Untitled

June 27, 2017

```python
In [95]: %matplotlib inline
         import matplotlib
         matplotlib.rcParams['text.usetex'] = True
         matplotlib.rcParams['text.latex.unicode'] = True
         matplotlib.rcParams['text.latex.preamble'] = [
                 '\\\\usepackage{CJK}',
                 r'\AtBeginDocument{\begin{CJK}{UTF8}{gbsn}}',
                 r'\AtEndDocument{\end{CJK}}',
         ]
         import matplotlib.pyplot as plt
         import numpy as np
         import sys
         import os

         fp = 'test1/cmp.txt'
         num = 30
         f = file(fp)
         n = 0
         s = f.readline()
         while(s!=''):
             n += 1
             s = f.readline()
         print('data contains ', n, 'tests.')
         x = np.zeros(n)
         mb = np.zeros(n)
         mh = np.zeros(n)
         sb = np.zeros(n)
         sh = np.zeros(n)
         f = file(fp)
         for i in range(n):
             s = f.readline()
             arr = s.split(' ')
             x[i] = float(arr[0])/100
             mb[i] = float(arr[1])
             mh[i] = float(arr[2])
             sb[i] = np.sqrt(float(arr[3]))
             sh[i] = np.sqrt(float(arr[4]))
         plt.plot(x, mb, 'b-')
```
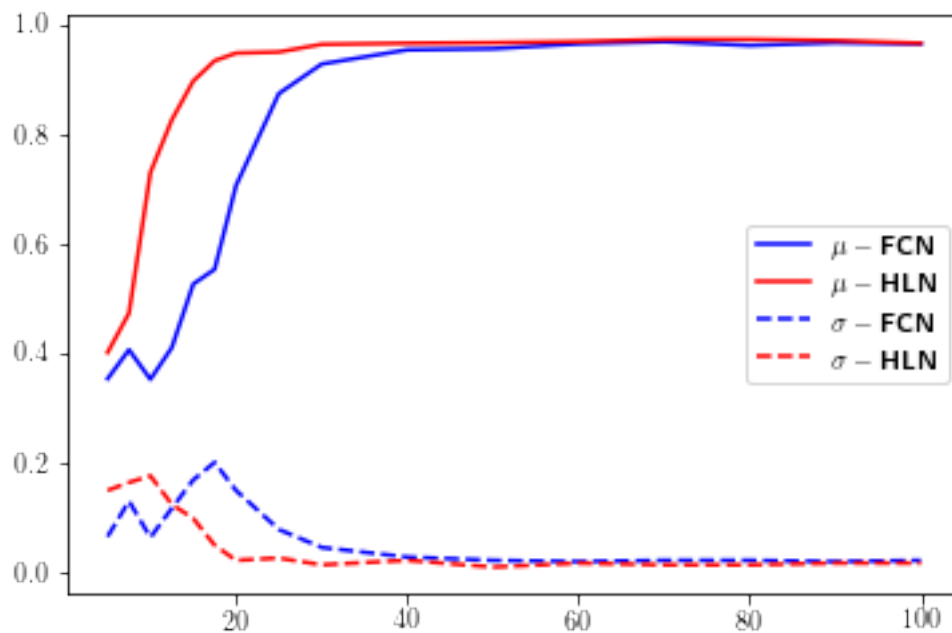
```
plt.plot(x, mh, 'r-')
plt.plot(x, sb, 'b--')
plt.plot(x, sh, 'r--')
plt.legend([r'$\mu-\textbf{FCN}$', \
            r'$\mu-\textbf{HLN}$', \
            r'$\sigma-\textbf{FCN}$', \
            r'$\sigma-\textbf{HLN}$'])
```

