Experiment No.: 8

Title: Simulation Study of Performance of M-ary PSK.

MATLAB Code Example:

clc;

clear all;

Close all;

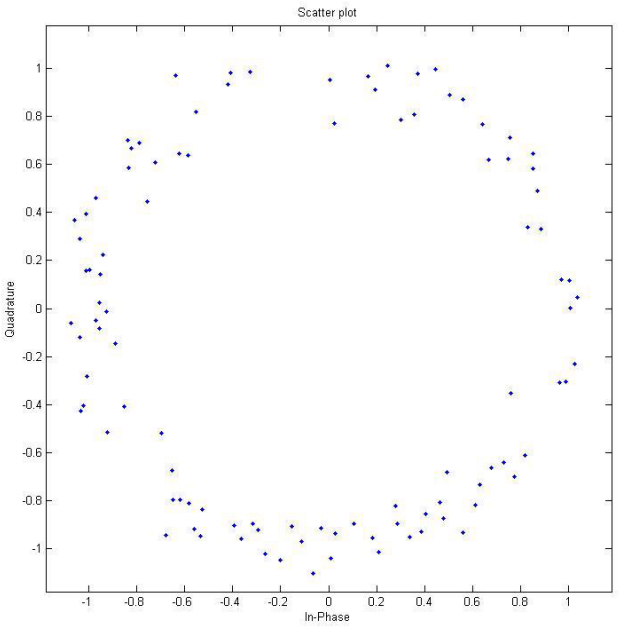
MATLAB Code:

```
M=input('Number_Symbols=');
SNR=input('SNR of M-ary PSK system in dB=');
x1=randint(100,1,M);
y1=pskmod(x1,M);
y1n=awgn(y1,SNR,'measured');
scatterplot(y1n);
y1r=pskdemod(y1n,M);
[num_error,er_rate]=symerr(x1,y1r)
```

a) Input:
Number_Symbols=32
SNR of M-ary PSK system in dB=20

Output:
num_error = 13
er_rate = 0.1300

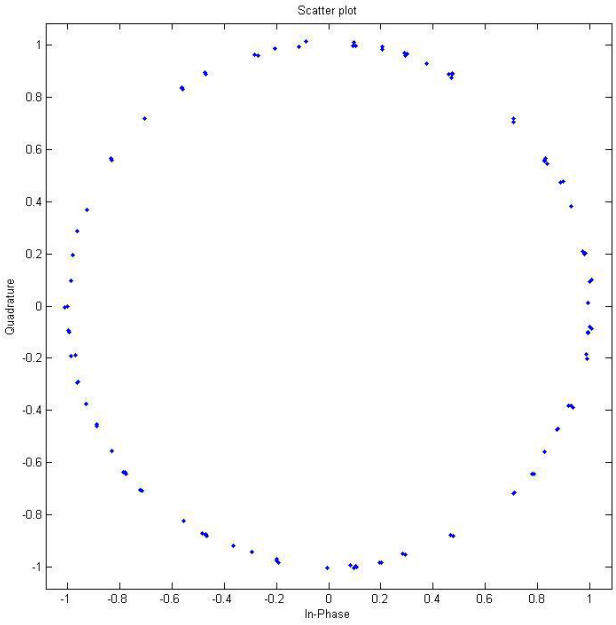
Constellation Diagram M-ary PSK



b) Input:
Number_Symbols=64
SNR of QPSK system in dB=40

Output:
num_error = 0
er_rate = 0

Constellation Diagram 2 M-ary PSK



Experiment No. 9

Title: Simulation Study of Performance of M-ary QAM.

