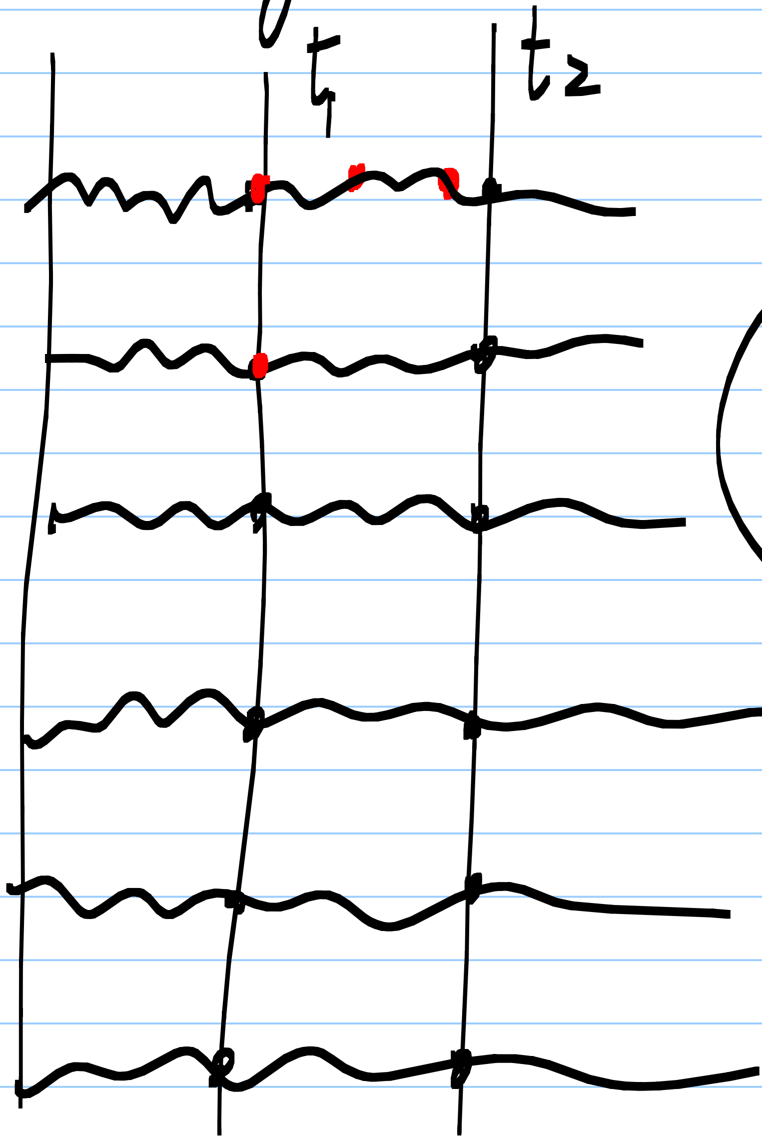
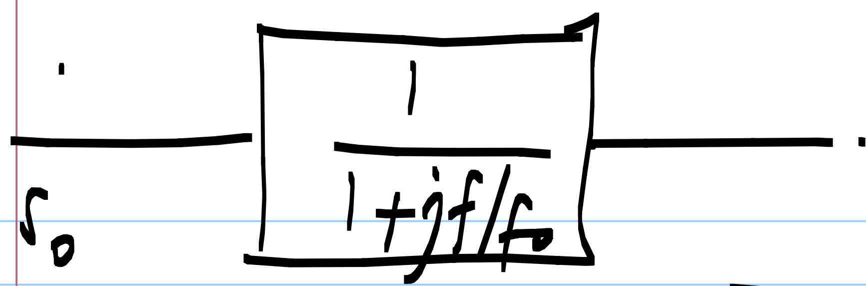
CT signal



