EXPT. NO. 5

Problem Statement: Write a program to plot a signal constellation diagram of received 8-PSK signal in the presence of AWGN.

clc;

clear all; close all;

pkg load communications

N = 3000; % Number of bits to be transmitted using \*-PSK

% Too large value may slow down the program

x = randi([0,1],1,N); % Random input bits generation M = 8; % Number of Symbols in 8-PSK

% Symbol Generation 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

% Transmitted Symbols yy = [yy y];

endfor

scatterplot(yy); % Constellation Diagram without Noise

EbN0db = 20; % Change this value & run program to see the noisy constellation.

EbN0 = 10^(EbN0dsb/10);

% AWGN Channel

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

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

% Received Symbols r = yy + sigma\*n;

scatterplot(r); % Constellation Diagram with Noise

