ECE 311 Lab 6

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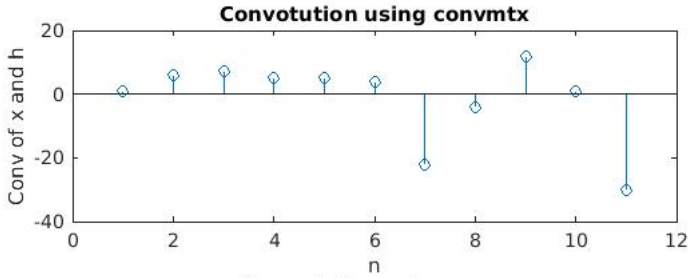
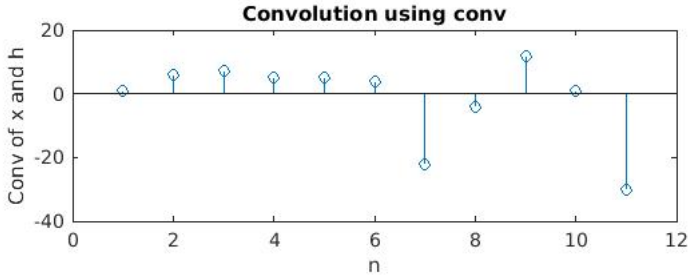
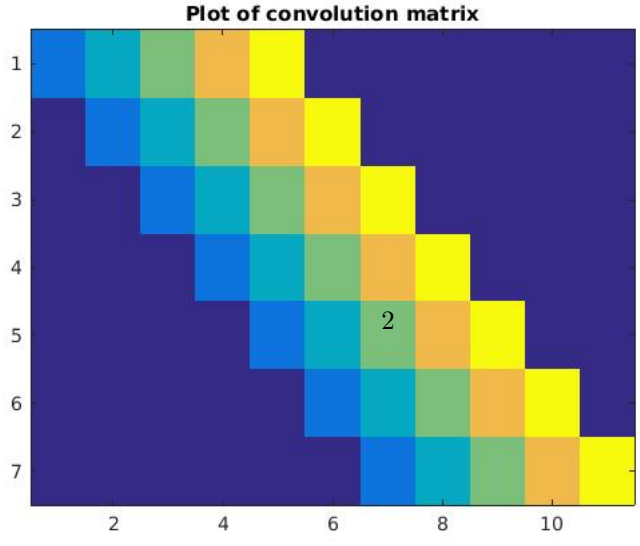
```
x = [ 1 4 -4 -3 2 5 -6];
h = [1 2 3 4 5];
a = convmtx(h,length(x));
figure;
imagesc(a);
title('Plot of convolution matrix');

cx = x*a;
c = conv(x,h);

figure;
subplot(211);
stem(cx);
title('Convotution using convmtx');
ylabel('Conv of x and h');
xlabel('n');
subplot(212);
stem(c);
title('Convolution using conv');
ylabel('Conv of x and h');
xlabel('n');
```

report1.m







$A = U\Sigma V^H$
$A^H A = V\Sigma^H U^H U\Sigma V^H$
$= V\Sigma^H \Sigma V^H$
$A^H AV = V\Sigma^H \Sigma = V\Sigma^2$

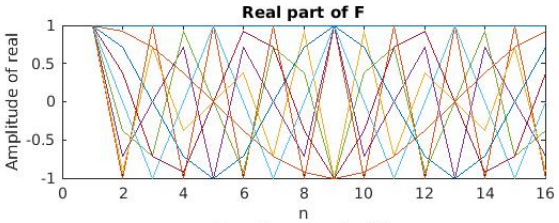
```
clear all;
clc;
A = [1,4,-2
     3,11,5
     7,7,7];
AH = A';

AAH = A*AH;
AHA = AH*A;

e1 = eig(AAH);
e2 = eig(AHA);

B = svd(A)
e1
e2
```

