Digital Signal Processing ▸ Matlab ▸

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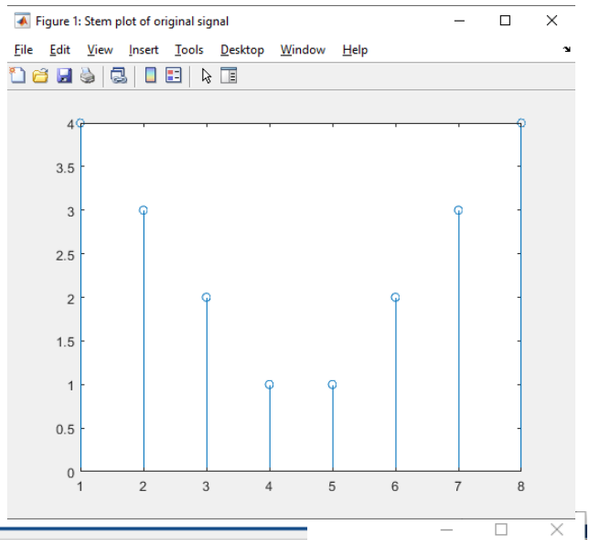
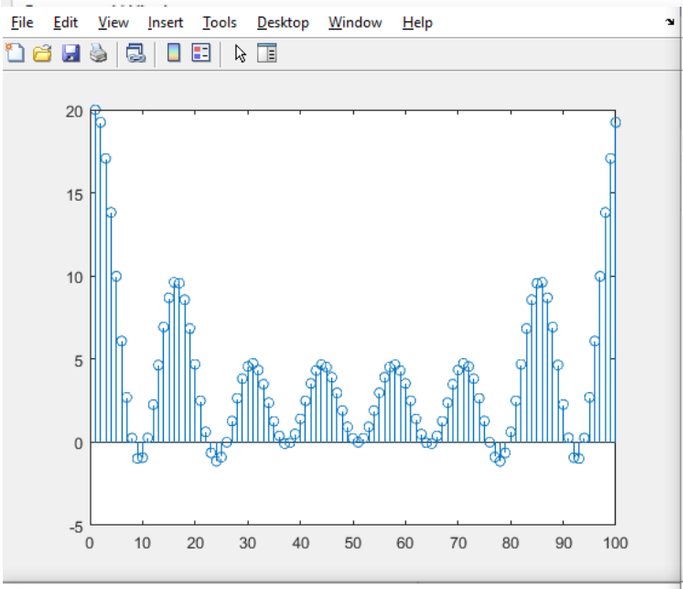
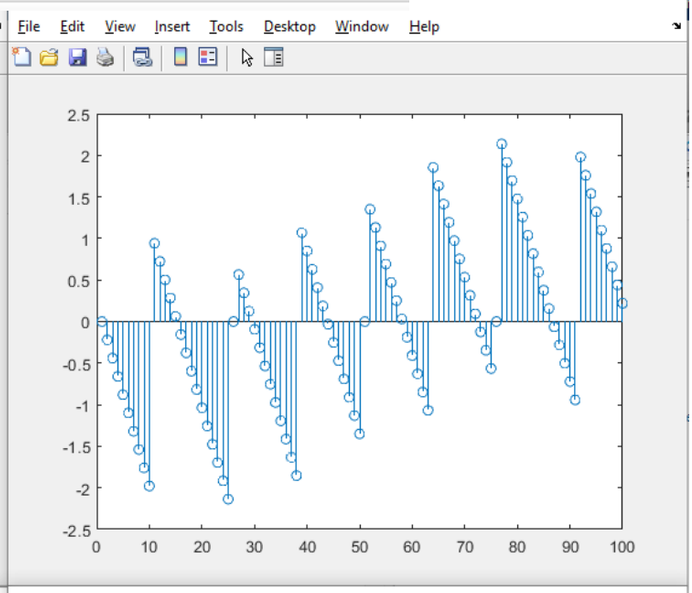
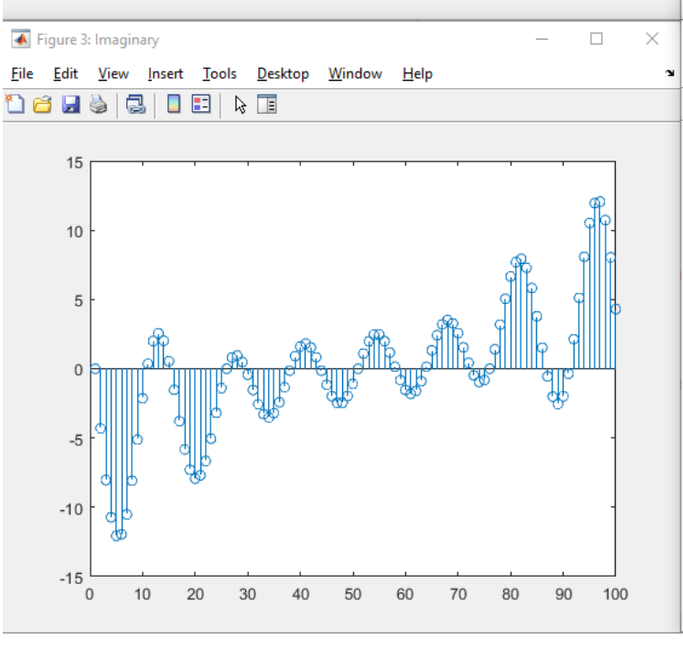
Baliguat_Exercise_4.m | Baliguat_Exercise_5.m*

