% **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;
```