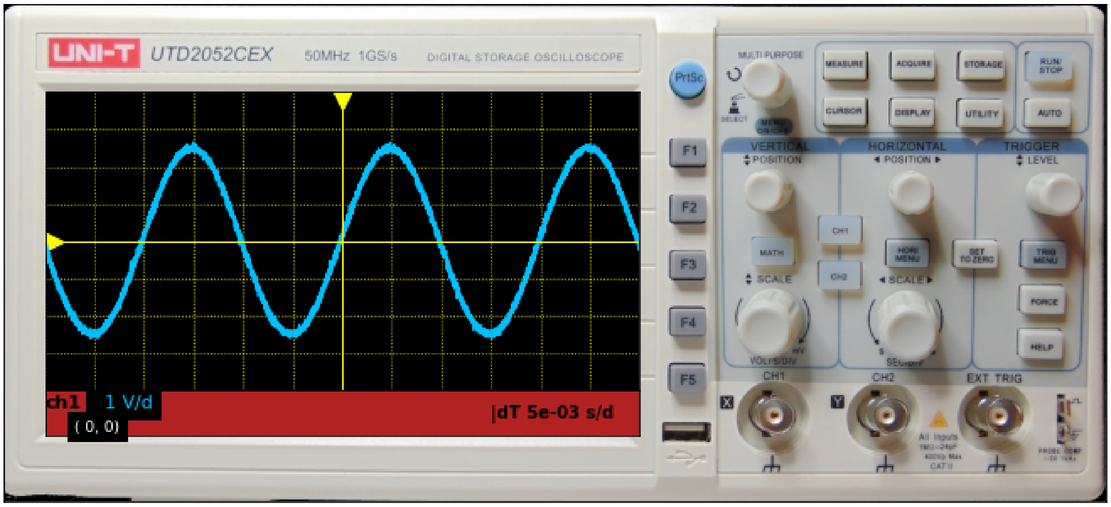


```
added channel 1 and set it as trigger signal
```



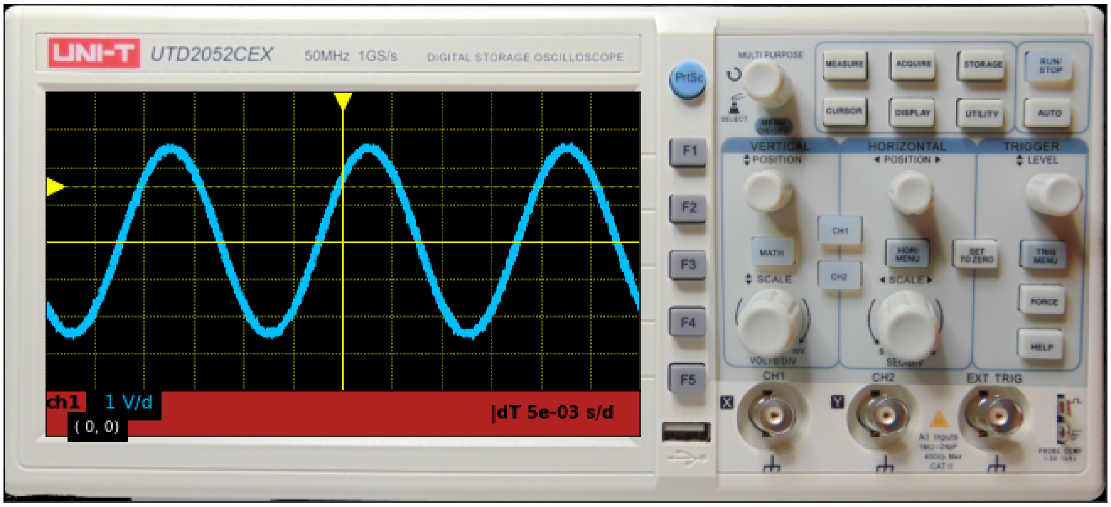
[4]:
```python
o = osci.Oscilloscope()

#### harmonic signal
## osci.Signal is the basic class for representing signal
# spectrum is a list of [freq., Amp] pairs
# noise is gaussian std
s1 = osci.Signal(spectrum = [[50, 2.5]], noise = 0.05)

## osci.Channel represents input channel. it has extra attribs for displays and triggers
c1 = osci.Channel(s1)
c1.voltdiv = 1

o.add_channel(c1)

o.step()
o.show()
```

```
added channel 1 and set it as trigger signal
```



