

## BER and SER analysis of BPSK and QPSK

BER: Bit error rate is defined as the ratio of the no of bits in error to the total no of bits.

SER: Symbol error rate is defined as the ratio of the no of symbols in error to the total no of symbols

### In case of BPSK

Each bit that is generated is represented as a symbol ,i.e bit '0' is represented as 1 and bit '1' is represented as -1 symbols respectively. Hence in this case both the SER and BER would be same as the no of bits generated =total no of symbols generated=N

Therefore  $BER_{BPSK} = SER_{BPSK}$

### In case of QPSK

Each of the generated two bits are mapped to a symbol, i.e

00 mapped to  $0.707 + i0.707$

01 mapped to  $-0.707 + i0.707$

11 mapped to  $-0.707 - i0.707$

10 mapped to  $0.707 - i0.707$

Hence the no of symbols transmitted would be half of the no of bits generated.

i.e if the total no of bits =N then, total no of symbols=N/2,

Therefore  $SER_{QPSK} = 2 * BER_{QPSK}$

Hence the  $SER_{QPSK}$  theoretical and simulated plots, are ahead from that of others.