clc;

clear all;

close all;

pkg load communications;

N=3000;

x=randi([0,1],1,N);

M=8;

yy=[];

for i=1:3:length(x) if x(i)==0 && x(i+1)==0 && x(i+2)==0 y=cosd(0)+1j\*sind(0);

elseif x(i)==0 && x(i+1)==0 && x(i+2)==1 y=cosd(45)+1j\*sind(45);

elseif x(i)==0 && x(i+1)==1 && x(i+2)==1 y=cosd(90)+1j\*sind(90);

elseif x(i)==0 && x(i+1)==1 && x(i+2)==0 y=cosd(135)+1j\*sind(135);

elseif x(i)==1 && x(i+1)==1 && x(i+2)==0 y=cosd(180)+1j\*sind(180);

elseif x(i)==1 && x(i+1)==1 && x(i+2)==1 y=cosd(225)+1j\*sind(225);

elseif x(i)==1 && x(i+1)==0 && x(i+2)==1 y=cosd(270)+1j\*sind(270);

elseif x(i)==1 && x(i+1)==0 && x(i+2)==0 y=cosd(315)+1j\*sind(315);

endif

yy=[yy y];

endfor

scatterplot(yy);

title('Constellation diagram without Noise','FontSize',20);

xlabel('in-phase','FontSize',25);

ylabel('Quadrature','FontSize',25);

EbN0db=20;

EbN0=10^(EbN0db/10);

n=(1/sqrt(2))\*[randn(1,length(yy))+1j\*randn(1,length(yy))];

sigma=sqrt(1/((log2(M))\*EbN0));

r=yy+sigma\*n;

scatterplot(r);

title('Constellation diagram with noise','FontSize',20);

xlabel('In-phase','FontSize',25);

ylabel('Quadrature','FontSize',25);



