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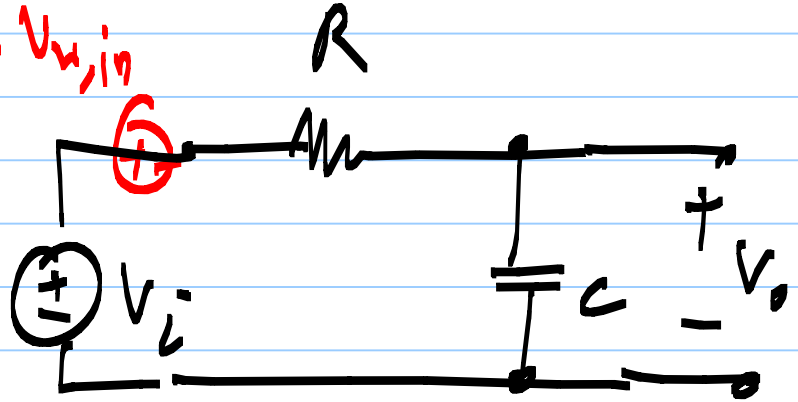
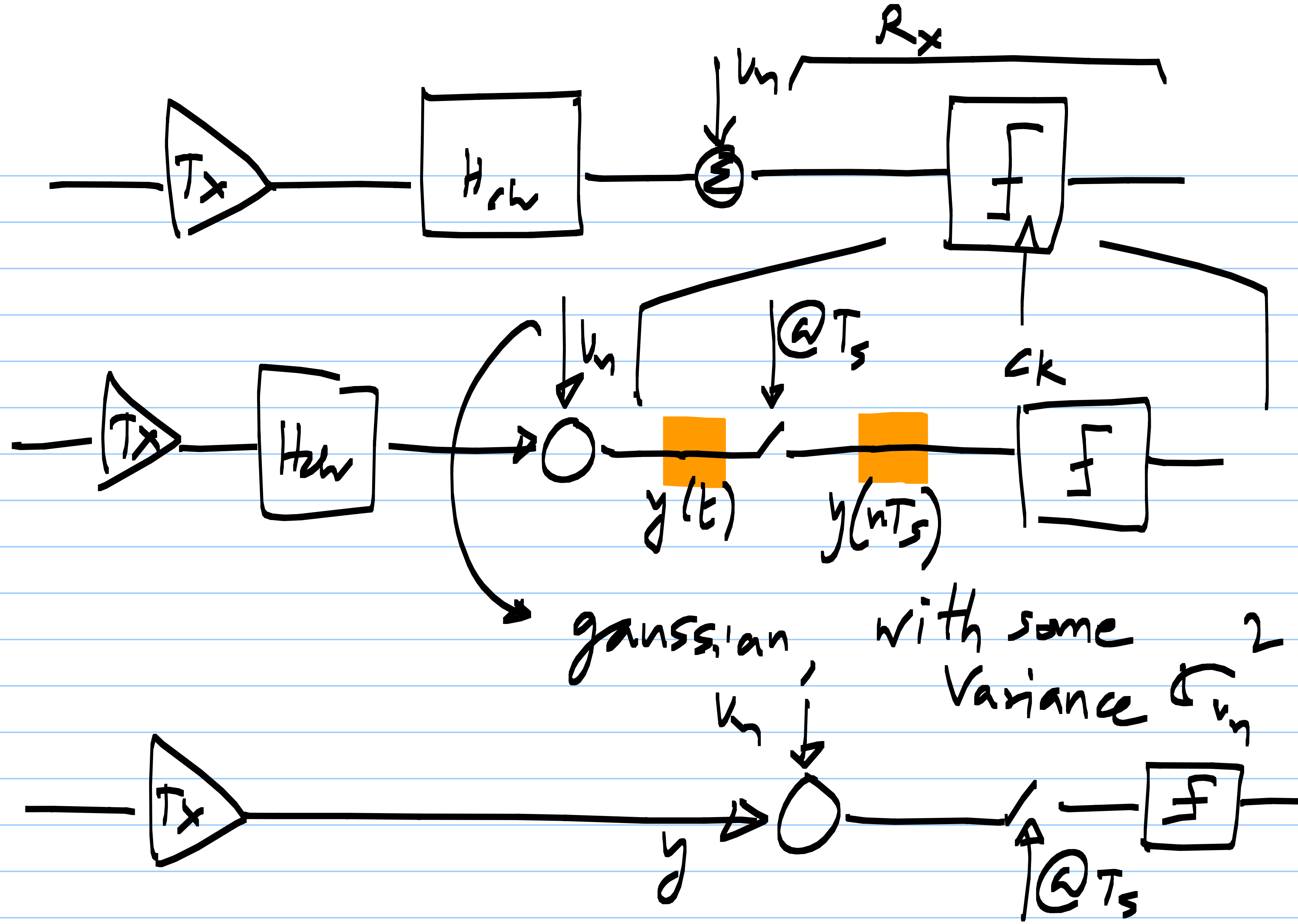


