

Carrier Signal: $\cos(2\pi f_0 t)$
 \downarrow
 freq.

APPL.

TRANSPORT

NETWORK

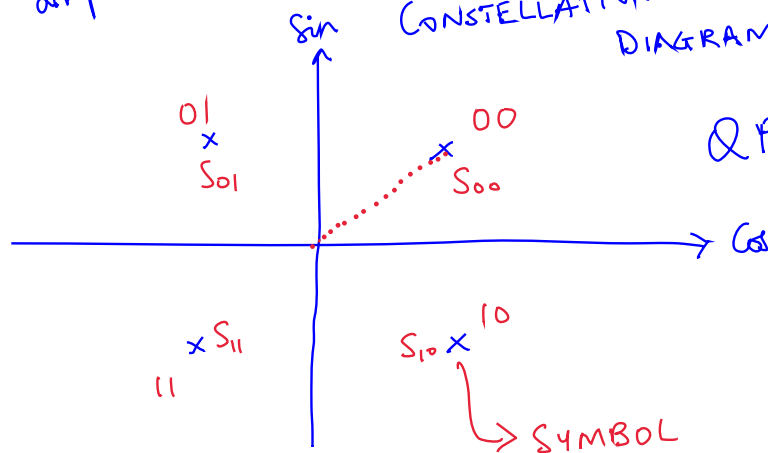
DLL \downarrow bits

PHY \downarrow signals

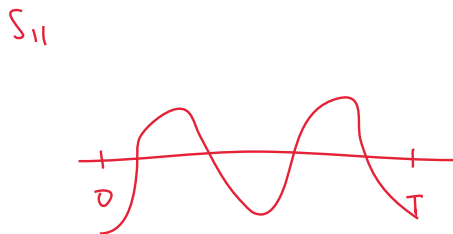
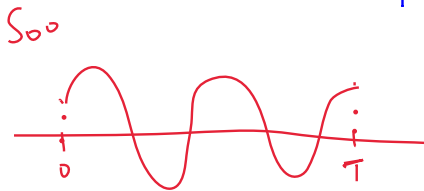
$A \cos(2\pi f_0 t + \phi)$
 \downarrow amp \rightarrow phase

CONSTELLATION DIAGRAM

QPSK



$$\int_0^T g(t) f(t) dt$$



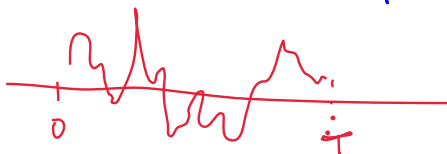
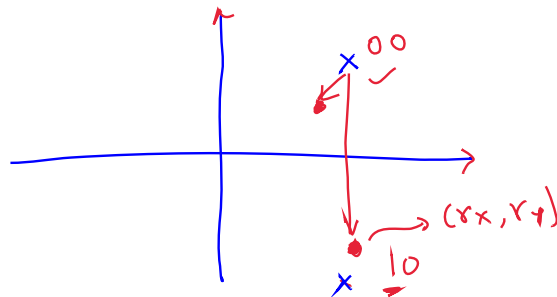
DATA: 00 11 10 10
 $S(t) = S_{00} S_{11} S_{10} S_{10}$

$$r(t) = a \cdot s(t) + n(t)$$

$$r_x = a \cdot s_x + n_x$$

$$r_y = a \cdot s_y + n_y$$

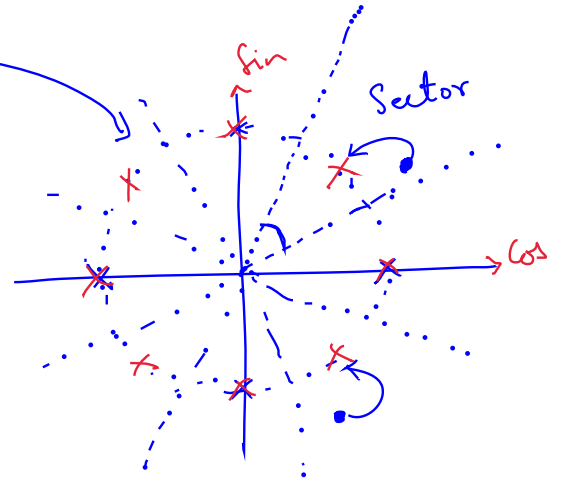
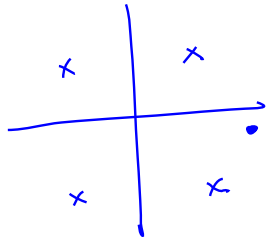
Gaussian



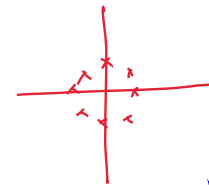
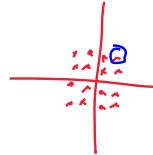
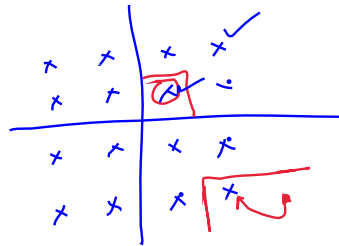
00 \rightarrow guessed correctly
 10 \rightarrow bit error

8-PSK

QPSK



QAM-16



W-CDMA

CDMA
OFDM(A)