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Lab 2 Jesse Layman SID: 861135479

```
% Professor: Ertem Tuncel,  
% TA: Ceren Sevinc,  
% EE141-022  
close all  
clear all
```

a)

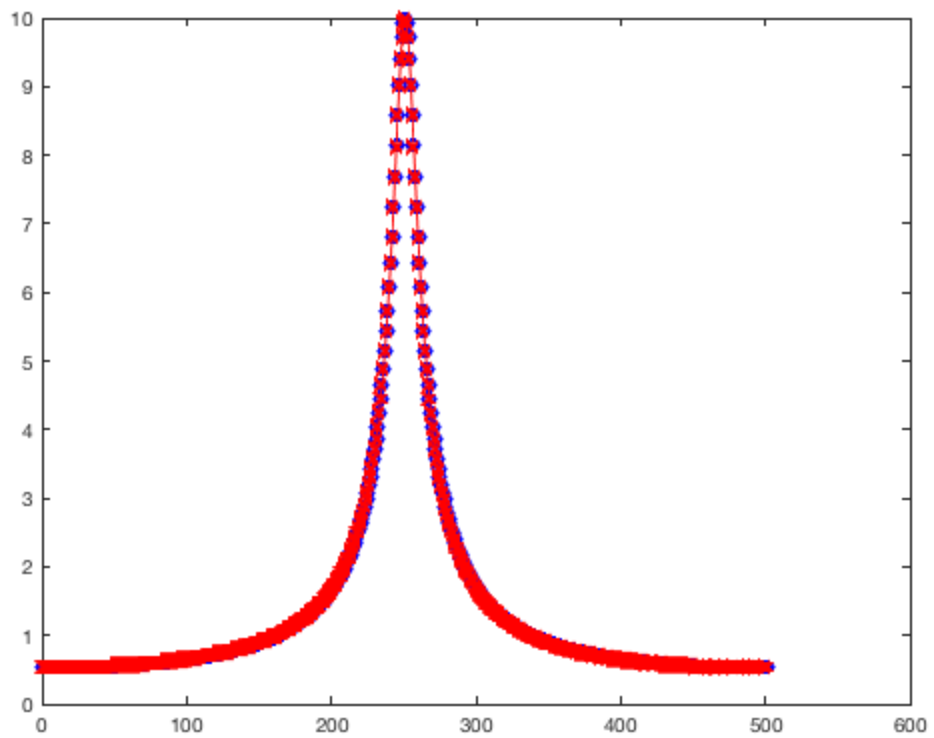
```
j = sqrt(-1);  
n = 0:1000;  
K = 501;  
w_k = linspace(-pi,pi,K);  
x = 0.9.^n;  
for k = 1:K  
    X(k) = sum(x.*exp(-j.*w_k(k).*n));  
end
```

b)

```
n_1 = 0:100;  
x_1 = 0.9.^n_1;  
for k = 1:K  
    XX(k) = sum(x_1.*exp(-j.*w_k(k).*n_1));  
end
```

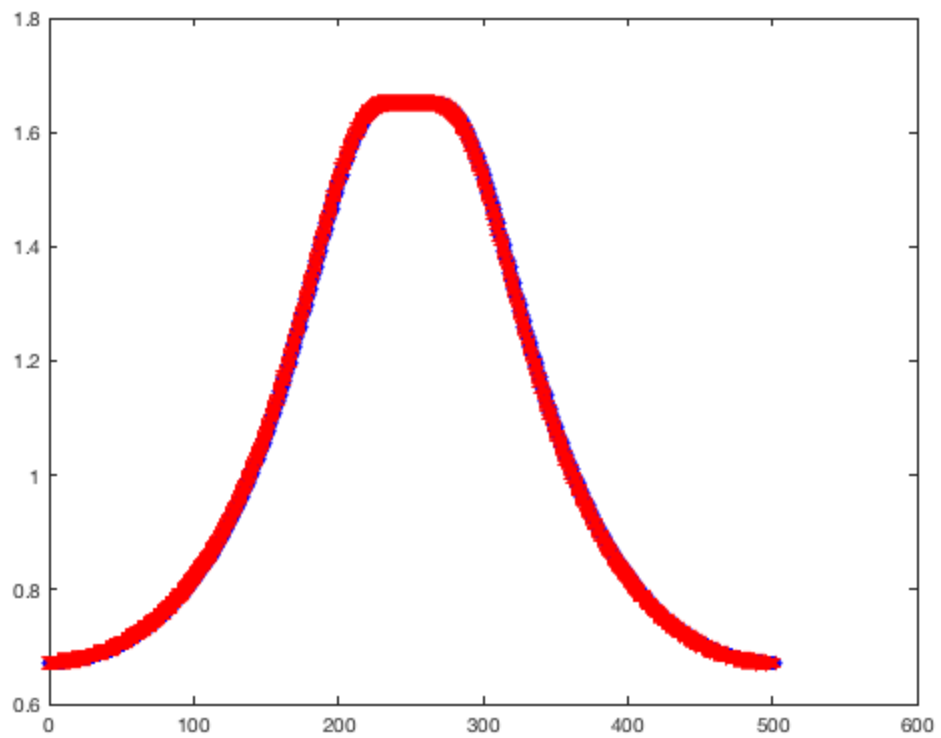
c)

```
figure  
plot(abs(X), 'b-o');  
hold on  
plot(abs(XX), 'r-x');
```