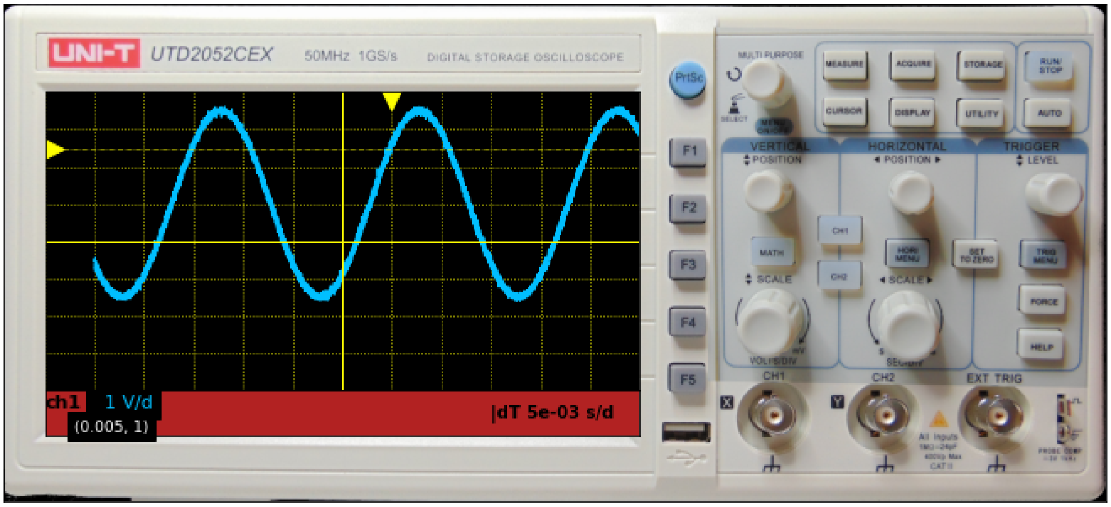
[5]:

```
## trigger
c1.trig = 1.5
o.step()
o.show()
```



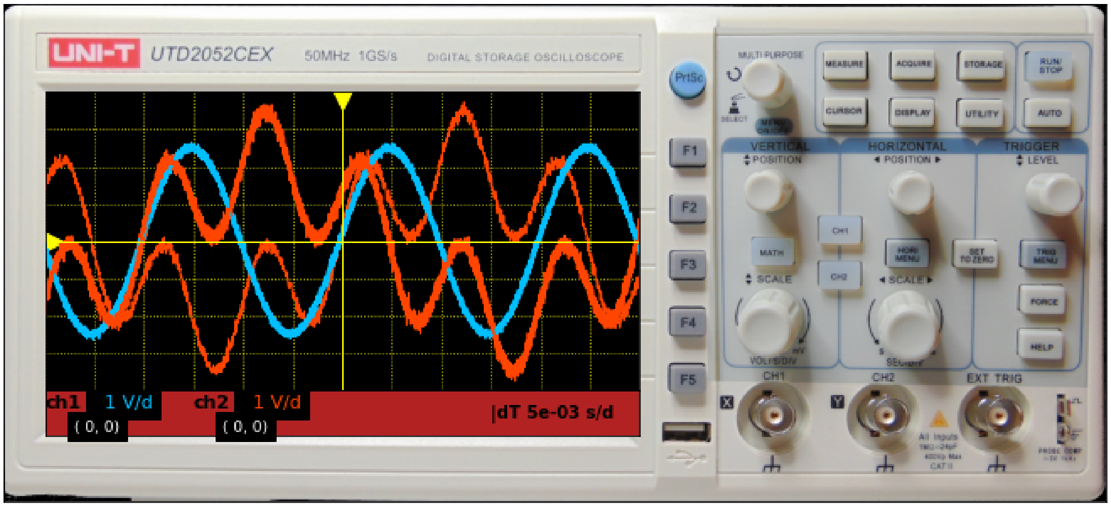
[6]:

```
## shift
c1.dh = 0.005
c1.dv = 1
o.step()
o.show()
```

