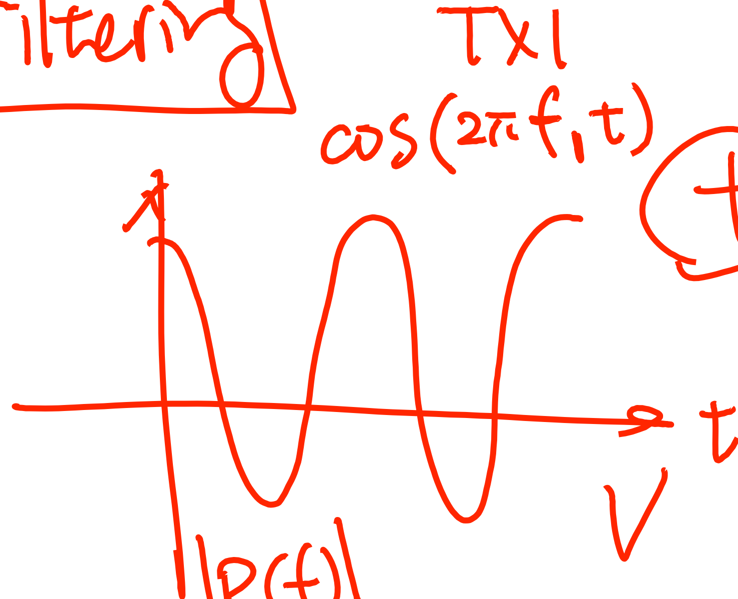
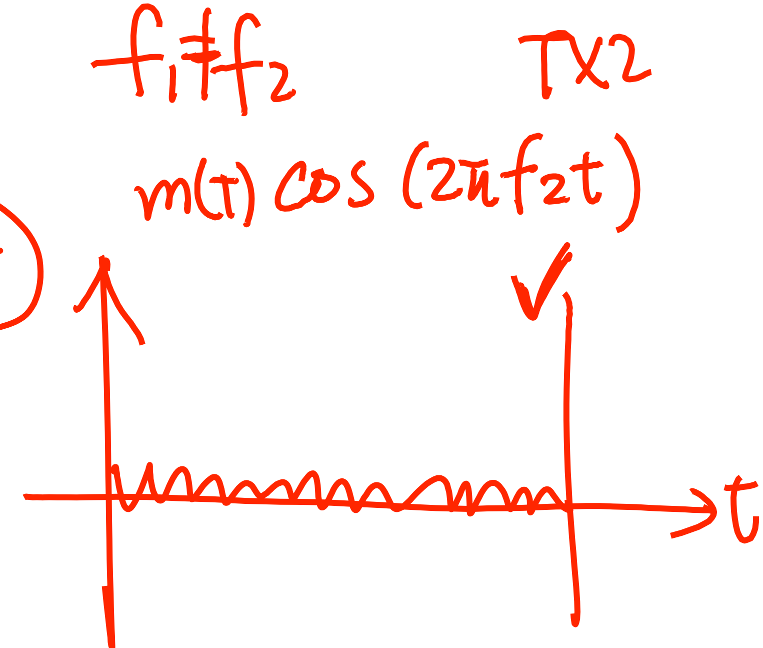
Basics 3