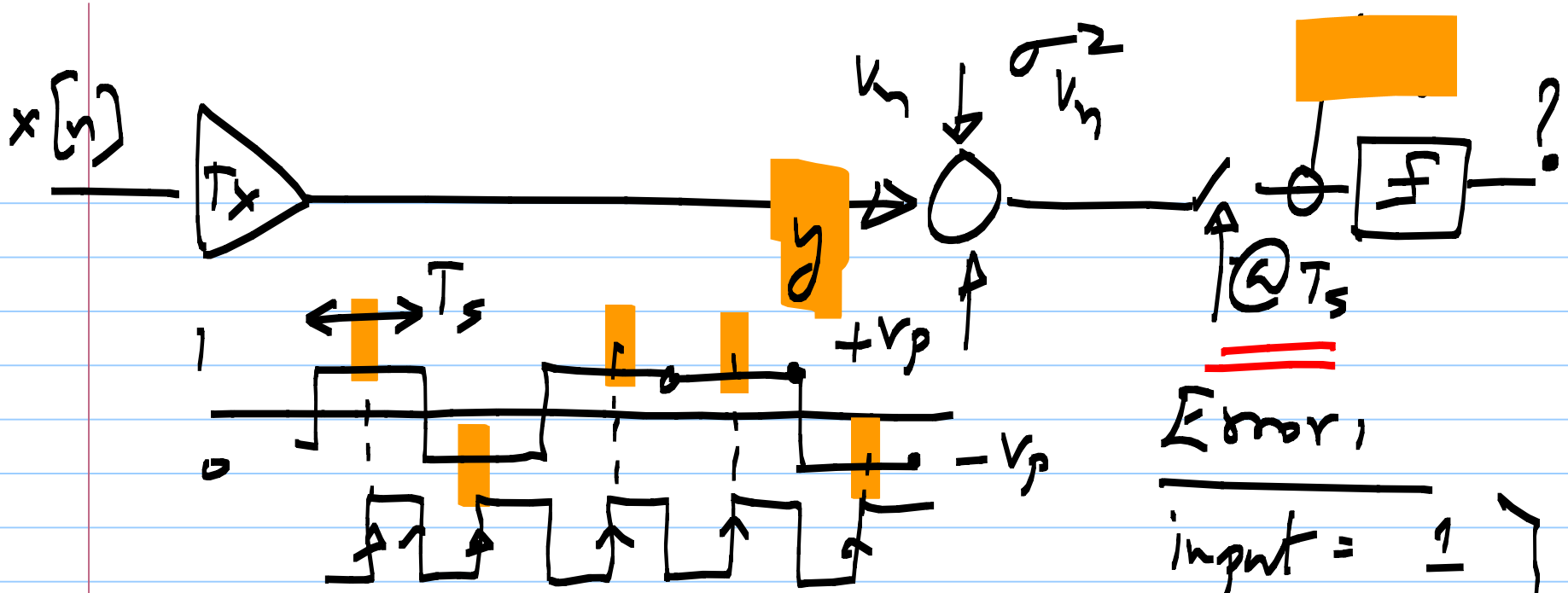
$$S_{v_n,in} = ?$$

$$\frac{V_o}{V_i} = \frac{1}{1+sRC}$$

$$S_{V_o} = 4kTR \cdot \frac{1}{1+4\pi^2 f^2 C^2 R^2}$$

$$\frac{S_{v_o}}{|V_o/V_i|^2} = 4kTR$$


Rx
Tx
H_{ch}
v_n
ck
v_n
@T_s
Tx
H_{ch}
y(t)
y(nT_s)
gaussian, with some variance $\sigma_{v_n}^2$
v_n
Tx
y
@T_s



