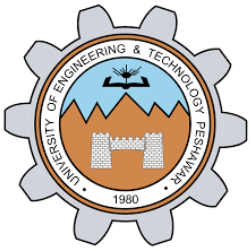
Digital Signal Processing

Assignment 01



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Section: "A"

"On my honor, as student at University of Engineering and Technology, I have neither given nor received unauthorized. assistance on this academic work"

Student Signature: _____

Submitted to:

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OBJECTIVE:

The objective of studying exponential sequences lies in their pivotal role in signal analysis and processing. Real exponential sequences are fundamental in modeling signal dynamics, while complex exponentials are essential for frequency domain analysis. This knowledge is used for effective modeling and analysis of signal behavior.

Task:

Write MATLAB code to generate output graphs for exponential sequences for Real and Complex Paraments.

Using Equations x[n] = A α^n for Real Graphs. Let A=1.5, n= -10 to 10

Code:

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Real.m

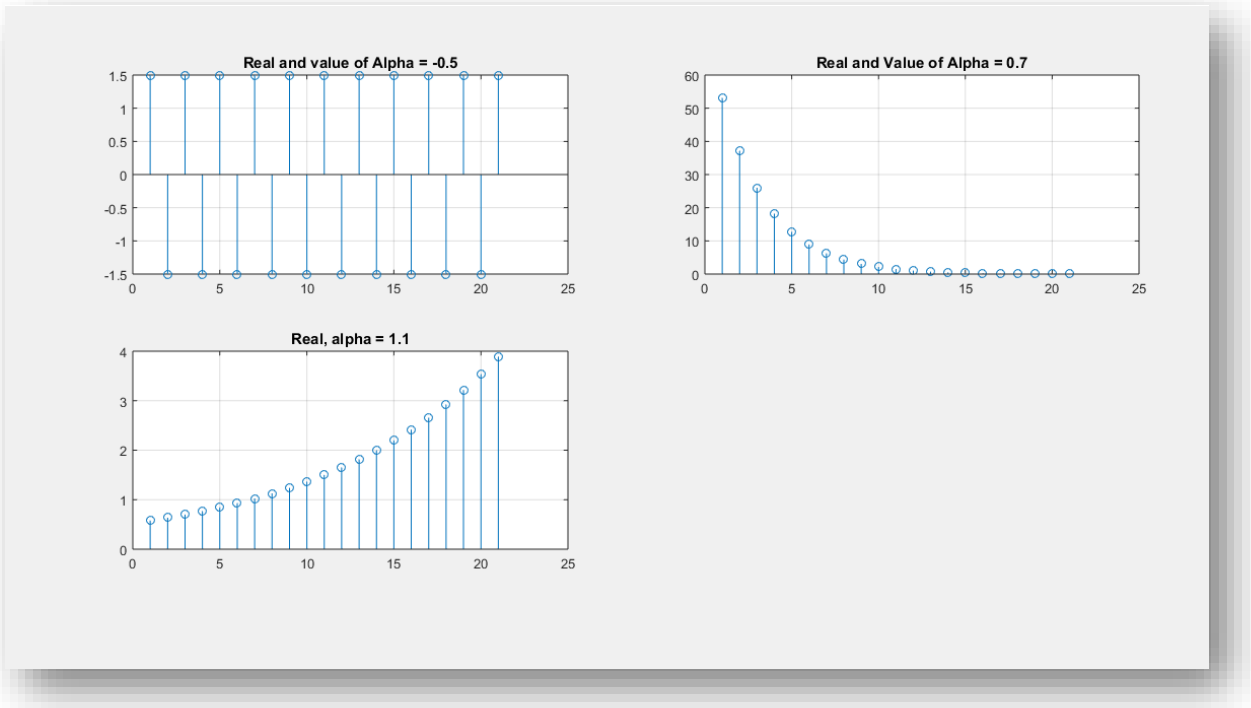
```
% Task1
clc
clear all
% x[n] = a^n;
n = -10:10;
alpha = -1;
A = 1.5;

real_x= A*alpha.^n;
subplot(3,2,1);
stem(real(real_x));
title('Real and value of Alpha = -0.5');
grid on

alpha_1 = 0.7;
real_x = A*alpha_1.^n;
subplot(3,2,2);
stem(real(real_x));
title('Real and Value of Alpha = 0.7');
grid on

alpha_2=1.1;
x_real=A*alpha_2.^n;
subplot(3,2,3)
stem(real(x_real));
title('Real, alpha = 1.1');
grid on;
```

Output:


Real and value of Alpha = -0.5
Real and Value of Alpha = 0.7
Real, alpha = 1.1

Code:

Using Equations x[n]=|A |e j(ω0n+ϕ) = |A | cos (ω0n + ϕ) + j |A |sin (ω0n + ϕ)
for Complex Graphs.