MATLAB Code Example:

```
clc;
clear all;
close all;

M=input('Number_Symbols=');
SNR=input('SNR of QPSK system in dB=');
x1=randint(500,1,M);
y2=qammod(x1,M);
y2n=awgn(y2,SNR,'measured');
scatterplot(y2n);
y2r=qamdemod(y2n,M);
[num_error,er_rate]=symerr(x1,y2r)
```

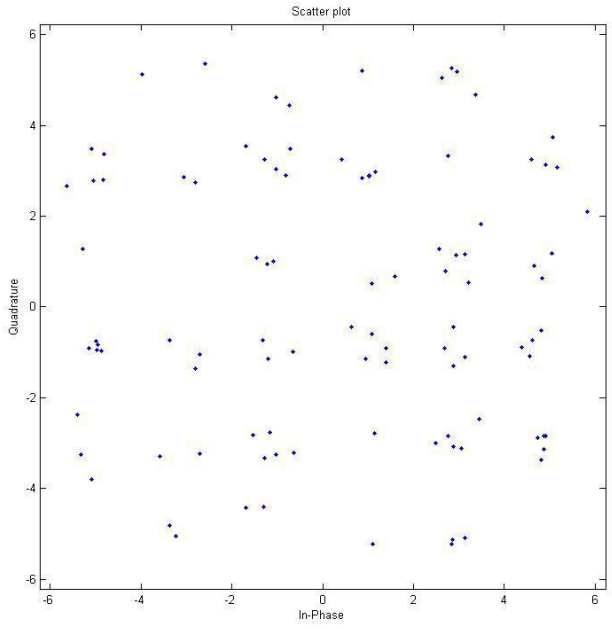
a) Input:

Number_Symbols=32
SNR of M-ary PSK system in dB=20

Output:

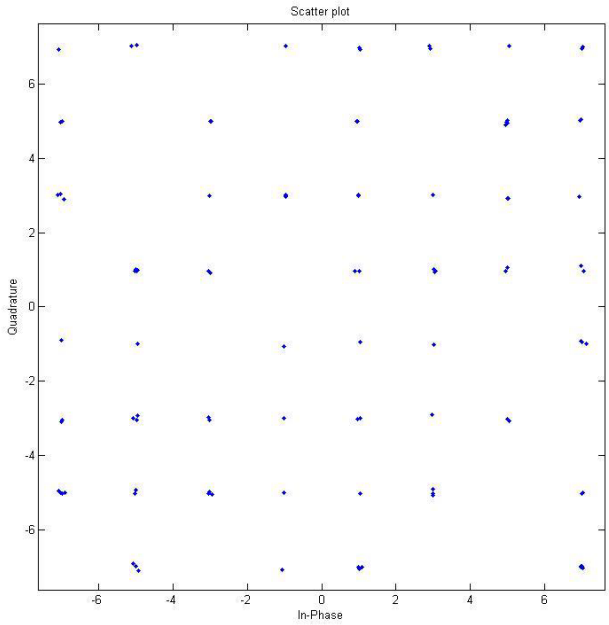
num_error = 1
er_rate = 0.0100

Constellation Diagram 1 QAM



b) Input:
Number_Symbols=64
SNR of QPSK system in dB=40
Output:
num_error = 0
er_rate = 0

Constellation Diagram 2 QAM



Experiment No.: 10

Title: Implementation of Huffman codes using suitable software.

MATLAB Code Example:

```
clc;
clear all;
close all;


m=input('Enter the number of Symbols='); symbols=[1:m]

for i=1:m

        p(i)=input('Enter the Probabilities of the symbol=');

end

[dict,avglen]=huffmandict(symbols,p)

avginfo=0;

for i=1:length(p)

        avginfo=avginfo+p(i)*(log2(1/p(i)));

end

avginfo

codeefficiency=avginfo*100/avglen

sig=randsrc(1,m,[symbols;p])

code=huffmanenco(sig,dict)

decoded=huffmandeco(code,dict)

isequal(sig,decoded)
```

OUTPUT:

```
Enter the number of Symbols=5

symbols = 1 2 3 4 5

Enter the Probabilities of the symbol=0.1
```

Enter the Probabilities of the symbol=0.2

Enter the Probabilities of the symbol=0.3

Enter the Probabilities of the symbol=0.2

Enter the Probabilities of the symbol=0.2

dict =

[1] [1x3 double]

[2] [1x3 double]

[3] [1x2 double]

[4] [1x2 double]

[5] [1x2 double]

avglen = 2.3000

avginfo =2.2464

code efficiency = 97.6713

sig =4 1 5 5 4

code = 1 1 0 0 1 1 0 1 0 1 1

decoded = 4 1 5 5 4

ans = 1