Error:

input = 1
output = 0

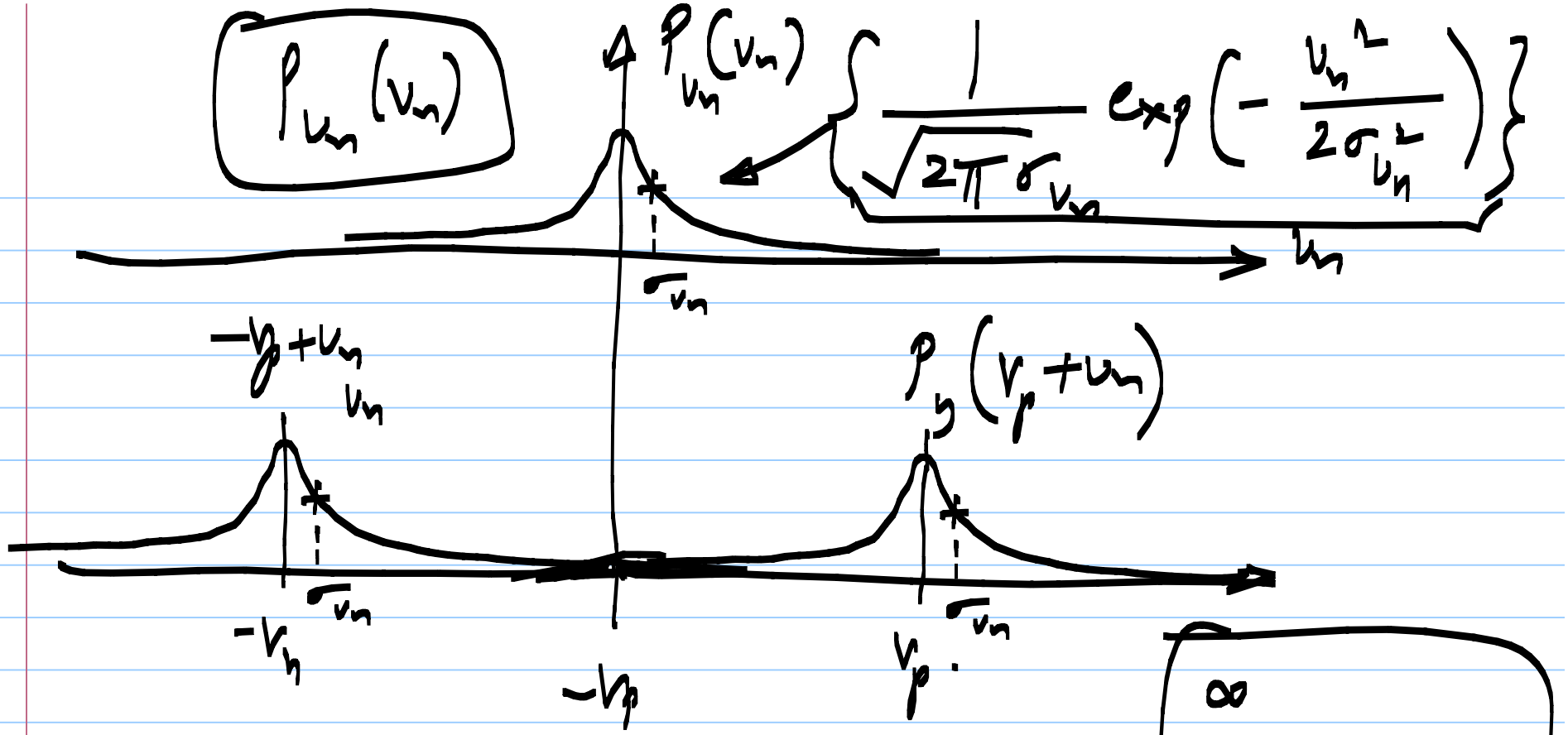
or

input = 0
output = 1

$V_p + v_n < 0$

$$P(1)\,P(v_n < -V_p) + P(0)\,P(v_n > V_p)$$

$-V_p + v_n > 0$



$$p(\varepsilon_{error}) = p(1) \cdot \int_{-\infty}^{-v_p} p_{v_n}(v_n) \cdot dv_n + p(0) \cdot \int_{v_p}^{\infty} p_{v_n}(v_n) \cdot dv_n$$

$p(1) = 1/2$ $\qquad$ $p(0) = 1/2$

$$P(\text{Error}) = \frac{1}{\sqrt{2\pi}\sigma_n} \int_{V_p}^{\infty} \exp\left(-\frac{v_n^2}{2\sigma_n^2}\right) \cdot dv_n \qquad y = \left(\frac{v_n}{\sigma_n}\right)$$