Let A=2, n= -10 to 10

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Exponentail.m

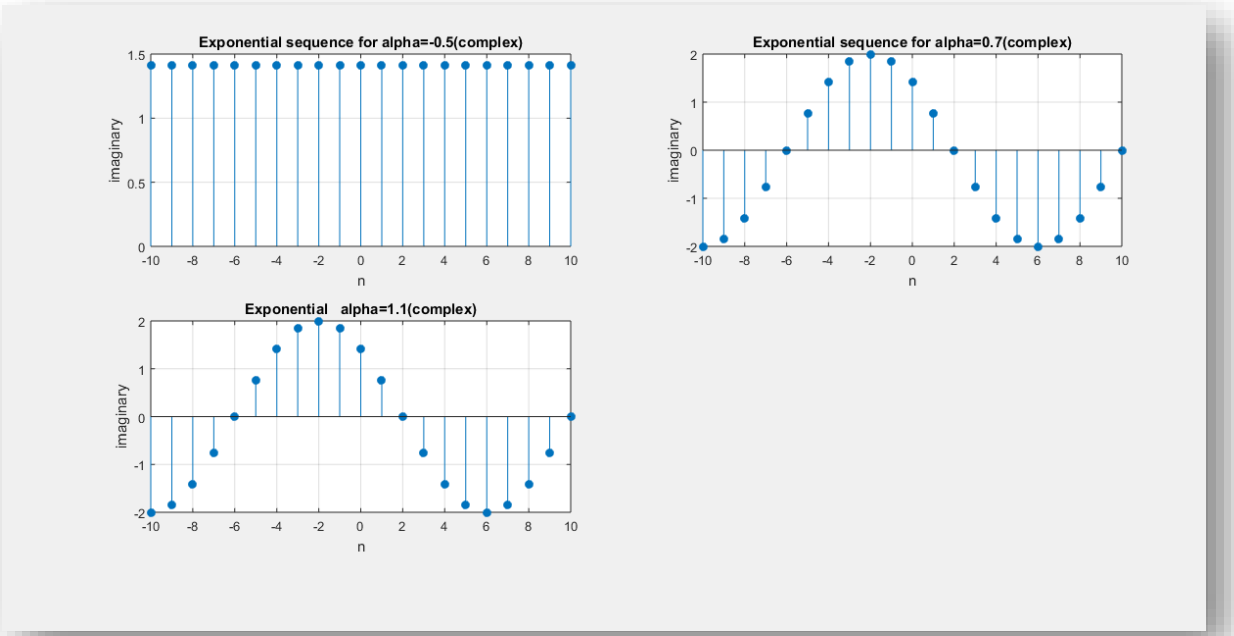
```
%Task 2
clc
clear all
A = 2;
n = -10:10;
alpha=1.1;
w=(15*pi)/8;
theta=pi/4;


alpha=-0.5;
w=0;
theta=pi/4;
x=abs(A)*cos(w*n+theta)+1j*abs(A)*sin(w*n+theta);
subplot(3,2,1);
stem(n,x,'filled');
title('Exponential sequence for alpha=-0.5(complex)');
xlabel('n')
ylabel('imaginary');
grid on;

alpha=0.7;
w=pi/8;
theta=pi/4;
x=abs(A)*cos(w*n+theta)+1j*abs(A)*sin(w*n+theta);
subplot(3,2,2);
stem(n,x,'filled');
title('Exponential sequence for alpha=0.7(complex)');
xlabel('n')
ylabel('imaginary');
grid on;

x=abs(A) * cos(w*n+theta) + 1j* abs(A) * sin(w*n+theta);
subplot(3,2,3);
stem(n,x,'filled');
title('Exponential   alpha=1.1(complex)');
xlabel('n')
ylabel('imaginary');
grid on;
```

Output:


Exponential sequence for alpha=-0.5(complex)
imaginary
n
Exponential sequence for alpha=0.7(complex)
imaginary
n
Exponential alpha=1.1(complex)
imaginary
n