ECE-GY 6143 Machine Learning HW 08

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1. Question 1:
   a. $\hat{y} = -0.2 - 0.3x_1 + x_2$
   b. $\gamma = 0.2, \hat{y} = -0.2 - 0.3x_1 + x_2$
   c. $m = 0.19$
   d. *all*

2. Question 2:
   a.

```
J = np.vectorize
    (lambda t :
        np.sum(
            (1-y*(x-t))*
            ((1-y*(x-t))>0).astype(int)
            )
     )
t = np.arange(100)/20
J = j(t)
plt.scatter (t, j)
```

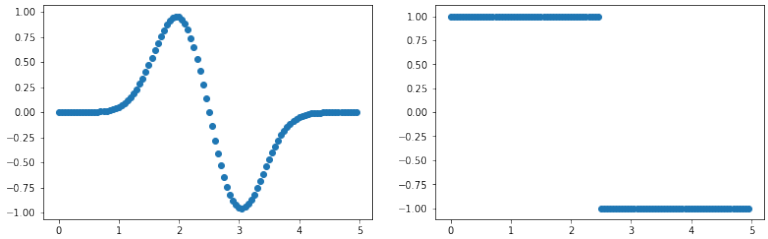
   b. $t = 3.1$
   c. $\epsilon = \{0, 0, 0, 1.3, 2.1, 0\}$
   d. x_4, x_5 are mis-classified

3. Question 3:
   a. $x = [[0,0,0,0],[0,0,0,0],[0,1,1,1],[0,0,0,0]]^T$ $w = [[0,0,0,0],[0,1,1,0],[0,1,1,0],[0,0,0,0]]^T$
   b. $z = 2$
   c. $z = 0$
   d. $z = 2$
   e. $x = Xmat^T.reshape(-1)$

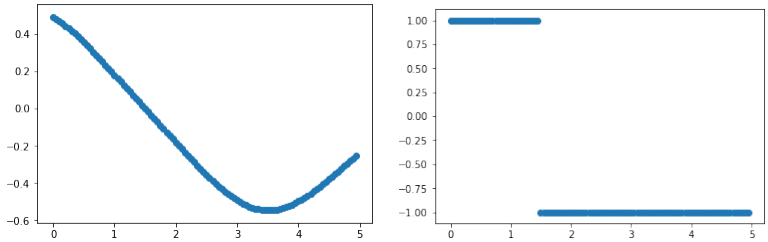
4. Question 4:

a.

```
Z = np.vectorize (lambda k : np.sum(
        alpha*y*np.exp(-gamma*((x-k)**2))
    ))
k = np.arange(0,100)/10
plt.scatter(k, Z(k))
plt.scatter(k, 2*(Z(k)>0).astype(int)-1)
```



b.



c. *a.*