Transmitted symbols : $\pm V_p$

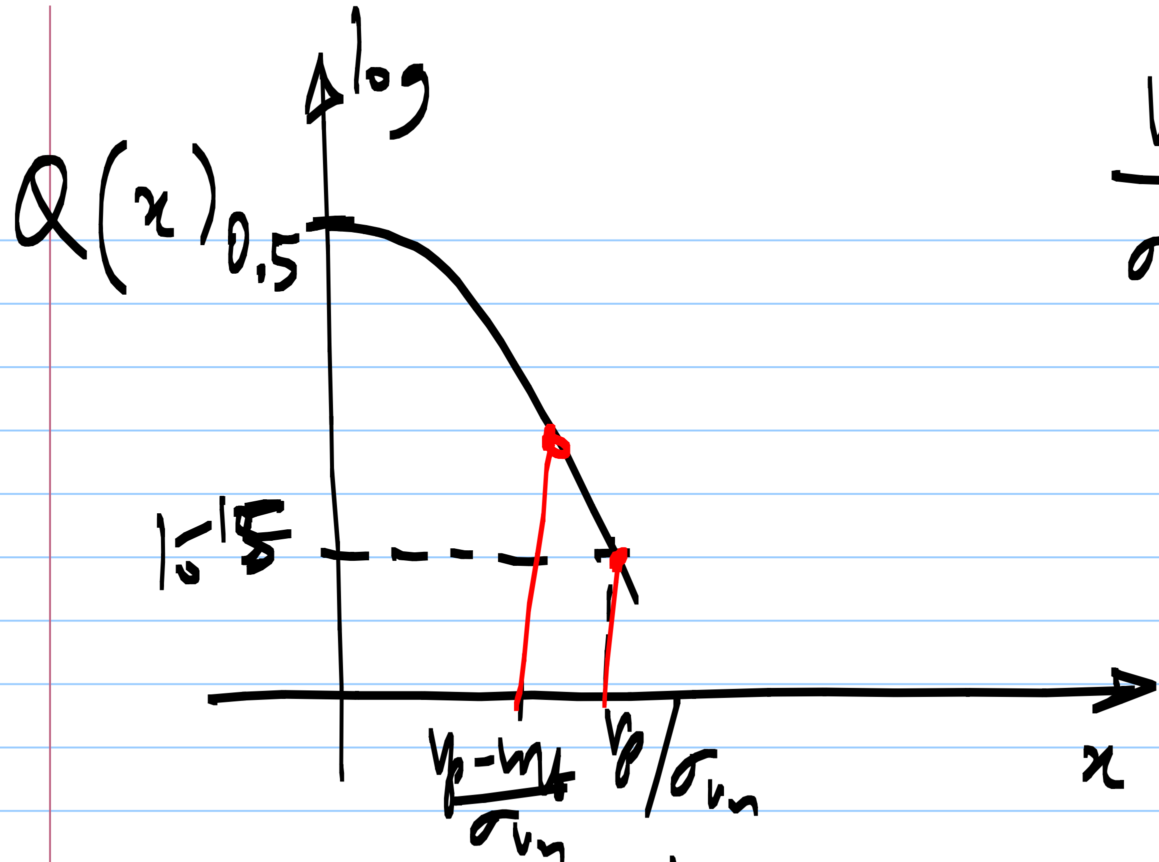
$$\frac{1}{\sqrt{2\pi}} \int_{V_p/\sigma_n}^{\infty} \exp\left(-\frac{y^2}{2}\right) \cdot dy \cdot \sigma_n$$

$$Q(x) = \frac{1}{\sqrt{2\pi}} \int_{x}^{\infty} \exp\left(-\frac{y^2}{2}\right) \cdot dy$$

