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We know that

BER of BPSK = SER of BPSK = BER of QPSK

$$= Q\sqrt{2\times\left(\frac{E_b}{N_0}\right)}$$

SER of QPSK $= 2\times Q\sqrt{2\times(E_b/N_0)}$

Practical values of BER & SER.

For E_b/N_0 ranging from 1 to 10, the obtained values of error rates are as follows:-

1. BER of BPSK.

E_b/N_0	BER
1	0.0793
2	0.0560
3	0.0383
4	0.0243
5	0.0137
6	0.0058
7	0.0024
8	0.0007
9	0.0002
10	0

2. SER of BPSK.

E_b/N_0	SER
1	0.0793
2	0.0560
3	0.0383
4	0.0243
5	0.0137
6	0.0058
7	0.0024
8	0.0007
9	0.002
10	0

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3. BER of QPSK.

E_b/N_0	BER
1	0.0781
2	0.0562
3	0.0372
4	0.0237
5	0.0125
6	0.0059
7	0.0024
8	0.0007
9	0.002
10	0

4. SER of QPSK

E_b/N_0	SER
1	0.1502
2	0.1093
3	0.0729
4	0.0469
5	0.0249
6	0.0118
7	0.0049
8	0.0014
9	0.0003
10	0.0001.

From the theoretical values and practical values, we can observe that,

1. BER of BPSK and ~~BER~~ SER of BPSK are same.
2. BER of QPSK and BER of BPSK are approximately same.
3. SER of QPSK is approximately double the SER of BPSK.

Explanation :-

In BPSK, only one bit is used for each symbol.

∴ Error in bit is equal to error in symbol.

∴ Symbol error rate = Bit error rate for BPSK.

In QPSK, two bits are used to represent each symbol.

∴ Symbol error rate corresponds to error in 1 symbol, which means error in 2 bits will

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be counted as error in 1 symbol.

∴ Symbol error rate = $\frac{\text{No. of errors}}{(\text{No. of bits}/2)}$

and, Bit Error Rate = $\frac{\text{No. of errors}}{(\text{No. of bits})}$

∴ Symbol error rate for QPSK is approximately twice the bit error rate.

And bit error rate of QPSK is same as bit error rate of BPSK.