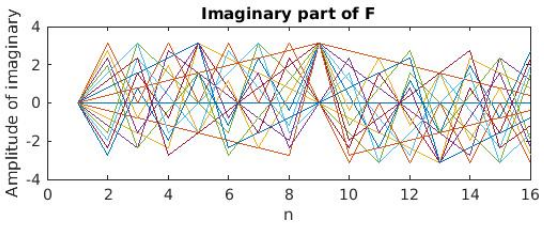
report2.m

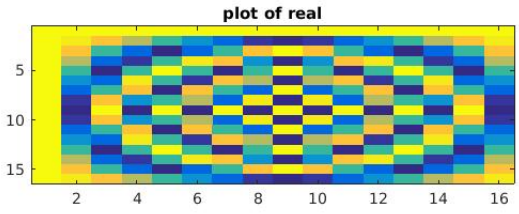
```
B =

   17.0401
    5.1974
    2.3712


e1 =

    5.6224
   27.0128
  290.3648


e2 =

    5.6224
   27.0128
  290.3648

>>
```

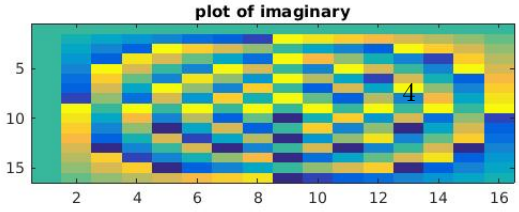
```
clc;
clear all;
x = [1 1 4 -4 -3 2 5 -6 3 2 4 -2 5 9 -8 4]';
F = dftmtx(length(x));
X = F*x;
r = real(F);
a = angle(F);
figure;
subplot(211);
plot(r);
title('Real part of F');
ylabel('Amplitude of real');
xlabel('n');
subplot(212);
plot(a);
title('Imaginary part of F');
xlabel('n');
ylabel('Amplitude of imaginary');

figure;
subplot(211);
imagesc(r);
title('plot of real');
subplot(212);
imagesc(a);
title('plot of imaginary');
```

report4.m



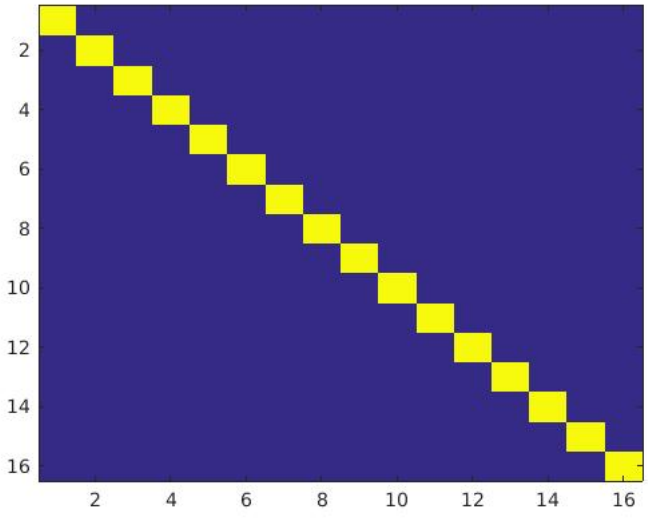






```
clc;
clear all;
x = [1 1 4 -4 -3 2 5 -6 3 2 4 -2 5 9 -8 4]';
F = dftmtx(length(x));
Fh = (1/length(x))*F';
A = Fh*F;
figure;
subplot(211);
plot(abs(A));
subplot(212);
plot(angle(A));

figure;
imagesc(abs(A));
```

report5.m



```
clc;
clear all;
X = loadImages('yalefaces');
Y = compMeanVec(X);
Z = reshape(Y,[60,80]);
imagesc(Z);
colormap gray
```

report6.m

```
function [ Y ] = compMeanVec( X )

sum = zeros(1,4800);
for i=1:165
    sum = sum + X(i,:);
end
sum = sum/165;
Y = sum;
end
```

compMeanVec.m