Q function

$$Q\left(\frac{V_p}{\sigma_n}\right)$$

$Q(6) : 10^{-12}$



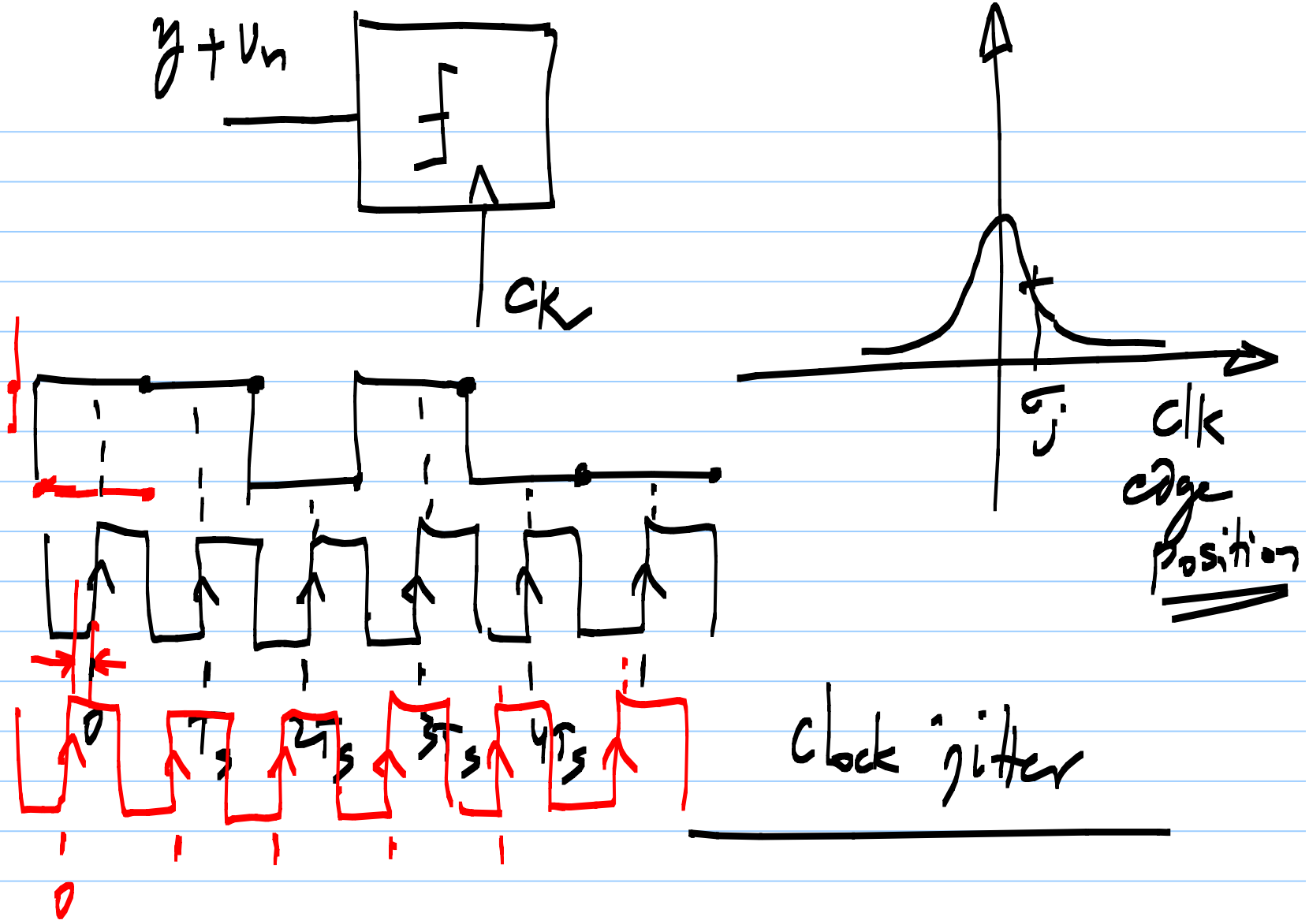
$\frac{V_p}{\sigma_n} >$

$P(V_n > V_p - V_{off})$

Comparator offset: V_{off}

$P(1) \cdot P(V_n < -V_p) + P(0) \cdot P(V_n > +V_p)$

$P(1) \cdot P(V_n < -V_p - V_{off}) + P(0) \cdot P(V_n > V_p - V_{off})$



clock jitter

$$P(\text{prev. bit} \neq \text{current bit}) \cdot P(T_j < -T_s/2) \quad (1/2)$$

$$+ P(\text{next bit} \neq \text{current bit}) \cdot P(T_j > T_s/2) \quad (1/2)$$

$$P(T_j > T_s/2) = Q\left(\frac{T_s}{2\sigma_j}\right)$$

$$P\left(T_j > \frac{T_s}{2} - T\eta\right) = Q\left(\frac{T_s/2 - T\eta}{\sigma_j}\right)$$

$-V_p$ $\qquad$ V_p

$$-V_{max} < v_{off} < V_{max}$$

$$-T_s/2 < \tau_{\eta_c} < T_s/2$$