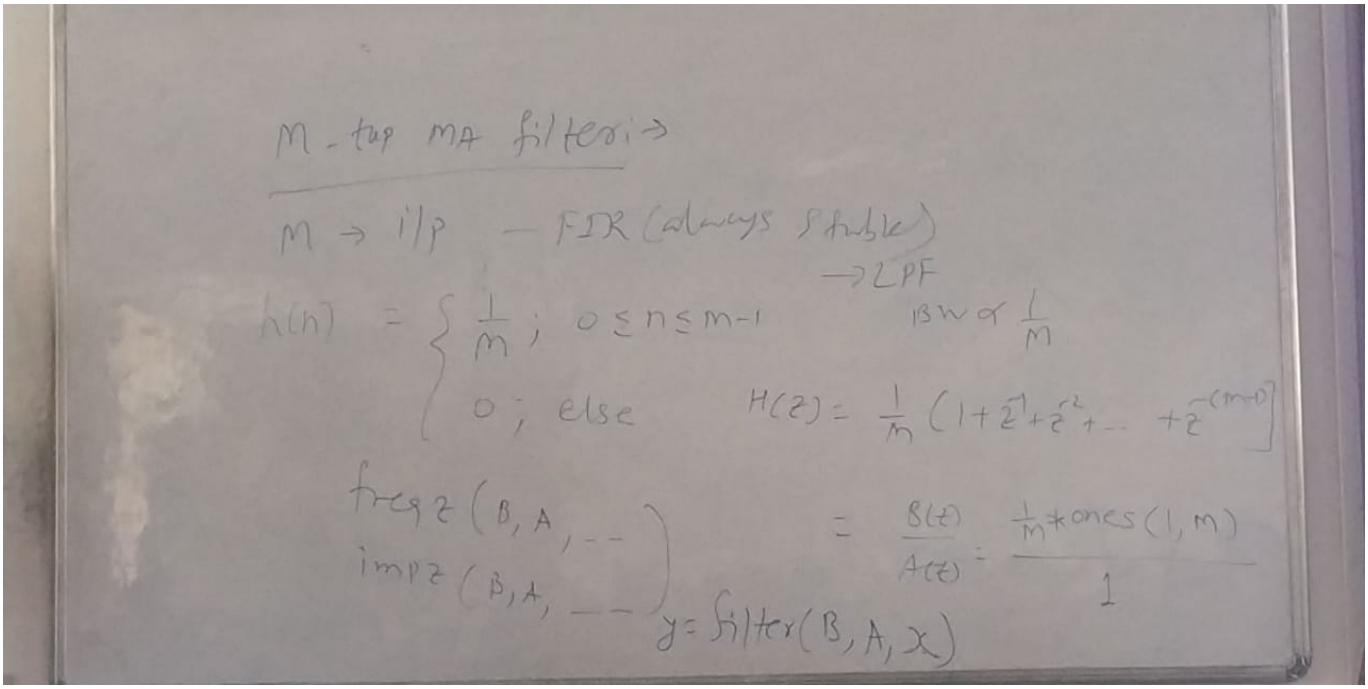
Experiment 4

1) For M-tap moving average filter, plot the magnitude and phase response for different values of M using MATLAB.

Note: Use inbuilt function: freqz.



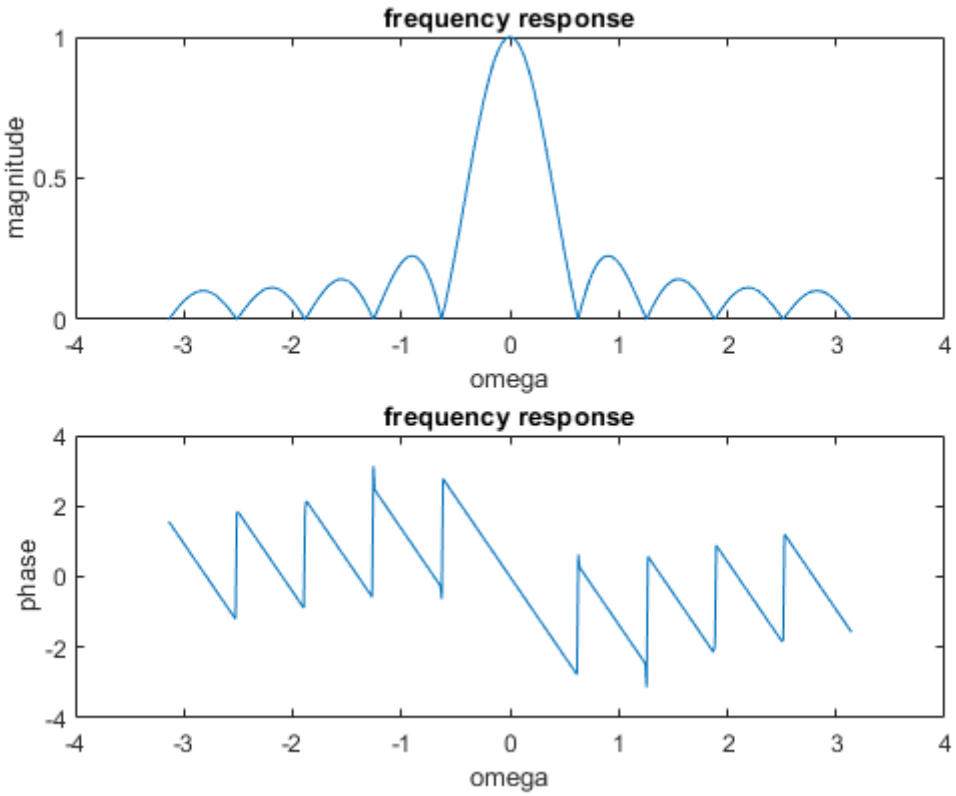

```
M = input('Enter the value of M:');
B = 1/M*ones(1,M);
A = input('Denominator cofficient :');
N=M-1;

W = -pi:pi/255:pi;
H = freqz(B,A,W);

figure(1)

subplot(2,1,1);
plot(W,abs(H));
title('frequency response');
xlabel('omega');
ylabel('magnitude');

subplot(2,1,2);
plot(W,angle(H));
title('frequency response');
xlabel('omega');
ylabel('phase');
```



Input:

```
Enter the value of M:10
Denominator cofficient :1
```

2) Write a MATLAB program to generate a signal x(n)=2n (0.95) n ; 0≤n≤99. Corrupt it by additive random noise with amplitude in interval [-0.5 0.5]. Apply the signal to a Moving average filter with given tap length. Plot the input signal,noise signal, corrupted signal and filtered signal in same plot. Use proper labels and legends.

Note: Use inbuilt functions: rand, filter

```
M = input('Enter the value of M:');
B = 1/M*ones(1,M);
A = 1;
figure(1)
b = 0.5;
a = -0.5;
r = a + (b-a).*rand(100,1);
X_C=2*r.*(0.95).^r;
w=[0:99];
X=2*w.*(0.95).^w;
t = 1:length(X);
X_noise=X+X_C';
Y = filter(B,A,X_noise);
```

```
plot(t,X_C,'-',t,Y,'-',t,X,'-.',t,X_noise,'-');
legend('Corrupted Signal','Filtered Signal',"Input Signal","Noise Signal")
```

Input:

```
Enter the value of M:13
```

Output: