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Learning Python from comparing Matlab with Python

Expamle 1. Plot sin(x) and cos(x)

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Matlab

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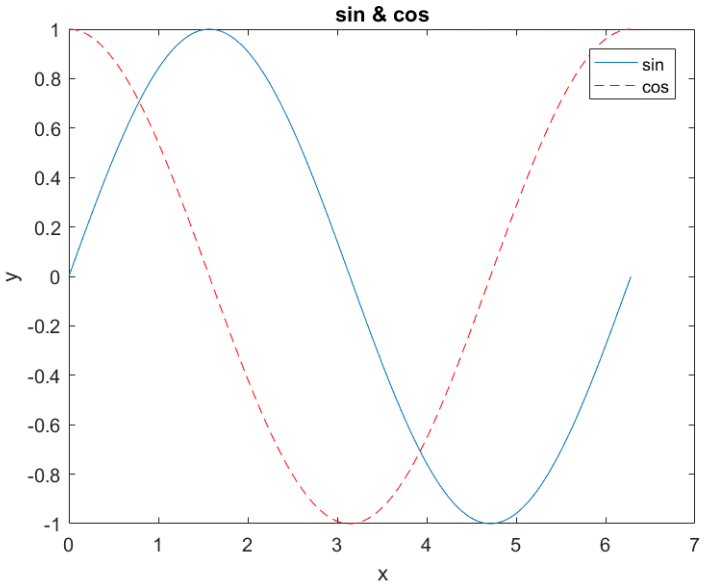
```
x = 0:pi/100:2*pi;
y1 = sin(x);
y2 = cos(x);
figure;
plot(x,y1);
hold on;
plot(x,y2,'r--');
legend('sin','cos')
title('sin & cos')
xlabel('x')
ylabel('y')
```



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Python

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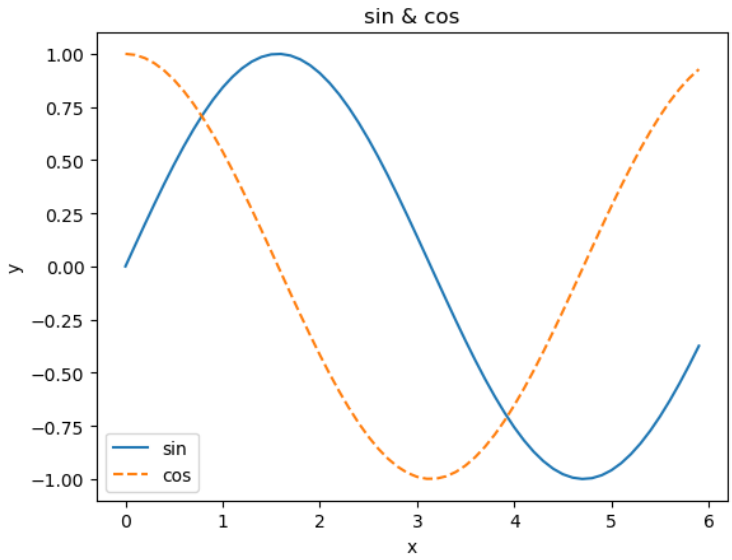
```
import numpy as np

import matplotlib.pyplot as plt

# data

x=np.arange(0,6,0.1)

y1=np.sin(x)

y2=np.cos(x)

# Drawing Graph

plt.plot(x,y1, label="sin")

plt.plot(x,y2, linestyle="--", label="cos") # plot dash line

plt.xlabel("x") # x label

plt.ylabel("y") # y label

plt.title('sin & cos' )# title

plt.legend()

plt.show()
```



Example 2. Step Function_ MATLAB function

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Matlab

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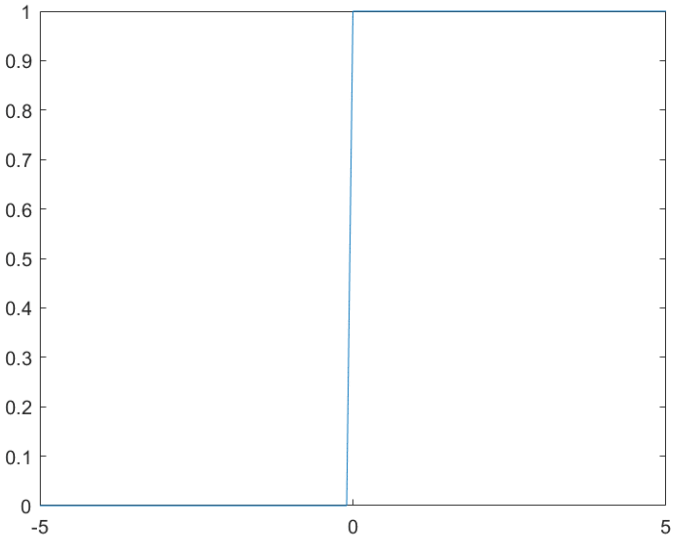
```
% Step function or Heaviside function for being Activation function or
% transformation function
clear;
clc;
a = -5:0.1:5;
z = hardlim(a);
plot(a,z)
```