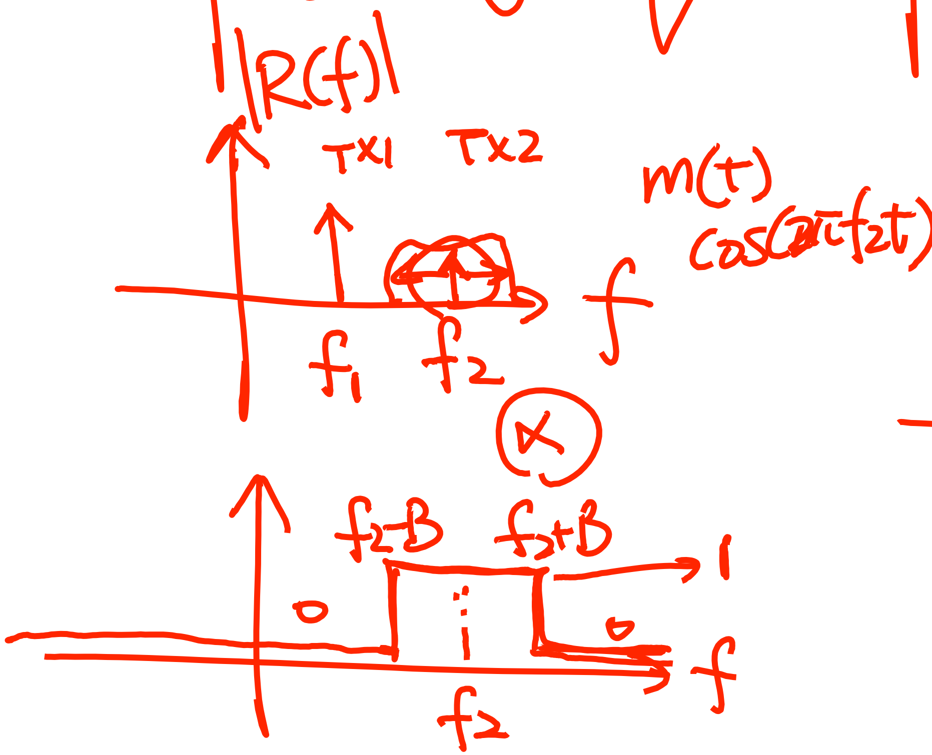
PROF. MICHAEL TSAI

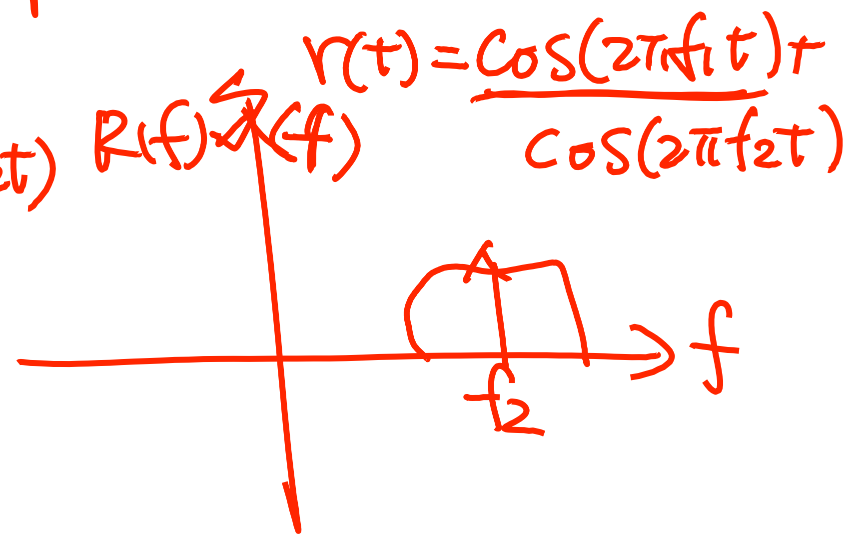
2014-02-26

Filtering


TX1
cos(2πf₁t)
+
t


f₁≠f₂
TX2
m(t) cos (2πf₂t)
t


|R(f)|
TX1
TX2
m(t)
cos(2πf₂t)
f
f₁
f₂
×
f₂-B
f₂+B
1
0
0
f
f₂


r(t) = cos(2πf₁t) + m(t) cos(2πf₂t).
R(f)
f
f₂

$S(t) = m(t) \cos(2\pi f_c t)$

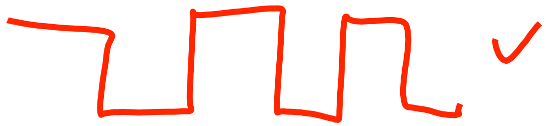
$m(t) = \begin{cases} 0 & \text{"0"} \\ 1 & \text{"1"} \end{cases}$