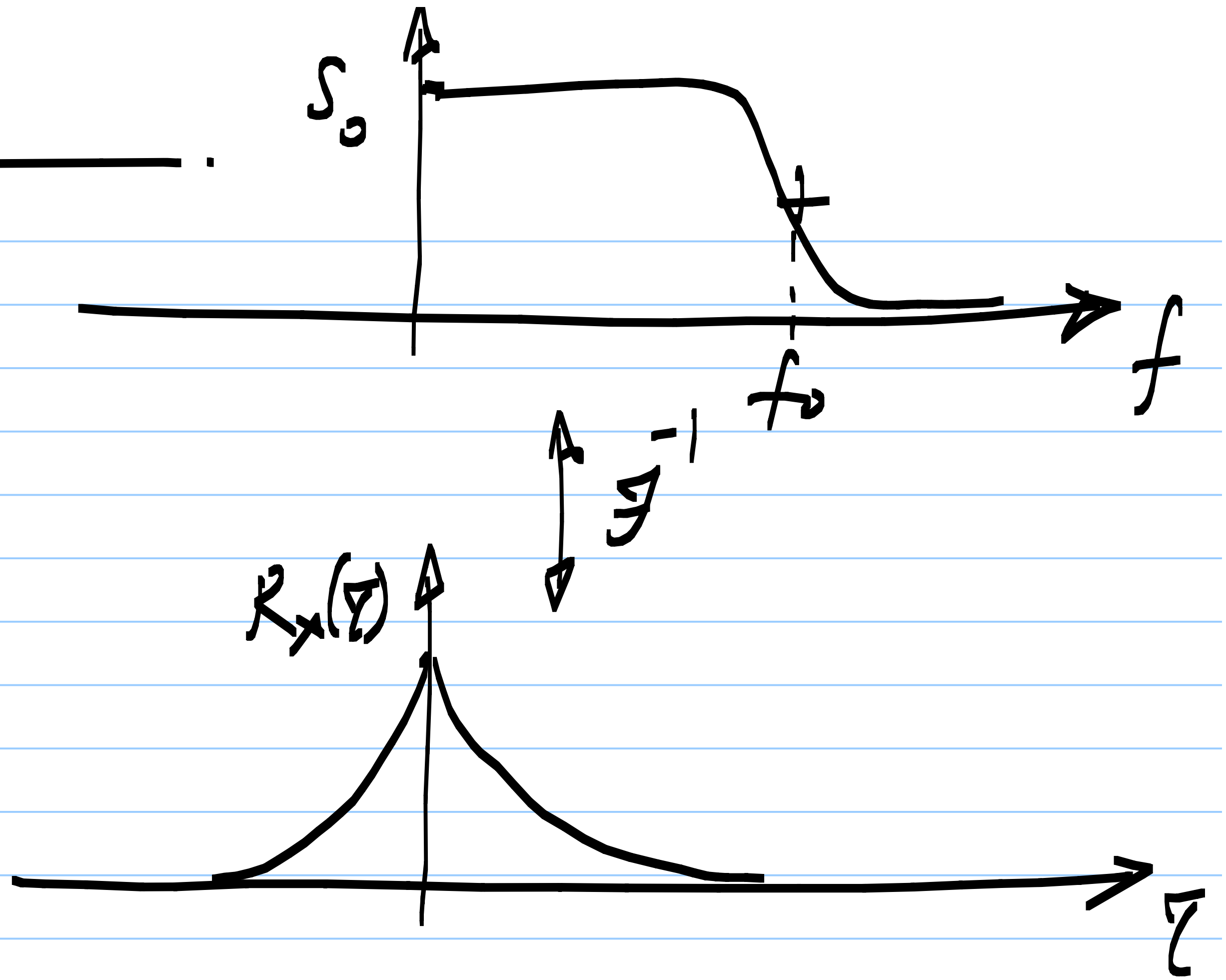
Stationary: $E[x]$, $E[x^2]$, same @ all t