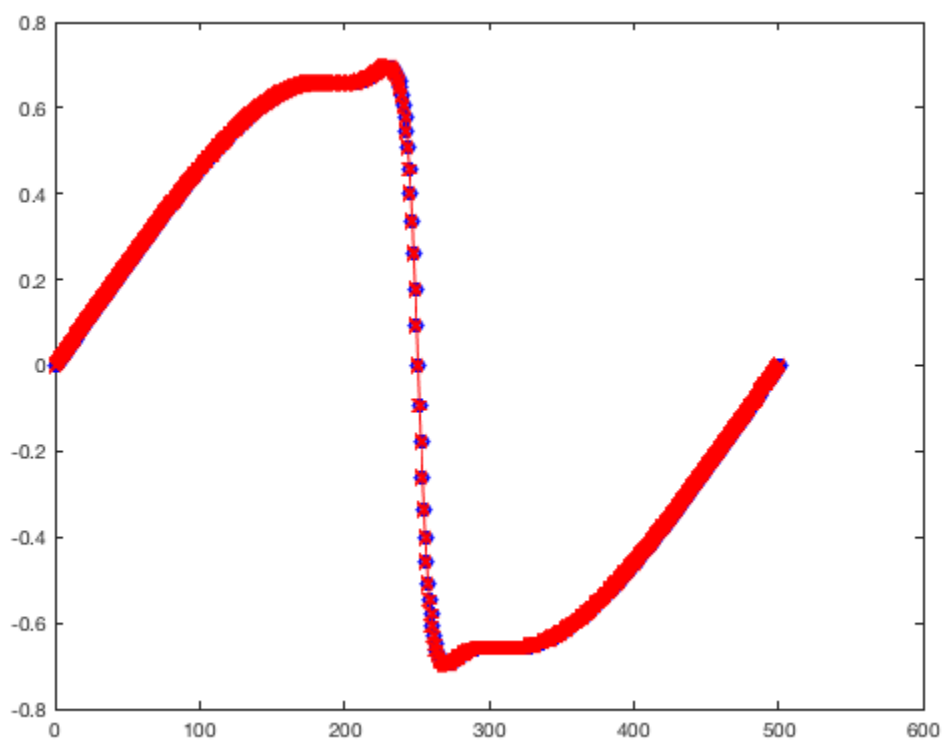
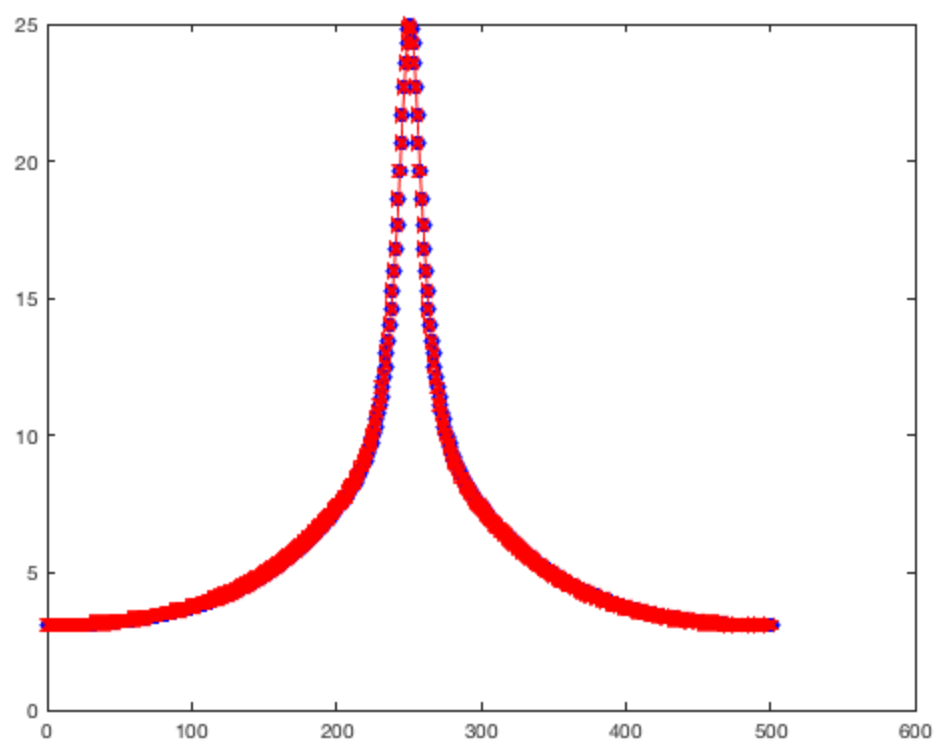
d)

```
y = 0.5.^n.*cos((pi*n)/8);
for k = 1:K
    Y(k) = sum(y.*exp(-j.*w_k(k).*n));
end
y_1 = 0.5.^n_1.*cos((pi*n_1)/8);
for k = 1:K
    YY(k) = sum(y_1.*exp(-j.*w_k(k).*n_1));
end
figure
plot(abs(Y), 'b-o');
hold on
plot(abs(YY), 'r-x');
```