OOK

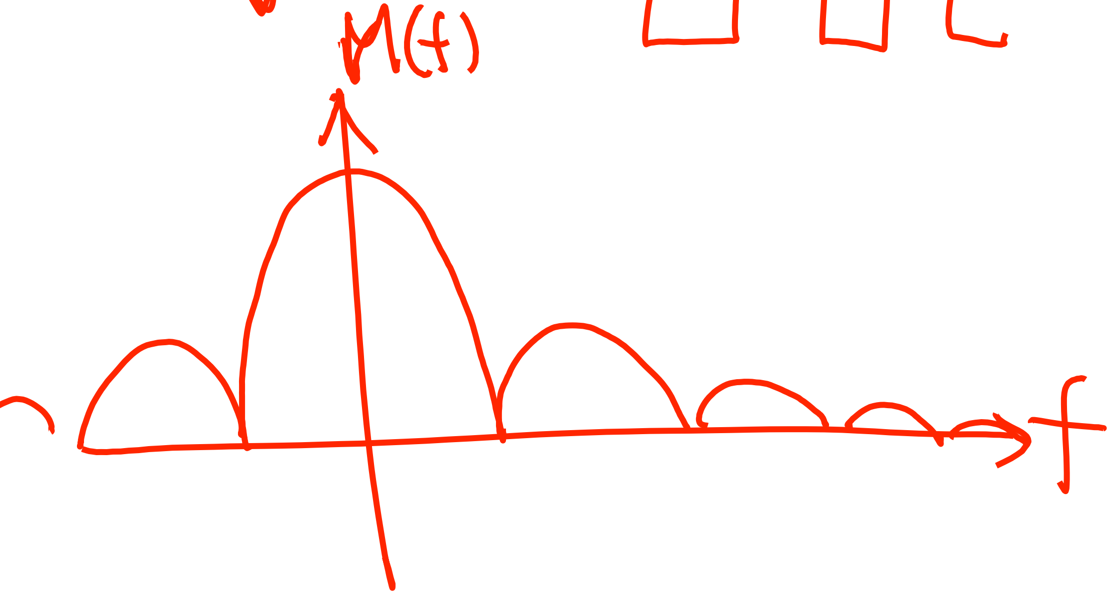
$\cos(\omega_m t)$

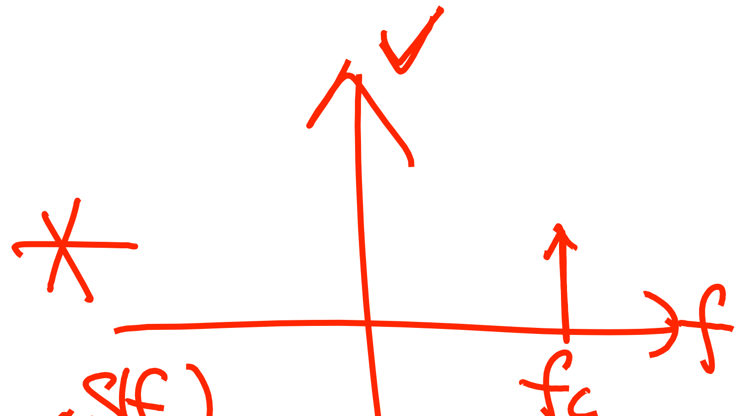
↓ ⇆

m(t)



