**Code**

clc

clear all

close all

A= 2;

B=0;

C=4;

D=2;

E=6;

F=2;

G=2;

H=1;

fs=10000;

t=0:1/fs:6;

a1=3;

a2=5;

a3=9;

a4=7;

f1=7;

f2=9;

f3=11;

f4=13;

x1 = a1\*cos(2\*pi\*f1\*t);

x2 = a2\*sin(2\*pi\*f2\*t);

x3 = a3\*cos(2\*pi\*f3\*t);

x4 = a4\*cos(2\*pi\*f4\*t);

signal\_x = x1 + x2 + x3+ x4;

subplot(2,1,1)

plot(t,signal\_x,'Linewidth',1);

xlabel('Time')

ylabel('Amplitude')

title('Time Domain')

fx = abs(fftshift(fft(signal\_x))) / ( length(signal\_x)/2);

freq = linspace(-fs/2 , fs/2, length(signal\_x));

subplot(2,1,2)

bar(freq,fx,'Linewidth',1)

xlim([-18, +18])

xlabel('Frequency')

ylabel('Amplitude')

title('Frequency Domain')

%noise

sd = 15;

noise = sd\*randn(size(signal\_x)); % noise power = sd^15

figure

subplot(2,1,1)

plot(t,noise, 'linewidth', 1)

xlabel('Time (s)');

ylabel('Amplitude');

title('Time-Domain Representation of Noise');

fftNoise = fft(noise);

fftNoise = fftshift(fftNoise)/(length(signal\_x)/2);

subplot(2,1,2)

%noisy signal

bar(freq,abs(fftNoise), 'linewidth', 2)

title('Frequency-Domain Representation of Noise');

xlabel('Frequency (Hz)');

ylabel('Amplitude');

xlim([-18,+18])

noisySignal = signal\_x + noise;

figure

subplot(2,1,1)

plot(t,noisySignal, 'linewidth', 1)

xlabel('Time (s)');

ylabel('Amplitude');

title('Time-Domain Representation of Noisy Signal');

fftNoisySignal = fft(noisySignal);

fftNoisySignal = fftshift(fftNoisySignal)/(length(signal\_x)/2);

subplot(2,1,2)

bar(freq,abs(fftNoisySignal), 'linewidth', 2)

title('Frequency-Domain Representation of Noisy Signal');

xlabel('Frequency (Hz)');

ylabel('Amplitude');

xlim([-18 ,+18])