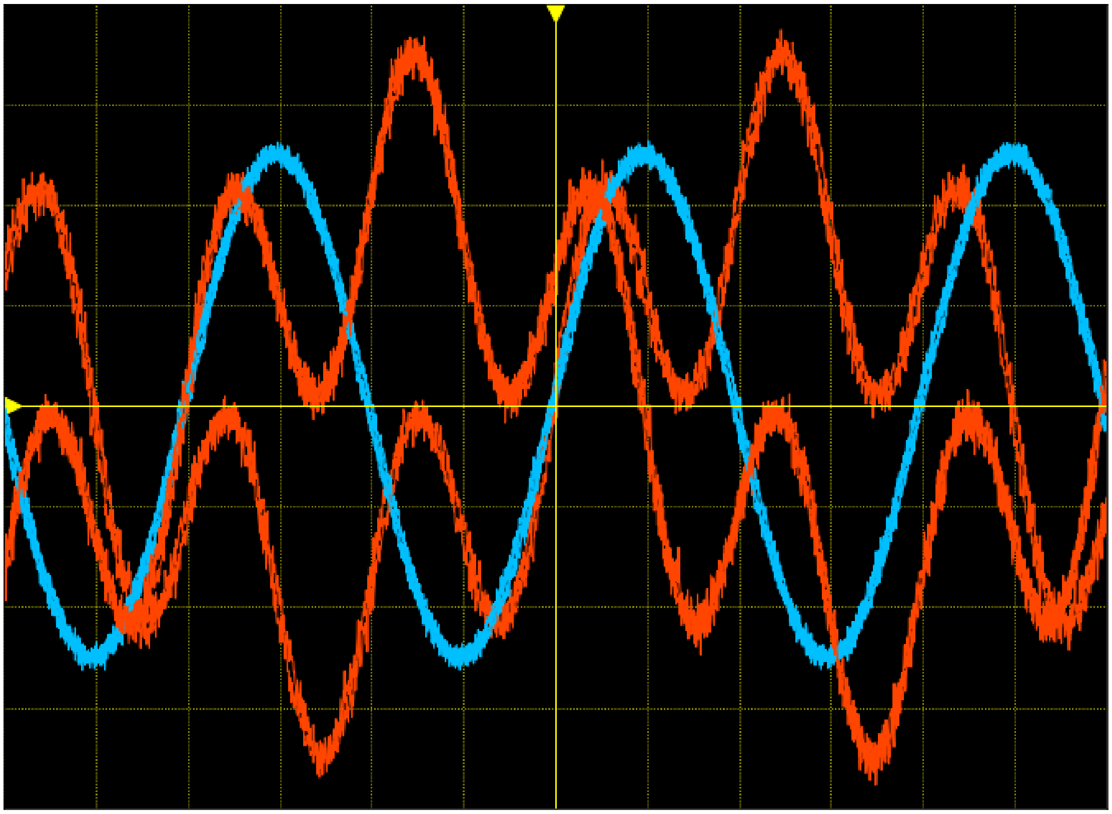


```
[7]: o = osci.Oscilloscope()

     ## two channels, TY mode
     s1 = osci.Signal(spectrum = [[50, 2.5]], noise = 0.05)
     s2 = osci.Signal(spectrum = [[100, 1.5], [20, 2]], noise = 0.1)

     c1 = osci.Channel(s1)
     c1.voltdiv = 1
     c2 = osci.Channel(s2)
     c2.voltdiv = 1

     o.add_channel(c1)
     o.add_channel(c2, trig = False)   ## c1 remains triggering

     o.step()
     o.show()
```

```
added channel 1 and set it as trigger signal
added channel 2
```



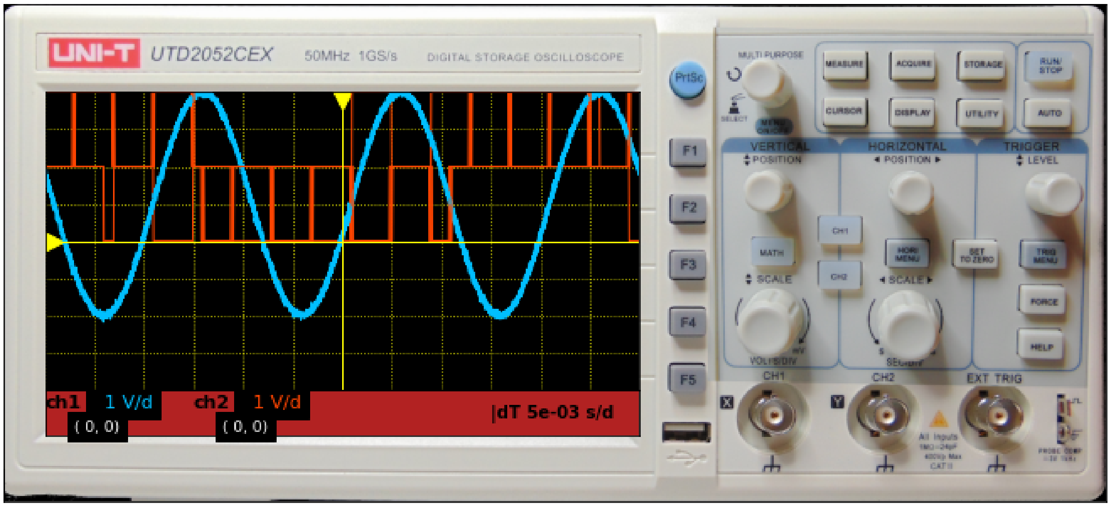
```
[8]: ## take just the screen; 1:1 aspect
     o.screen()
```

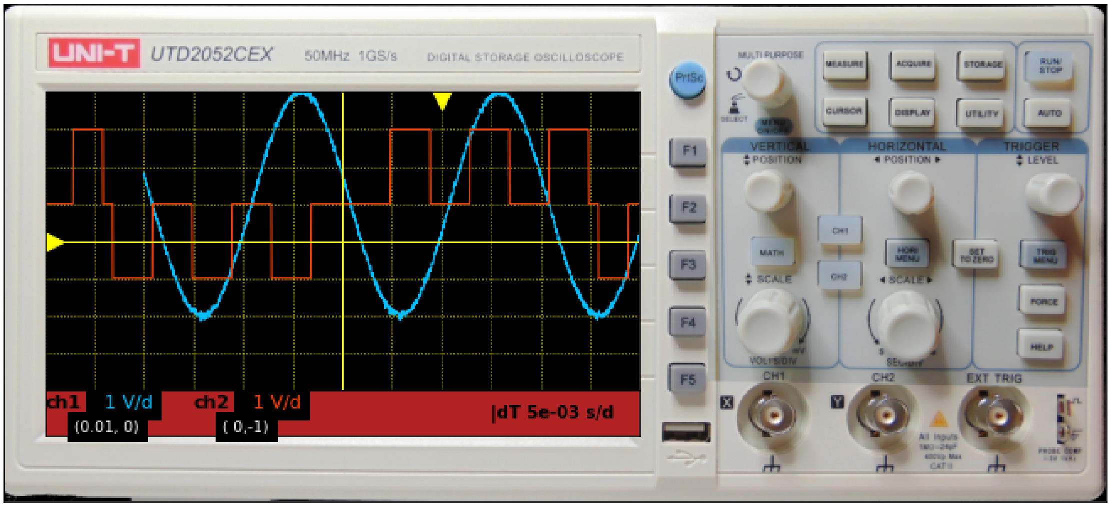


[9]:

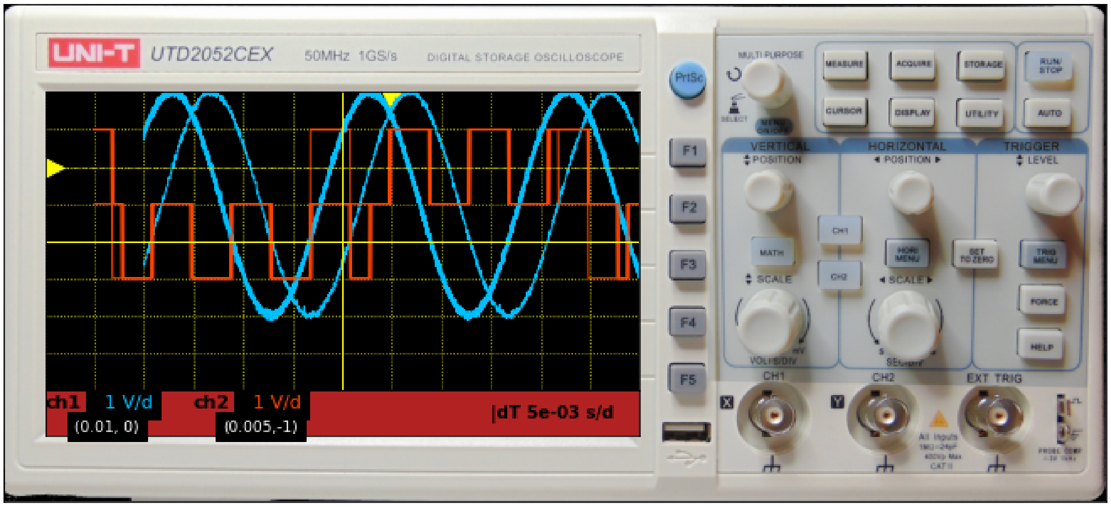
```
o = osci.Oscilloscope()

## square signal in channel 2
s1 = osci.Signal(offset = 1, spectrum = [[50, 3]], noise = 0.05)
s2 = osci.Signal(square = [[125, 2, 0.7], [20, 2, 0.2]])

c1 = osci.Channel(s1)
c1.voltdiv = 1
c2 = osci.Channel(s2)
c2.voltdiv = 1

o.add_channel(c1)
o.add_channel(c2, trig = False)

o.step()
o.show()


## only one sample instead of default 5
o.clear()
c1.dh = 0.01
c2.dv = -1
o.show()
```

```
added channel 1 and set it as trigger signal
added channel 2
```





