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SECTION - 1

**TASK-1**

clear all

close all

bin\_name=dec2bin('raunak sharma');

ran\_sig=reshape(bin\_name,1 ,[]);

num\_char=size(bin\_name,1);

num\_bits=7\*num\_char;

w=1/2;

i=0;

m\_est\_array=[];

dec\_point\_array=[];

y=[];

k1=0;

y\_dec=0;

isi\_term=0;

for T = 0:w:num\_bits\*w-w %%%% Duration 30 seconds with interval of 1 sec.

f=100;

fs=5\*f;

ts=1/fs;

t = T:ts:T+w;

i=i+1;

if ran\_sig (i)=='1'

m\_t = rectpuls(t-T,2\*w);

n\_t = 0.1\*randn(1,length(m\_t));

end

if ran\_sig (i)=='0'

m\_t = -1\*rectpuls(t-T,2\*w);

n\_t = 0.1\*randn(1,length(m\_t));

end

%%%h\_t=delta(t)

y\_t=m\_t+n\_t;

N=length(m\_t) ;

m\_f=fft(m\_t)/(N);

y\_f= fft(y\_t)/N;

freqaxis=linspace(-fs/2,fs/2, N);

figure(1)

hold all %%% keeps the previous plots and everytime changes the color

subplot(2,1,1), plot(t,m\_t);

title('signal in time m (t)')

xlabel('time')

ylabel('amplitude')

grid on

axis([-inf inf -inf inf]) %%% first two are limits for x-axis, the other two are limits for y-axis: observe why 0 inf , and -5 5 are used here.

hold on %%% keeps the previous plots

subplot(2,1,2), plot(freqaxis,fftshift(abs(m\_f)))

title('signal in frequency M(f)')

xlabel('frequency (Hz)')

ylabel('Magnitude')

grid on

axis([-inf inf -inf inf]) %%% first two are limits for x-axis, the other two are limits for y-axis: observe why -inf inf , and 0 3 are used here.

figure(3)

hold all %%% keeps the previous plots and everytime changes the color

t\_index=t;

subplot(2,1,1), plot(t\_index,y\_t);

title('signal in time y(t)')

xlabel('time')

ylabel('amplitude')

grid on

axis([-inf inf -inf inf]) %%% first two are limits for x-axis, the other two are limits for y-axis: observe why 0 inf , and -5 5 are used here.

hold on %%% keeps the previous plots

subplot(2,1,2), plot(freqaxis,fftshift(abs(m\_f)))

title('signal in frequency Y(f)')

xlabel('frequency (Hz)')

ylabel('Magnitude')

grid on

axis([-inf inf -inf inf]) %%% first two are limits for x-axis, the other two are limits for y-axis: observe why -inf inf , and 0 3 are used here.

y= [y y\_t];

decision\_point=(k1)\*length(y\_t)+ceil (length(y\_t)/2);

dec\_point\_array=[dec\_point\_array decision\_point];

y\_dec= y(decision\_point);

if y\_dec>0

m\_est=1;

end

if y\_dec<0

m\_est=0;

end

k1=k1+1;

m\_est\_array= [m\_est\_array m\_est]

end

bin\_char=reshape(dec2bin(m\_est\_array),1,[]);

est\_bits=reshape(bin\_char,num\_char,7);

det\_name=reshape(char(bin2dec(est\_bits)),1,[])

% keyboard