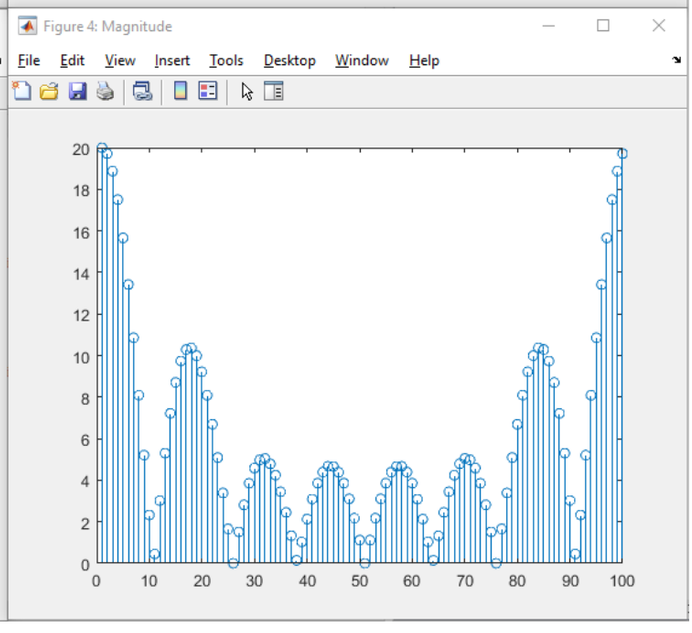
```
%Baliguat, Dennis Ivan C.
% MATLAB Exercise: Plot the real, imaginary, magnitude, and
% phase of the DTFT of the following signal:
% 1. x(n) = {4, 3, 2, 1, 1, 2, 3, 4}. Comment on the angle plot.
%            ↑

x = [4 3 2 1 1 2 3 4];
figure('Name','Stem plot of original signal');
stem(x);
N = 100;
X = fft(x,N);
figure('Name','Real');
stem(real(X));
figure('Name','Imaginary');
stem(imag(X));
figure('Name','Magnitude');
stem(abs(X));
figure('Name','Phase');
stem(angle(X));


```











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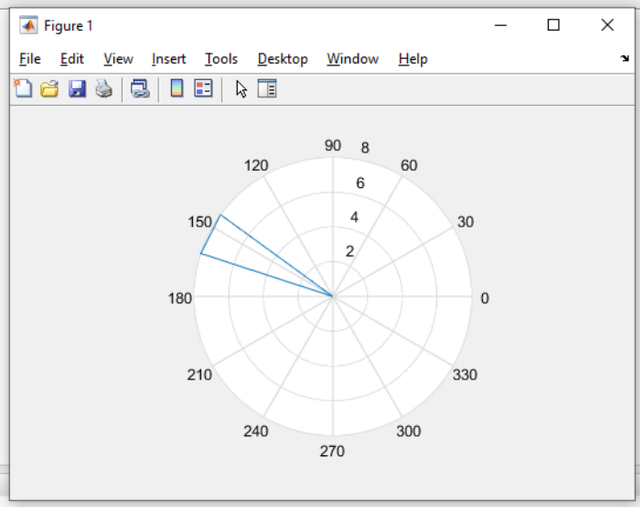
Baliguat_Exercise_5.m | Baliguat_Exercise_5_1.m

```
%Baliguat, Dennis Ivan C.
% MATLAB Exercise: Plot the real, imaginary, magnitude, and
% phase of the DTFT of the following signal:
% 1. x(n) = {4, 3, 2, 1, 1, 2, 3, 4}. Comment on the angle plot.
%           ?

clear
clc
f = 1/2*pi;
x2 = [4 3 2 1 1 2 3 4];
n = length(x2);
X = [];
% X = zeros(length(n));
for N = 1:n
    X(N) = (x2(N)*exp((-2i*pi*f)*n));
end
angle(X)
rose(angle(X))
% k
```



Command Window

```
ans =

    2.7246    2.7246    2.7246    2.7246    2.7246    2.7246    2.7246    2.7246
```

2.

Digital Signal Processing ▸ Matlab ▸

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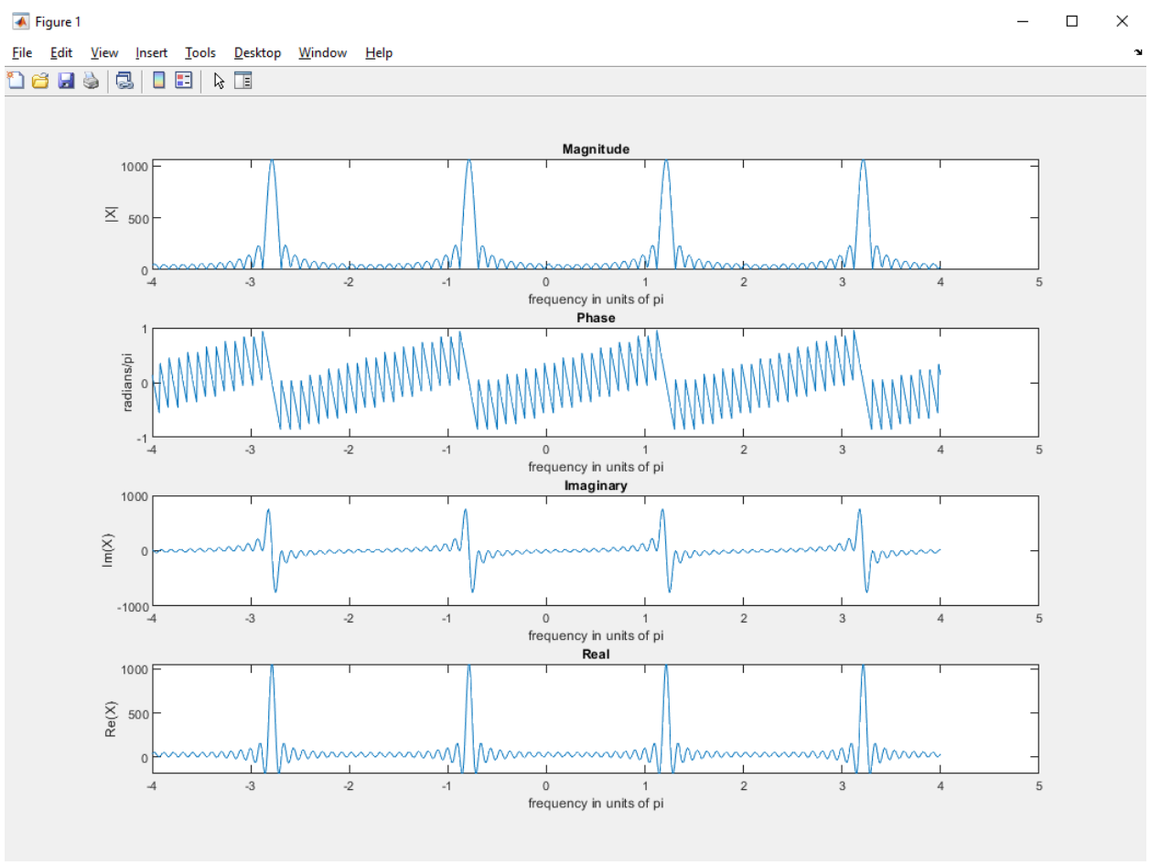
Baliguat_Exercise_5.m | Baliguat_Exercise_5_1.m

```
%Baliguat, Dennis Ivan C.
% x(n) = [cos(0.5πn) + j sin(0.5πn)][u(n) − u(n − 51)]. Comment on the magnitude
% plot.

clear
clc
f = 1/2*pi;
n = 0:20;
k = -400:400;
w = (pi/100)*k;
x = exp((-0.5i*pi*f)*n).*(1-(1-51));
X = x * (exp(-1j*pi/100)) .^ (n'*k);
magX = abs(X);
angX = angle(X);
XI = imag(X);
XR = real(X);
subplot(4,1,1); plot(w/pi,magX); xlabel('frequency in units of pi'); ylabel('|X|'); title('Magnitude');
subplot(4,1,2); plot(w/pi,angX/pi); xlabel('frequency in units of pi'); ylabel('radians/pi'); title('Phase');
subplot(4,1,3); plot(w/pi,XI); xlabel('frequency in units of pi'); ylabel('Im(X)'); title('Imaginary');
subplot(4,1,4); plot(w/pi,XR); xlabel('frequency in units of pi'); ylabel('Re(X)'); title('Real');
```



3.

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Baliguat_Exercise_5.m | Baliguat_Exercise_5_1.m

```
%Baliguat, Dennis Ivan C.
% x(n) = r x(n) = 2 (0.5^)3 u(n + 2)
% plot.

clear
clc
f = 1/2*pi;
n = 0:20;
k = -400:400;
w = (pi/100)*k;
x = (2*(0.5)^3)*(n+2);
X = x * (exp(-1j*pi/100)) .^ (n'*k);
magX = abs(X);
angX = angle(X);
XI = imag(X);
XR = real(X);
subplot(4,1,1); plot(w/pi,magX); xlabel('frequency in units of pi'); ylabel('|X|'); title('Magnitude');
subplot(4,1,2); plot(w/pi,angX/pi); xlabel('frequency in units of pi'); ylabel('radians/pi'); title('Phase');
subplot(4,1,3); plot(w/pi,XI); xlabel('frequency in units of pi'); ylabel('Im(X)'); title('Imaginary');
subplot(4,1,4); plot(w/pi,XR); xlabel('frequency in units of pi'); ylabel('Re(X)'); title('Real');
```

Figure 1

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