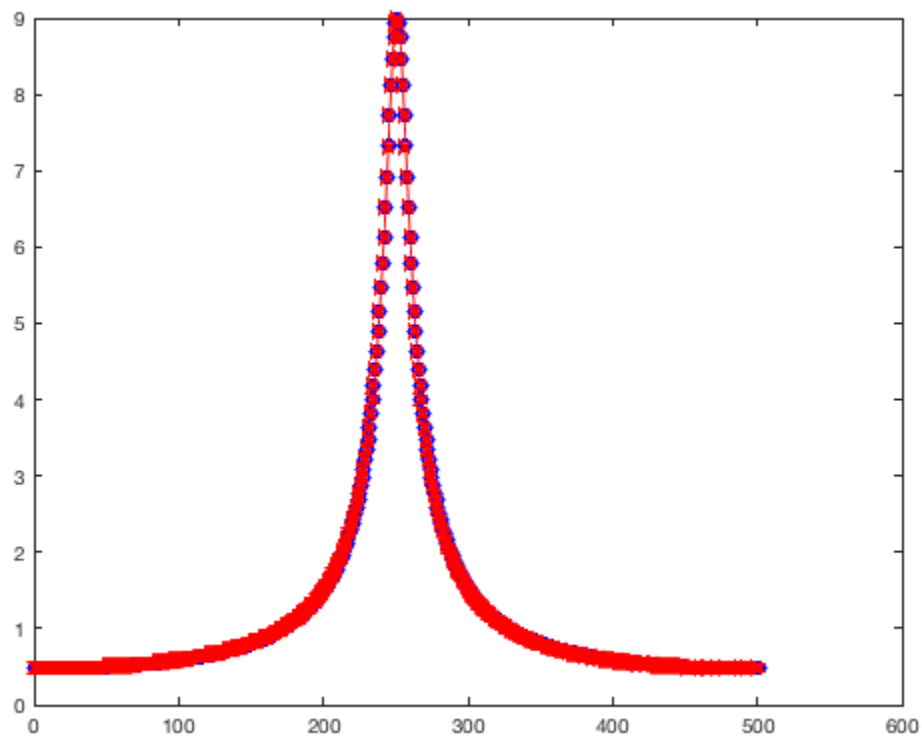
e)