Example 3. Step Function_Python def

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Python

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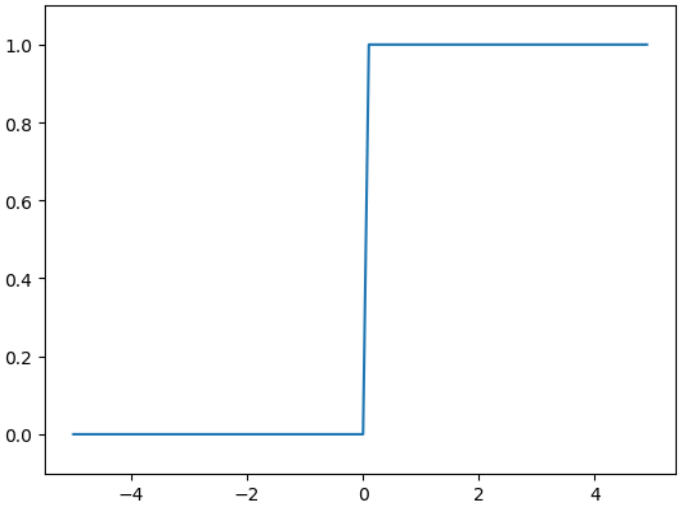
Step Function

```
import numpy as np

import matplotlib.pylab as plt

def step_function(x):

    return np.array(x > 0, dtype=np.int)



X = np.arange(-5.0, 5.0, 0.1)

Y = step_function(X)

plt.plot(X, Y)

plt.ylim(-0.1, 1.1)    # y range
```

plt.show()



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Example 3. Show one image

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Matlab

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```
I = imread('pout.tif');
imshow(I)
```

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Python

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```
import matplotlib.pyplot as plt

from matplotlib.image import imread
```

```
img=imread('pout.png')# read image png format

plt.imshow(img)

plt.show()
```

Example 4. Display image from array

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Matlab

```
%     Synthetic data_Display image from array

figure();

subplot(211);

I_image=uint8(100*ones(28,28));

I_image(1:3,1:3)=200;

imshow(I_image);

imwrite(I_image,'C:/pythonwork/images/image1.bmp','bmp');

subplot(212);
```

```
I_lable= logical(zeros(28,28));

I_lable(1:3,1:3)=1;

imshow(I_lable);

imwrite(I_lable,'C:/pythonwork/labels/label1.bmp','bmp');
```

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Python

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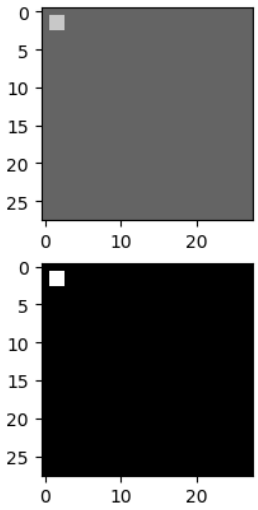
```
# Python Imaging Library/ conda install -c anaconda scipy/
# http://www.scipy-lectures.org/advanced/image_processing/
from scipy import ndimage
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
from matplotlib.colors import NoNorm
import pylab
from scipy import misc
import numpy as np

#http://scikit-image.org/docs/dev/user_guide/transforming_image_data.html
```

```
#im_image = np.uint8(100*np.ones((28, 28)))
#im_image =100.*np.ones((28,28), dtype=np.float32)

im_image =100*np.ones((28,28), dtype=np.uint8)
im_image[1:3, 1:3] = 200
plt.subplot(211)
#plt.gray()
#plt.imshow(im_image , cmap='gray', norm=NoNorm())
plt.imshow(im_image , cmap=pylab.gray() , norm=NoNorm())
#plt.imshow(im_image , cmap=plt.cm.gray, norm=NoNorm())
#plt.show()

plt.imsave('C:/pythonwork/images/Pimage1.png', im_image) # uses the Image module (PIL)
#convert image (np.array) to binary image
#https://stackoverflow.com/questions/40449781/convert-image-np-array-to-binary-image
im_label=im_image<120
#im_label=np.zeros((28,28), dtype=bool)
#im_label[1:3, 1:3] =np.array([[True, True] , [True, True]])
plt.subplot(212)
plt.imshow(im_label , cmap=plt.cm.binary)
plt.show()
plt.imsave('C:/pythonwork/labels/Plabel1.png', im_label) # uses the Image module (PIL)



# Store data to disk, and load it again:
#>>> np.save('/tmp/123', np.array([[1, 2, 3], [4, 5, 6]]))
#>>> np.load('/tmp/123.npy')
#array([[1, 2, 3],
#              [4, 5, 6]])

#arr = np.array(img) transform image to array
#arr = img.load() load array
#a=np.ones(10, dtype=bool)
#https://matplotlib.org/users/image_tutorial.html
#https://stackoverflow.com/questions/3823752/display-image-as-grayscale-using-
matplotlib/11603881
```


0
5
10
15
20
25
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