

# WIRELESS COMMUNICATION

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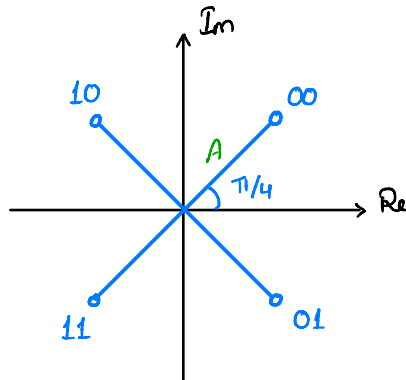




# I TRANSMITTER SIMULATION :-

→ Using the Quadrature Phase Shift Keying modulation scheme before transmitting the data.

(QPSK)



A: Amplitude

In QPSK, 2 bits are modulated at once, and the four possible carrier shifts available for the transmitting bits are  $45^\circ$ ,  $135^\circ$ ,  $225^\circ$  &  $315^\circ$ .

Bits to Phase mapping :-

00	→	$A \cdot e^{j\pi/4}$
10	→	$A \cdot e^{j3\pi/4}$
11	→	$A \cdot e^{j5\pi/4}$
01	→	$A \cdot e^{j7\pi/4}$

→ Ensuring Gray Coding.

→ Matlab file : [Section\\_1\\_TransmitterSimulation\\_QPSKmodulation.mlx](#)

## Transmitter Simulation

Applying QPSK modulation on the transmitting bits

### Clear variables

```
clc;  
clear all;  
close all;
```

### Initialiazing Input Variables

```
N_data = 100; % length of information bits  
A = 1; % Amplitude of the symbols
```

### Simulation Method - 1

```
Tx_constellation = A*[exp(j*pi/4), exp(j*3*pi/4), exp(j*5*pi/4), exp(j*7*pi/4)]; %  
generating QPSK constellation
```

```
Tx_bits = round(rand(1,N_data)); % Random data generation
```

```
group_of_2_bits = reshape(Tx_bits,2,N_data/2); % grouping the data sequence to 2  
bits. As QPSK can transmit 2 bits at a time
```

```
Tx_bits_mapping_1to4 = group_of_2_bits(1,:)*2+group_of_2_bits(2,:)+1; %  
converting data to have values only from 1 to 4, to be able to be mapped according  
to QPSK constellation
```

```
Tx_symbols = Tx_constellation(Tx_bits_mapping_1to4) % Final QPSK symbols  
according to the input data
```