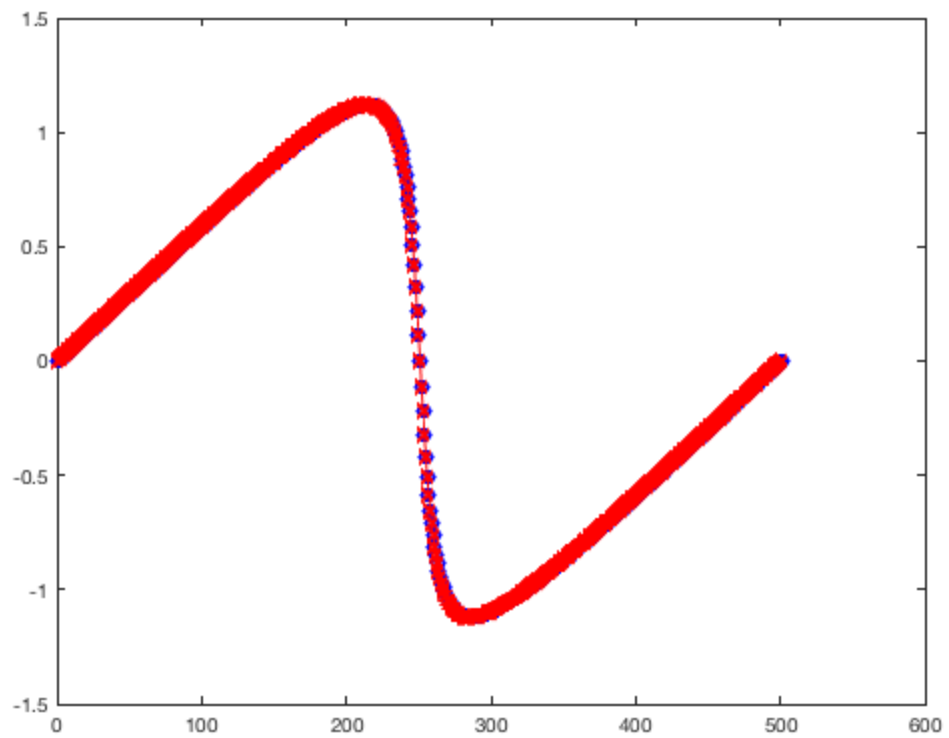
```
z = 2*x+3*y;  
for k = 1:K  
    Z(k) = sum(z.*exp(-j.*w_k(k).*n));  
end  
z_1 = 2*x_1+3*y_1;  
for k = 1:K  
    ZZ(k) = sum(z_1.*exp(-j.*w_k(k).*n_1));  
end  
figure  
plot(abs(Z), 'b-o');  
hold on  
plot(abs(ZZ), 'r-x');  
figure  
plot(angle(Z), 'b-o');  
hold on  
plot(angle(ZZ), 'r-x');
```



f)