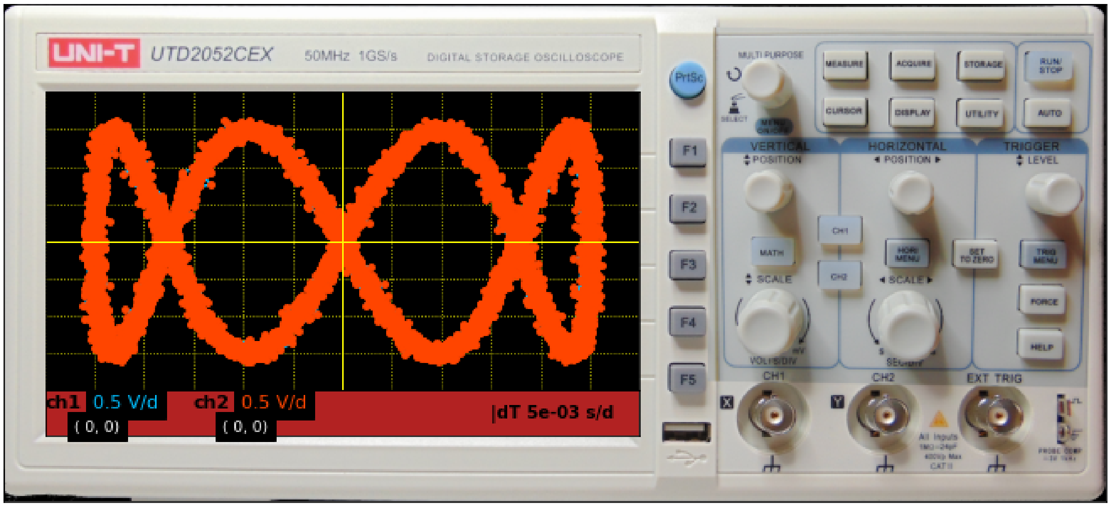
[10]:
```
o.trig_channel = c2    ## c2 is now triggering
c2.trig = 3
c2.dh = 0.005
o.step()
o.show()
```



[11]:
```
o = osci.Oscilloscope()

## x-y mode
s1 = osci.Signal(spectrum = [[50, 2.5]], noise = 0.05)
s2 = osci.Signal(spectrum = [[200, 1.5]], noise = 0.05)
```

```
c1 = osci.Channel(s1)
c1.voltdiv = 0.5
c2 = osci.Channel(s2)
c2.voltdiv = 0.5

o.add_channel(c1)
o.add_channel(c2, trig = False)

o.mode = [c1,c2] ### set this to list of the x-y channels. any other shows all␣
 ↪TYs

o.step()
o.show()
```