✗ Wireless Communication





PSK

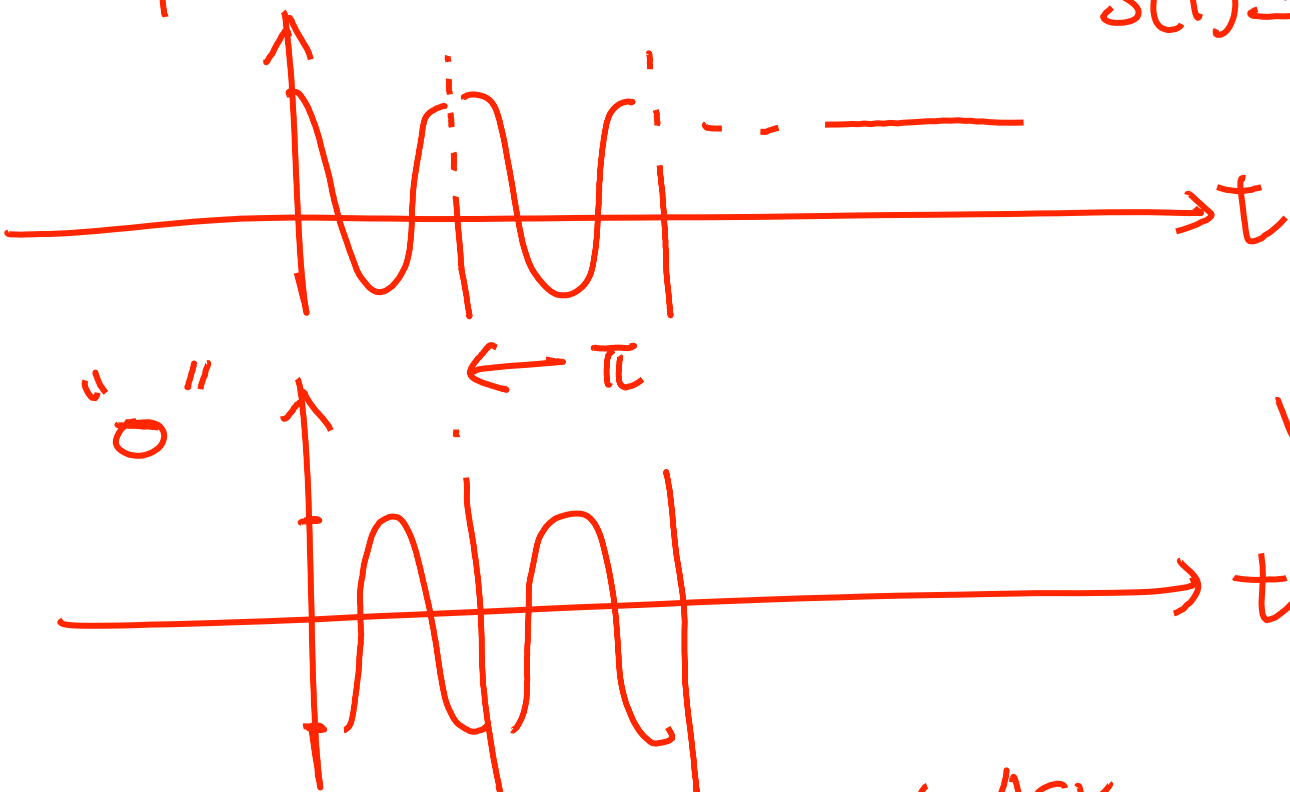
P: Phase

$$s(t) = m(t)\cos(2\pi f_c t)$$

$$m(t) = \begin{cases} -1 & \text{"0"} \\ 1 & \text{"1"} \end{cases}$$

"1"

"0"



$$s(t) = \cos(2\pi f_c t + \phi(t))$$

$$\phi(t) = \begin{cases} 0 & \text{"00"} \\ \frac{\pi}{4} & \text{"01"} \\ \frac{\pi}{2} & \text{"10"} \\ \frac{3\pi}{4} & \text{"11"} \end{cases}$$