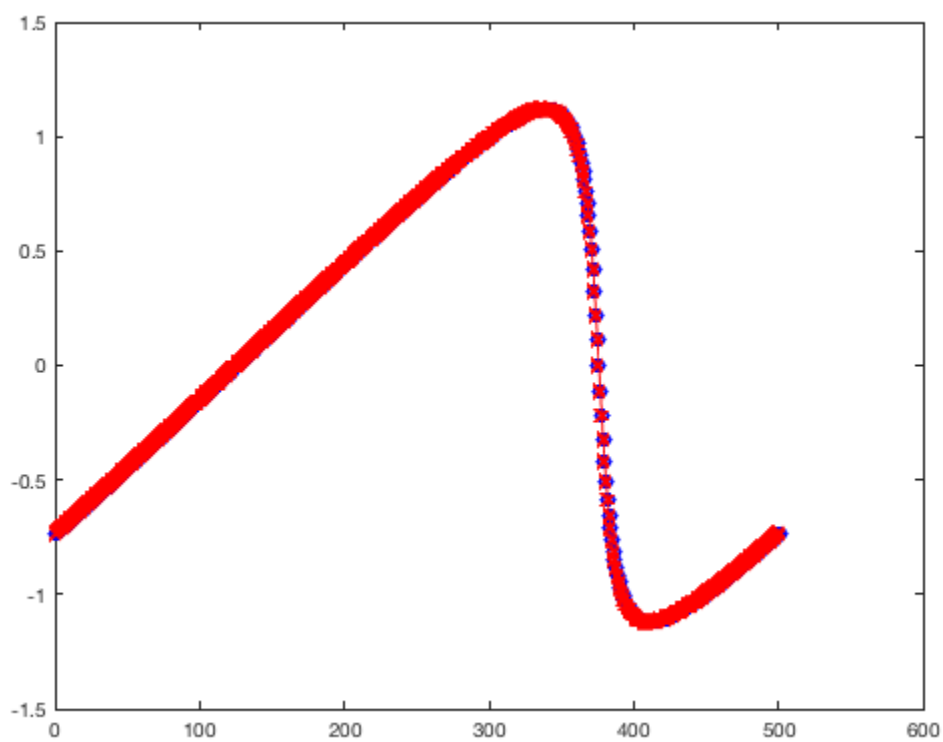
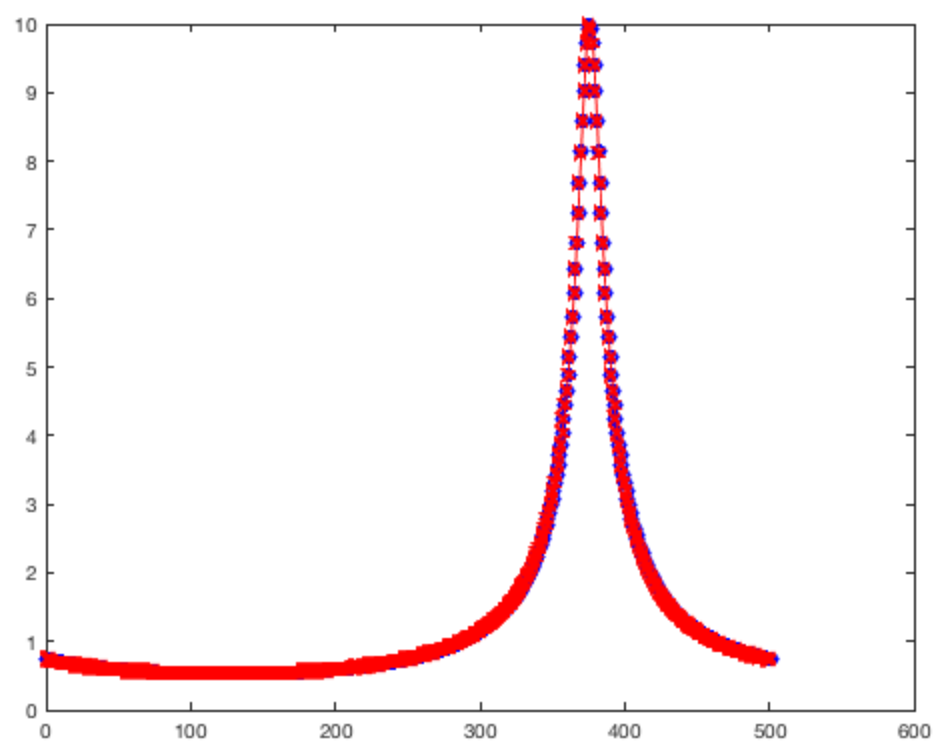
```
zf = 0.9.^(n+1);  
for k = 1:K  
    Zf(k) = sum(zf.*exp(-j.*w_k(k).*n));  
end  
zf_1 = 0.9.^(n_1+1);  
for k = 1:K  
    ZZf(k) = sum(zf_1.*exp(-j.*w_k(k).*n_1));  
end  
figure  
plot(abs(Zf), 'b-o');  
hold on  
plot(abs(ZZf), 'r-x');  
figure  
plot(angle(Zf), 'b-o');  
hold on  
plot(angle(ZZf), 'r-x');
```





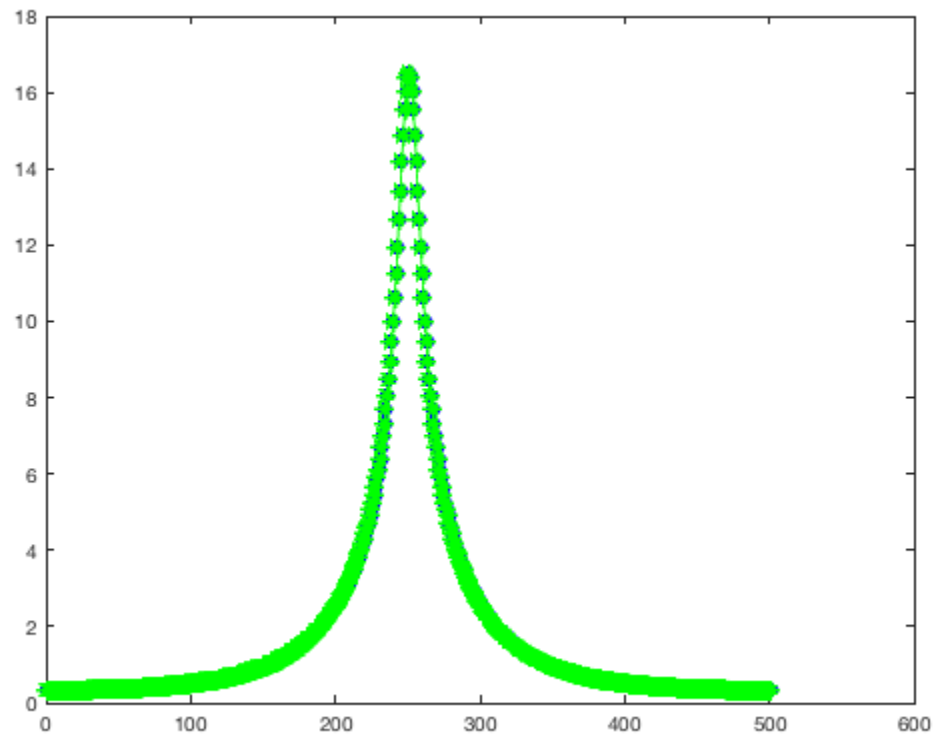
g)

