

## Homework 4

1. Run the following program in matlab, and discuss what it is doing.

```
% downloading data with matlab
conn = yahoo; %connect to Yahoo
name='IBM';
begindate='2-january-2014';
enddate='14-may-2014';
data1 =fetch(conn,name,{'High','Low','Close'},begindate,enddate);%
downloading data with matlab
data=data1(:,4); % closing prices
plot(x)
```

2. (a) Discuss what the Python program below is doing, (b) Run the program in Python, (c) Convert the python program in to matlab and run it in matlab.

```
from numpy import *
from pylab import *
WINDOW = 10
data = [1,2,3,4,5,5,5,5,5,5,5,5,5,5,5]
weightings = repeat(1.0, WINDOW) / WINDOW
y=convolve(data, weightings,'valid')
plot(y)
```

3. Replace the data in problem 2 by the data generated in problem 1, and rerun the matlab program you wrote in problem 2.

4. Replace the weighting for SMA by the weightings for WMA, and rerun the program. Discuss the difference between SMA and WMA results.

5.

**P10.3 Suppose that we have the following input/target pairs:**

$$\left\{ \mathbf{p}_1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}, t_1 = 1 \right\}, \left\{ \mathbf{p}_2 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}, t_2 = -1 \right\}.$$

**These patterns occur with equal probability, and they are used to train an ADALINE network, with no bias. What does the mean square error performance surface look like?**

6.

**P10.4 Consider the system of Problem P10.3 again. Train the network using the LMS algorithm, with the initial guess set to zero and a learning rate  $\alpha = 0.25$ . Apply each reference pattern only once during training. Draw the decision boundary at each stage.**

10.3, 10.4, 10.5, 10.6