Independent University Bangladesh

Department of Electrical and Electronics Engineering

Lab Report 06

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Course code: EEE 321L

Couse name: Digital Signal Processing Lab

Lab no: 06

Lab title: Study on z-transform

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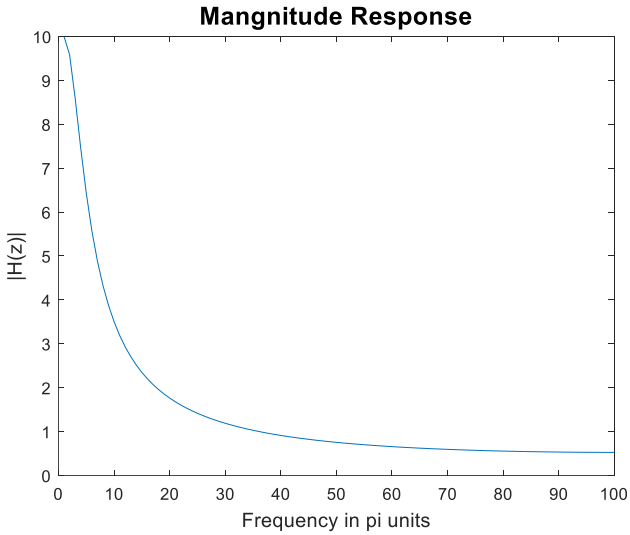
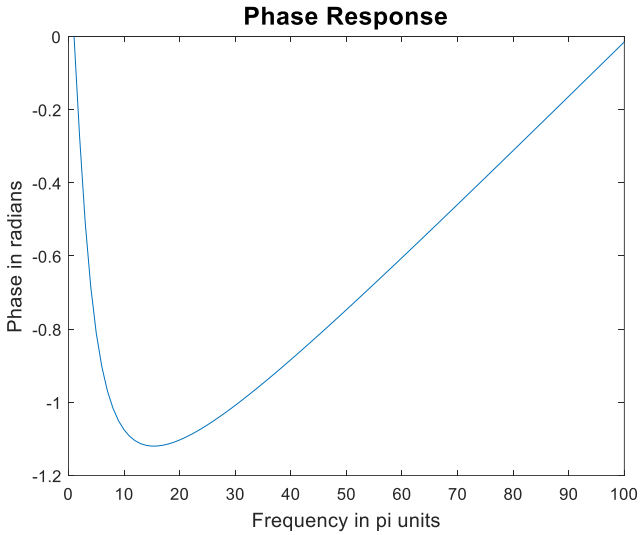
a) Frequency response and pole-zero plot for y(n) = 0.9y(n–1) + x(n)

Code:

```
% coefficients from differnece equation
b = [1 0];
a = [1 -0.9];
% points of frequency vector
w = 100;
% compute frequency response
[H, w] = freqz(b,a,w);
% zerp-pole plot
zplane(a,b)
% magnitude and phse response
mag = abs(H);
phase = angle(H);
% plotting
figure(2); plot(mag)
title('Mangnitude Response','fontsize',15)
xlabel('Frequency in pi units','fontsize',12)
ylabel('|H(z)|','fontsize',12)
figure(3); plot(phase)
title('Phase Response','fontsize',15)
xlabel('Frequency in pi units','fontsize',12)
ylabel('Phase in radians','fontsize',12)
```

Outputs:





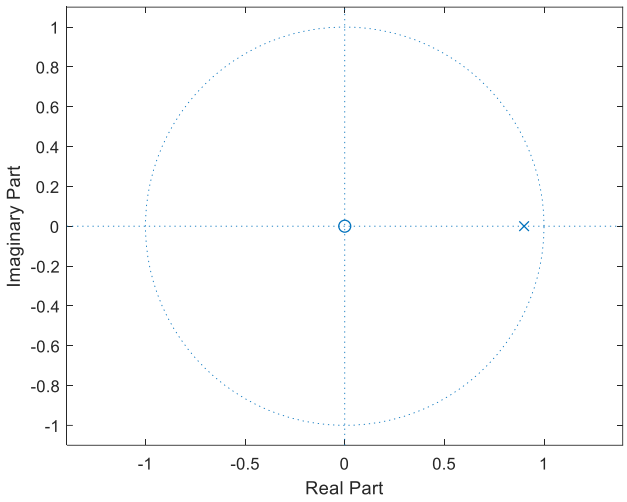


Figure: Pole-zero plot

b) Assignment:

i. Function definition:

```
% function to compute frequency response from difference equation coefficients
function [mag, ph]= fResponse(b,a)
w = 100;     % frequency vector points
[H, w] = freqz(b,a,w);
% magnitude and phse response
mag = abs(H);
ph = angle(H);
% plotting
plot(mag)
title('Mangnitude Response','fontsize',15)
xlabel('Frequency in pi units','fontsize',12)
ylabel('|H(z)|','fontsize',12)
figure(2); plot(ph)
title('Phase Response','fontsize',15)
xlabel('Frequency in pi units','fontsize',12)
ylabel('Phase in radians','fontsize',12)
end
```

ii. Call and output:

Code:

```
% assignment: y(n) = 0.9y(n-1) + 2x(n)
b = [2 0];
a = [1 -0.9];
[mag, phase] = fResponse(b,a);
```

Outputs: