**CSE-516 – Lab02**

OrigData = load('Orig\_Data.dat');

%Part 1 for Figure 3.1 of Lab02%

orig\_x = OrigData(:,1);

orig\_y = OrigData(:,2);

origXmean = mean(orig\_x);

origYmean = mean(orig\_y);

adjDataX = orig\_x - origXmean;

adjDataY = orig\_y - origYmean;

plot(orig\_x, orig\_y, '+');

title('Original data');

axis([-1 4 -1 4]);

%Part 2 for Figure 3.2 of Lab02%

cov\_mtax = cov(adjDataX, adjDataY);

[eigenvectors, eigenvalues] = eig(cov\_mtax);

plot(adjDataX, adjDataY, '+');

title('Normalized data with primary components');

hold on;

plot(eigenvalues(:), eigenvalues(:));

plot(-eigenvalues(:), -eigenvalues(:));

plot(eigenvalues(:), -eigenvalues(:));

plot(-eigenvalues(:), eigenvalues(:));

axis([-2 2 -2 2]);

hold off;

%Part 3 for Figure 3.3 of Lab02%

daXY = [adjDataX,adjDataY];

FinalData = daXY \* eigenvectors;

FinalData = fliplr(FinalData);

FinalData(:,1) = -FinalData(:,1);

plot(FinalData(:,1), FinalData(:,2), '+');

title('Data in new space');

axis([-2 2 -2 2]);

%Part 4 for Figure 3.4 of Lab02%

FinalVector = eigenvectors(:,2);

fVTrans = transpose(FinalVector);

daA = transpose(daXY);

Final\_data\_2 = fVTrans \* daA;

rowDATAdj = FinalVector \* Final\_data\_2;

rDAdjX = rowDATAdj(1,:);

rDAdjY = rowDATAdj(2,:);

plot(orig\_x, orig\_y, '+');

hold on;

plot(rDAdjX, rDAdjY, '.');

hold off;

title('Data with reduced dimension');

title('Data with reduced dimension w/ Legend');

legend('3.1 Original Data', '3.4 Reduced Dim');

axis([-2 5 -2 5]);







