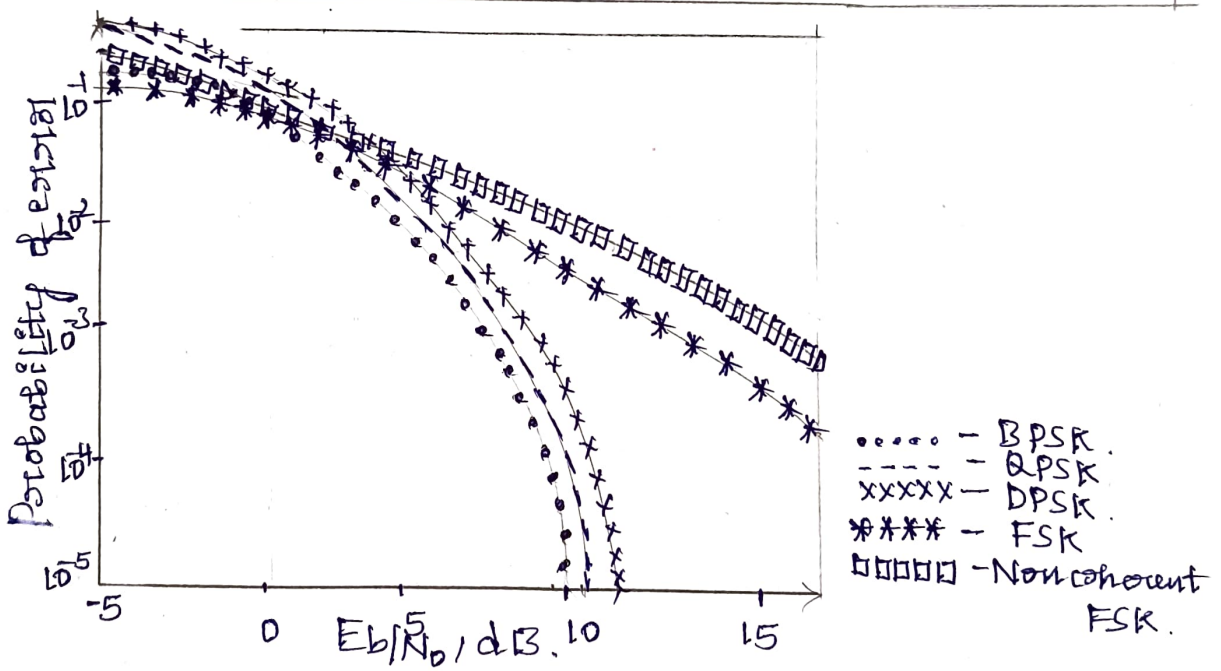
Comparision of binary and quaternary modulation techniques.

Modulation	Detection method	Error Probability Pe
BPSK.	Coherent	$\frac{1}{2}\text{erfc}\sqrt{Eb/No}$
FSK	Coherent	$\frac{1}{2}\text{erfc}\sqrt{\frac{Eb}{2No}}$
QPSK	Coherent	$\text{erfc}\sqrt{\frac{Eb}{No}}$
MSK	Coherent	$\text{erfc}\sqrt{\frac{Eb}{No}}$
DPSK	Non-coherent	$\frac{1}{2}\exp[-Eb/No]$
FSK	Non-coherent	$\frac{1}{2}\exp[-Eb/2No]$



Performance comparision for different modulation schemes.

1. The error rates for all the systems decrease monotonically with increasing values of Eb/No
2. Coherent PSK produces smaller error rate than any other systems.
3. Coherent PSK and DPSK require an Eb/No that is 3dB less than the corresponding values for conventional

coherent FSK and Non-coherent FSK respectively to realise the same error rate.

4. At high values of E_b/N_0, DPSK and Non-coherent FSK perform almost as well as coherent PSK and conventional coherent FSK respectively for the same bit rate and signal energy per bit.

5. In QPSK two orthogonal carriers $\sqrt{2/T}\cos 2\pi f_c t$ and $\sqrt{2/T}\sin 2\pi f_c t$ are used, where the carrier frequency f_c is an integral multiple of the symbol rate $1/T$ with the result that two independent bit streams can transmitted & subsequently detected in the receiver.

At high values of E_b/N_0 coherently detected binary PSK and QPSK have about the same error rate performance for the same value of E_b/N_0.

6. In MSK, two orthogonal carriers $\sqrt{2/T_b}\cos 2\pi f_c t$ and $\sqrt{2/T_b}\sin 2\pi f_c t$ are modulated by the two antipodal symbol shaping pulses $\cos(\pi t/2T_b)$ and $\sin(\pi t/2T_b)$ respectively over $2T_b$ intervals.

The receiver uses coherent phase decoding process over two successive bit intervals to recover the original bit stream.

MSK has same error rate performance as QPSK.