✓

4PSK

QPSK

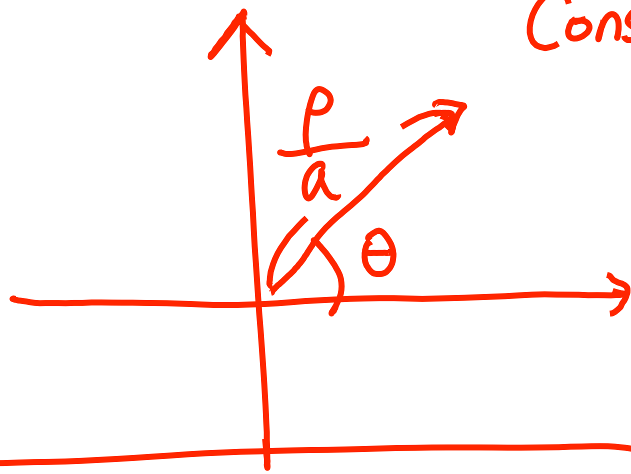
8PSK

16PSK

4-ASK

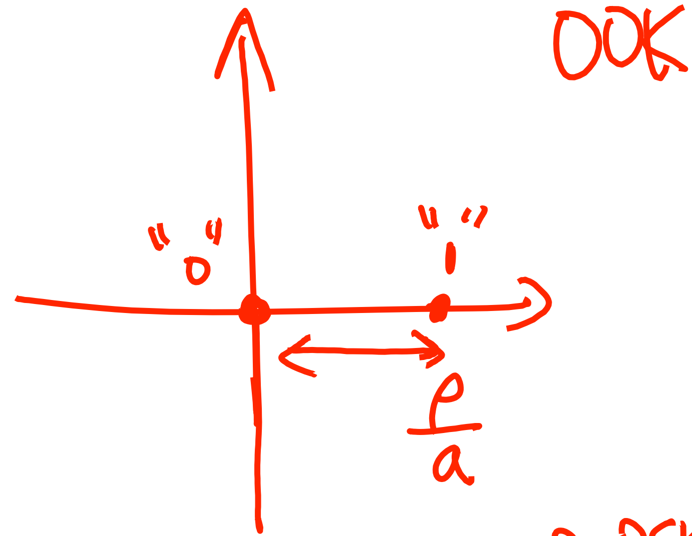
QASK

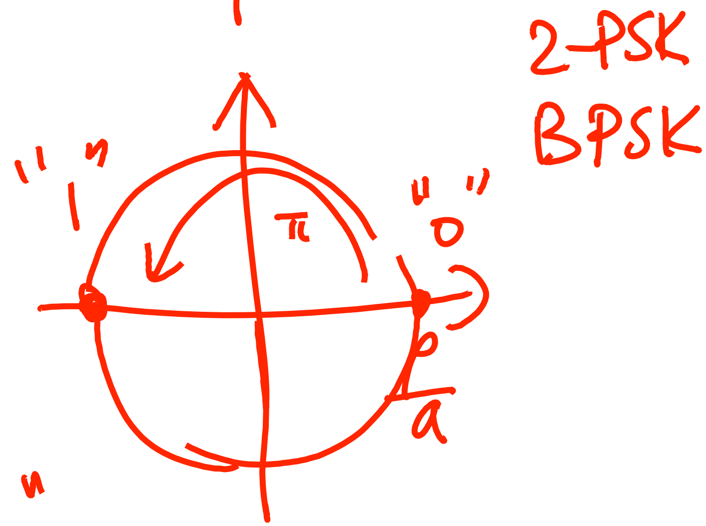
Error Margin

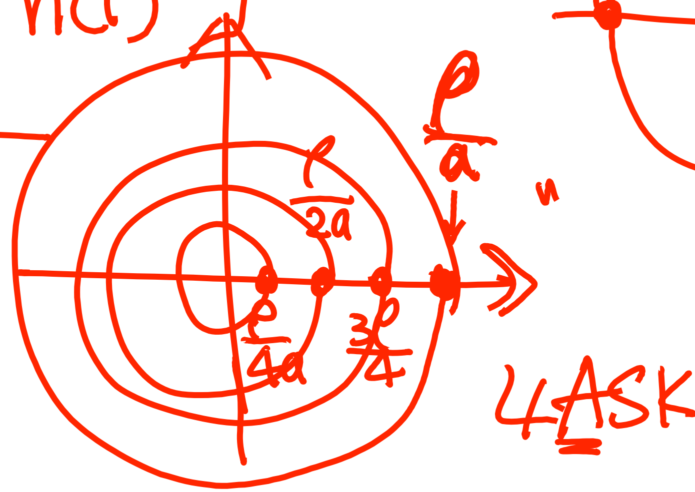


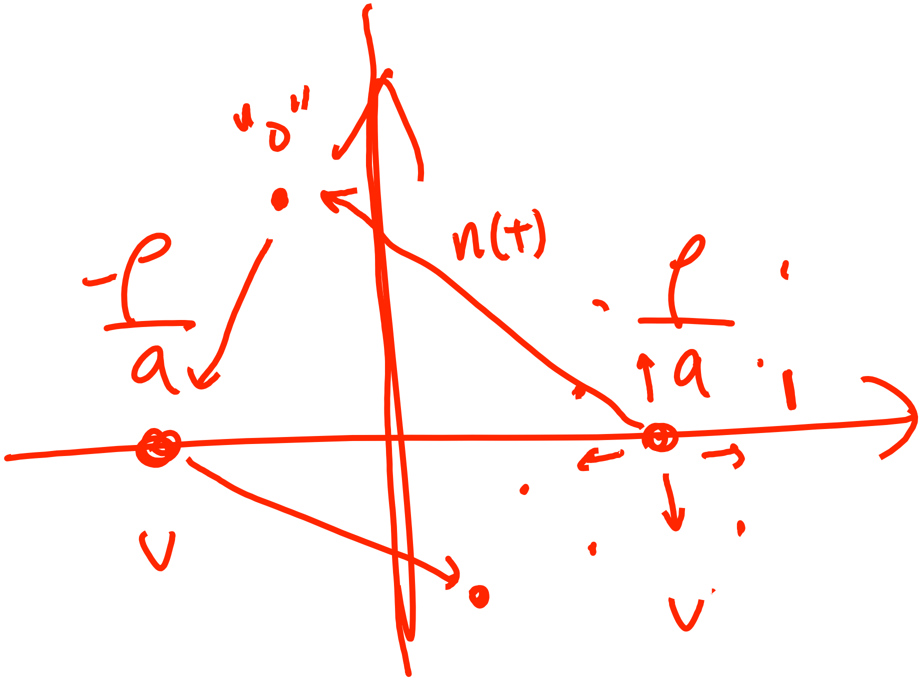
$$r(t) = \frac{s(t)}{a} + n(t)$$

Constellation