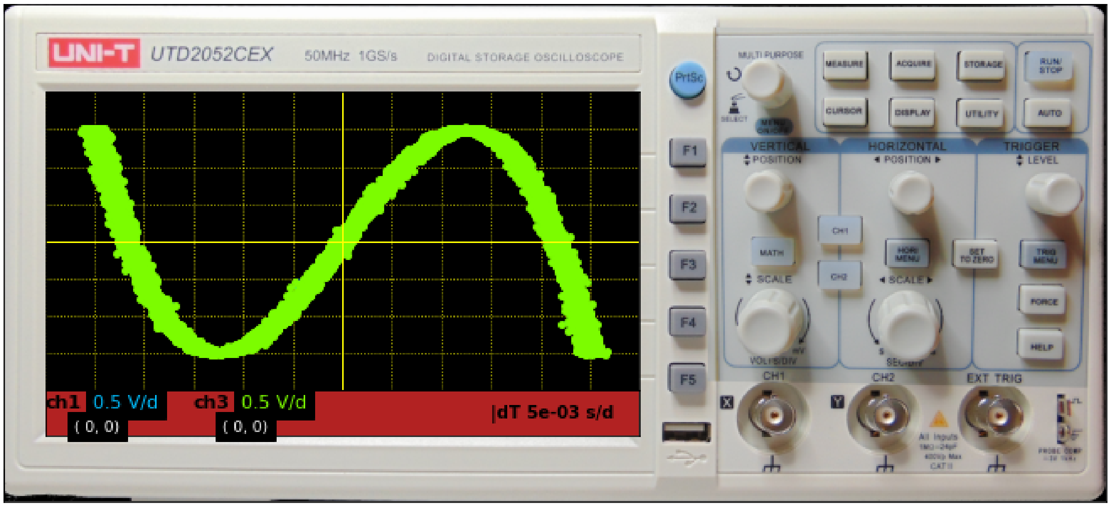
```
added channel 1 and set it as trigger signal
added channel 2
```



[12]:

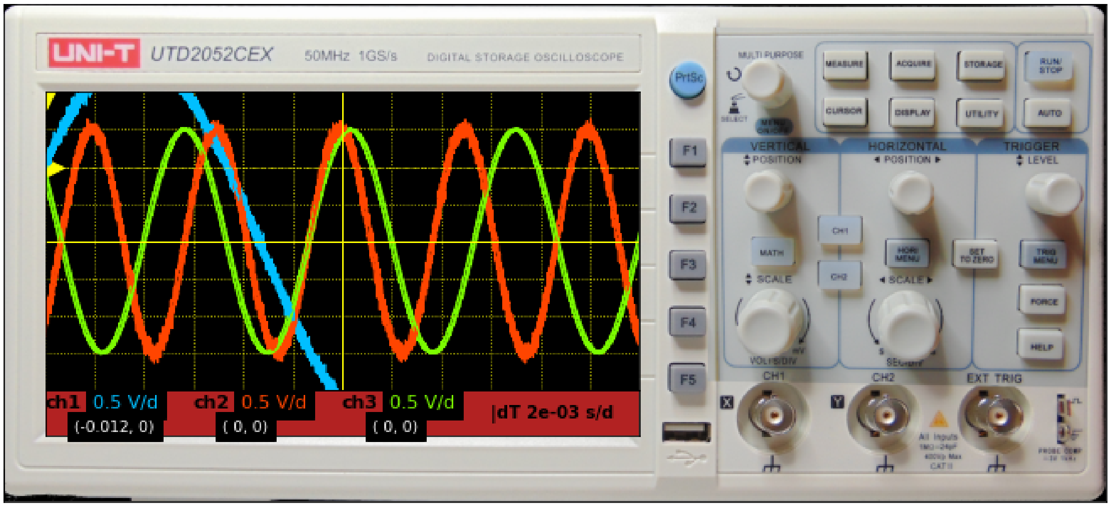
```
s3 = osci.Signal(spectrum = [[150, 1.5]], noise = 0.01)
c3 = osci.Channel(s3)
c3.voltdiv = 0.5

o.add_channel(c3, trig = False)
o.mode = [c1, c3]

o.step()
o.show()
```

```
added channel 3
```



[13]:

```
## 3 channels
o.mode = 'for TY, this may be whatever-just not a list of [chX,chY]'
o.secdiv = 2e-3
c1.trig = 1
c1.dh = - 6 * o.secdiv   ## put trigger to origin
o.step()
o.show()
```

