**QPSK Modulation**

clc;

clear all;

close all;

%GENERATE QUADRATURE CARRIER SIGNAL

Tb=1;t=0:(Tb/100):Tb;fc=1;

c1=sqrt(2/Tb)\*cos(2\*pi\*fc\*t);

c2=sqrt(2/Tb)\*sin(2\*pi\*fc\*t);

%generate message signal

N=8;m=rand(1,N);

t1=0;t2=Tb

for i=1:2:(N-1)

t=[t1:(Tb/100):t2]

if m(i)>0.5

m(i)=1;

m\_s=ones(1,length(t));

else

m(i)=0;

m\_s=-1\*ones(1,length(t));

end

%odd bits modulated signal

odd\_sig(i,:)=c1.\*m\_s;

if m(i+1)>0.5

m(i+1)=1;

m\_s=ones(1,length(t));

else

m(i+1)=0;

m\_s=-1\*ones(1,length(t));

end

%even bits modulated signal

even\_sig(i,:)=c2.\*m\_s;

%qpsk signal

qpsk=odd\_sig+even\_sig;

%Plot the QPSK modulated signal

subplot(3,2,4);plot(t,qpsk(i,:));

title('QPSK signal');xlabel('t---->');ylabel('s(t)');grid on; hold on;

t1=t1+(Tb+.01); t2=t2+(Tb+.01);

end

hold off

%Plot the binary data bits and carrier signal

subplot(3,2,1);stem(m);

title('binary data bits');xlabel('n---->');ylabel('b(n)');grid on;

subplot(3,2,2);plot(t,c1);

title('carrier signal-1');xlabel('t---->');ylabel('c1(t)');grid on;

subplot(3,2,3);plot(t,c2);

title('carrier signal-2');xlabel('t---->');ylabel('c2(t)');grid on;

**QPSK Demodulation**

t1=0;t2=Tb;

for i=1:N-1

t=[t1:(Tb/100):t2];

%correlator

x1=sum(c1.\*qpsk(i,:));

x2=sum(c2.\*qpsk(i,:));

%decision device

if (x1>0&&x2>0)

demod(i)=1;

demod(i+1)=1;

elseif (x1>0&&x2<0)

demod(i)=1;

demod(i+1)=0;

elseif (x1<0&&x2<0)

demod(i)=0;

demod(i+1)=0;

elseif (x1<0&&x2>0)

demod(i)=0;

demod(i+1)=1;

end

t1=t1+(Tb+.01); t2=t2+(Tb+.01);

end

subplot(3,2,5);stem(demod);

title('qpsk demodulated bits');xlabel('n---->');ylabel('b(n)');grid on;