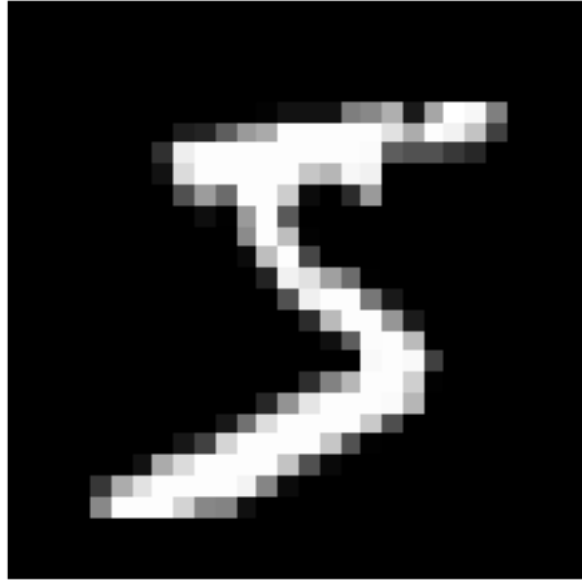('data contains ', 16, 'tests.')
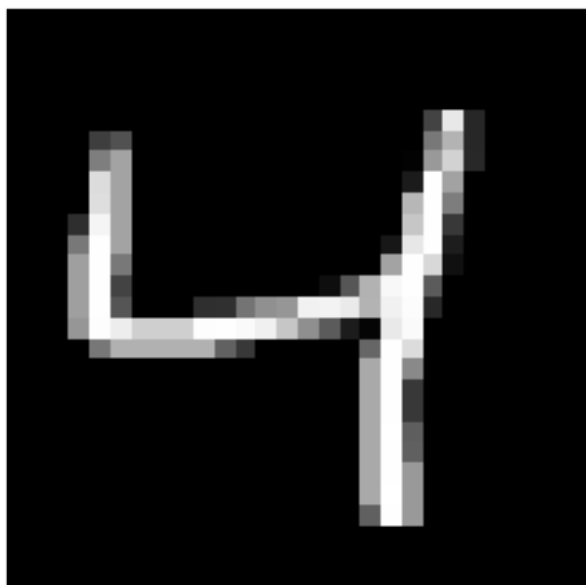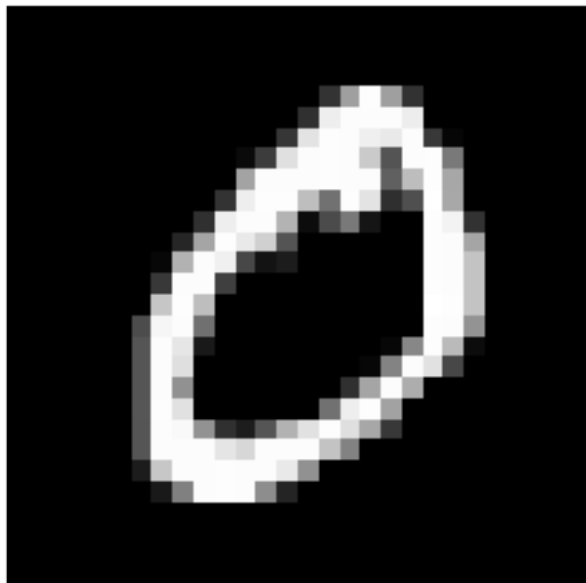
```
In [94]: # test HLN on MNIST database
         import struct
         filename = 'MNIST/train-images-idx3-ubyte'
         binfile = open(filename , 'rb')
         buf = binfile.read()
         index = 0
         magic,numImages,numRows,numColumns = \
             struct.unpack_from('>IIII' , buf , index)
         index += struct.calcsize('>IIII')
         # images
         ims = np.zeros()
         im1 = struct.unpack_from('>784B' ,buf, index)
         index += struct.calcsize('>784B')
```

```python
im = np.array(im1)
im = im.reshape(28,28)
fig = plt.figure()
plotwindow = fig.add_subplot(111)
plt.imshow(im , cmap='gray')
plt.axis('off')
plt.show()
```

$$\mu^2 \leftarrow \theta$$