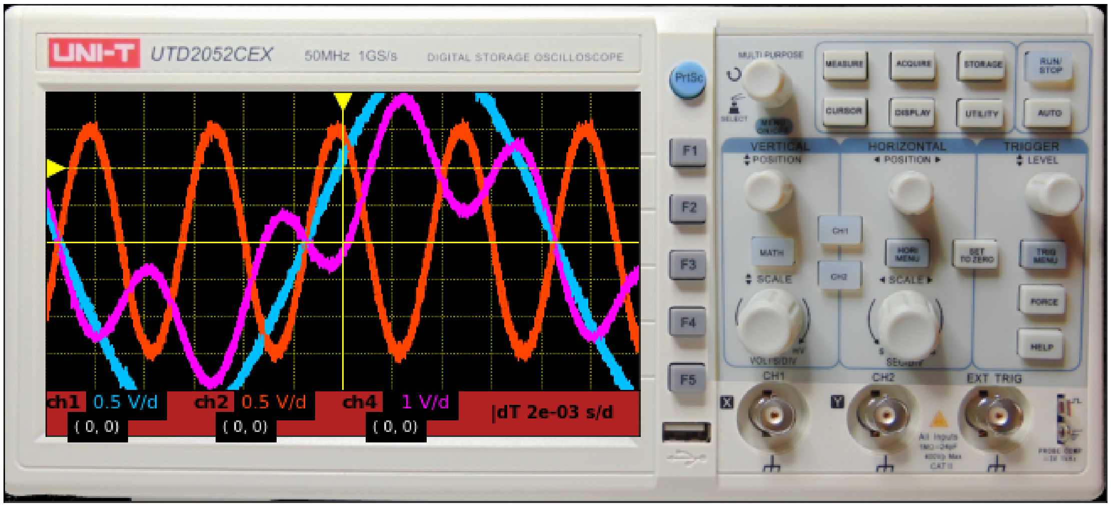


[14]:

```
c4 = osci.DiffChannel( c1 , c2 )
c4.voltdiv = 1
o.add_channel( c4, trig = False )
```

```
c1.dh=0              ## align
c3.active = False   ## turn off

o.step()
o.show()
```

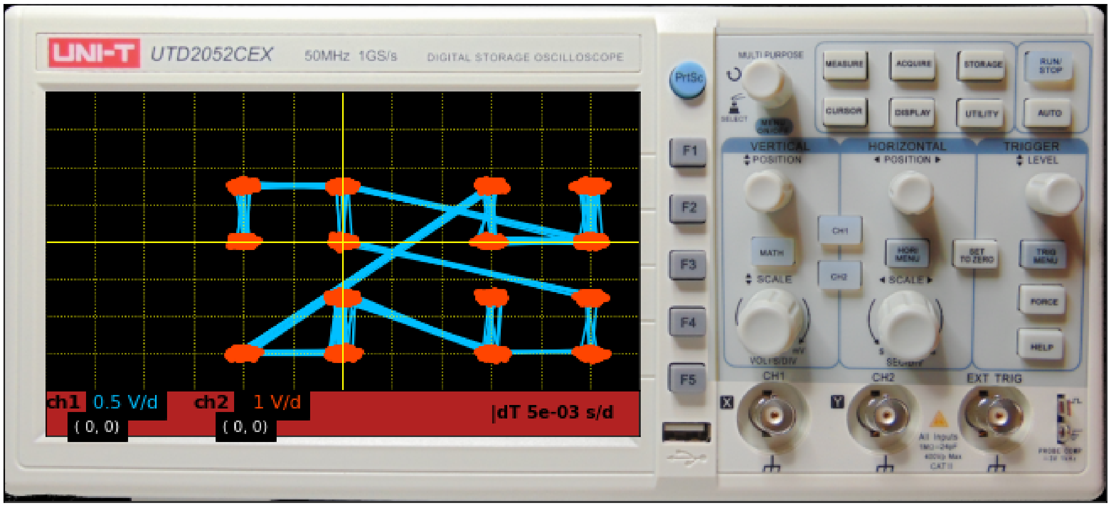
added channel 4



```
[15]: o = osci.Oscilloscope()

## x-y with squares
s1 = osci.Signal(offset = -1, square = [[50, 2.5, 0.3],[75, 1, 0.01, 0.6]],␣
 ↪noise = 0.05)
s2 = osci.Signal(square = [[200, 1.5,0.7], [25, -3, 0.2]], noise = 0.05)

c1 = osci.Channel(s1)
c1.voltdiv = 0.5
c2 = osci.Channel(s2)
c2.voltdiv = 1

o.add_channel(c1)
o.add_channel(c2, trig = False)

o.mode = [c1,c2] ### set this to list of the x-y channels. any other shows all␣
 ↪TYs

o.step()
o.show()
```

added channel 1 and set it as trigger signal

```
added channel 2
```



ch1 0.5 V/d ( 0, 0)

ch2 1 V/d ( 0, 0)

|dT 5e-03 s/d