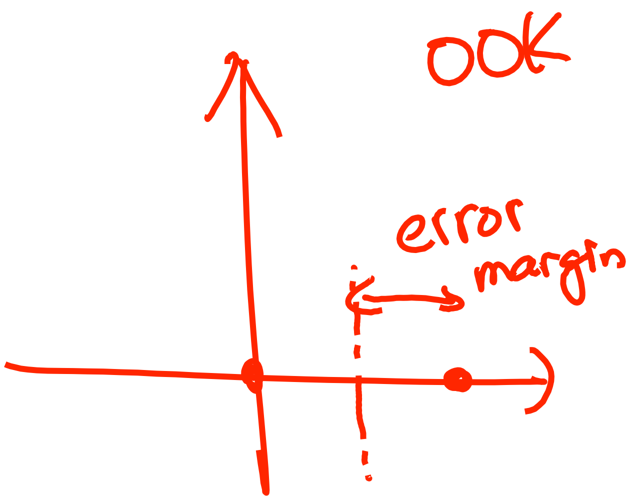


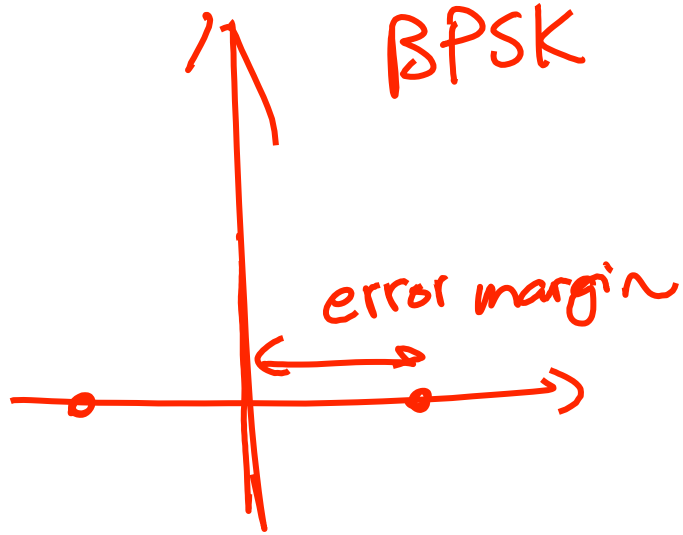




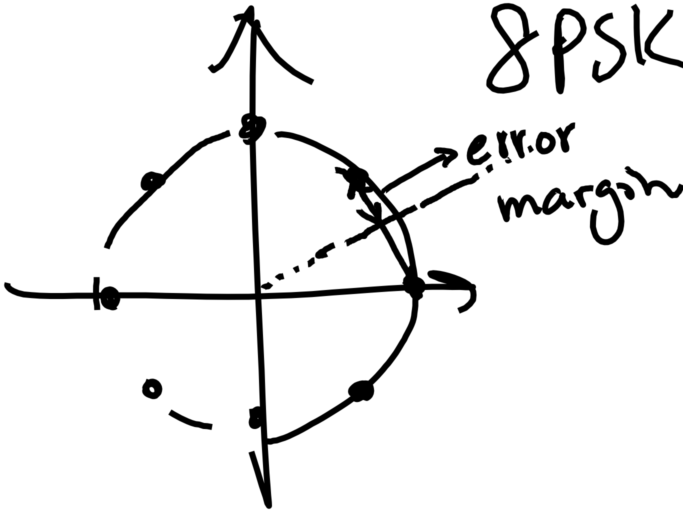
BPSK

OOK





8PSK



Claude Shannon Theory

$$R \le B \log_2\left(1+\frac{S}{N}\right)$$

↑ 正確 傳多少資料 T

B → 頻寬 $\left(1/T_s\right)$

$\frac{S}{N}$ → $\frac{\left(\frac{\rho}{a}\right)^2}{n^2}$ ↗ SNR