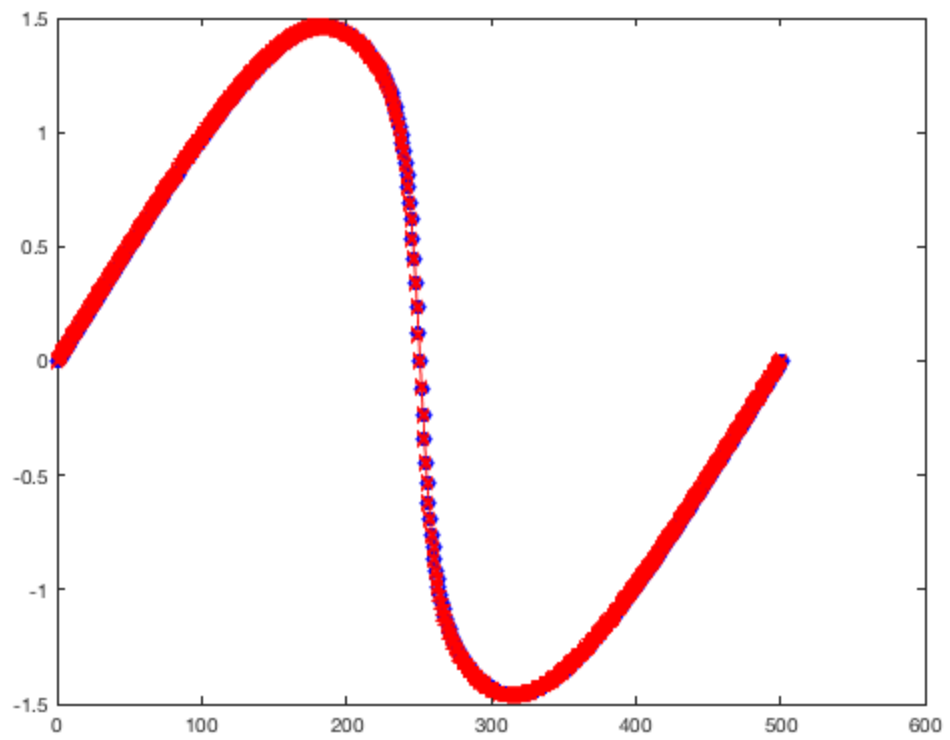
```
zg = exp(j*(pi/2).*n).*0.9.^n;
for k = 1:K
    Zg(k) = sum(zg.*exp(-j.*w_k(k).*n));
end
zg_1 = exp(j*(pi/2).*n_1).*0.9.^n_1;
for k = 1:K
    ZZg(k) = sum(zg_1.*exp(-j.*w_k(k).*n_1));
end
figure
plot(abs(Zg), 'b-o');
hold on
plot(abs(ZZg), 'r-x');
figure
plot(angle(Zg), 'b-o');
hold on
plot(angle(ZZg), 'r-x');
```



h)

```
zh = X.*Y;  
zh_1 = XX.*YY;  
zhh=conv(x,y);  
nn=0:2000;  
for k = 1:K  
    ZZh(k) = sum(zhh.*exp(-j.*w_k(k).*nn));  
end  
  
figure  
plot(abs(zh), 'b-o');  
hold on  
plot(abs(zh_1), 'r-x');  
plot(abs(ZZh), 'g-*')  
figure  
plot(angle(zh), 'b-o');  
hold on  
plot(angle(zh_1), 'r-x');
```





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