Cyclostationary: $E[x]$, $E[x^2]$, periodic in time

Seen in sampled systems



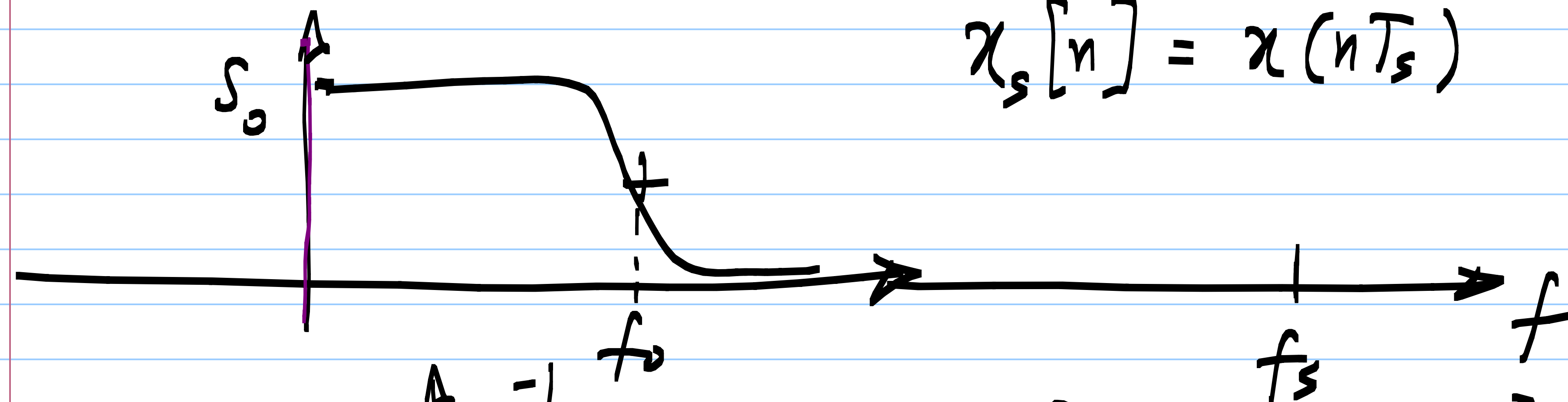
S_0
$\frac{1}{1+jf/f_0}$



S_0
f_0
f
$\mathcal{F}^{-1}$
$R_x(\tau)$
τ

$$R_x(\tau) = E\left[x(t)\,x(t-\tau)\right]$$

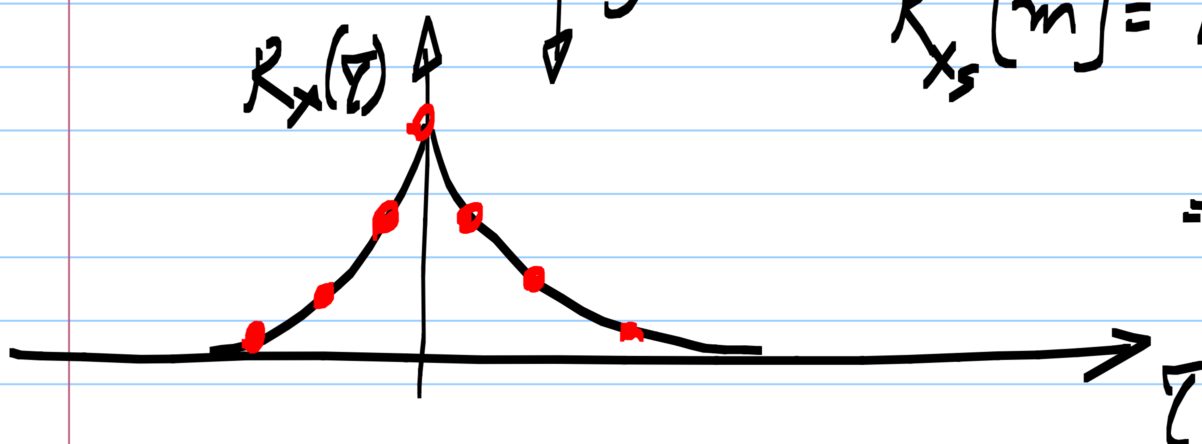
$$x_s[n] = x(nT_s)$$



$$\big\updownarrow\ \mathcal{F}^{-1}$$

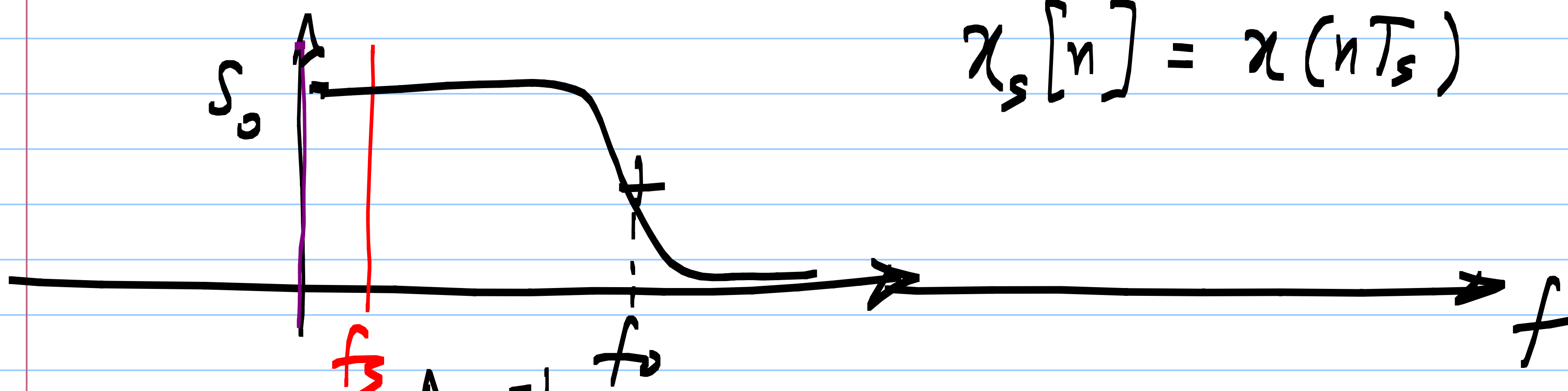
$$R_{x_s}[m] = E\left[x_s[n]\,x_s[n-m]\right]$$

$$= E\left[x(nT_s)\,x(nT_s - mT_s)\right]$$



$$R_x(\tau) = E\left[x(t)\,x(t-\tau)\right]$$

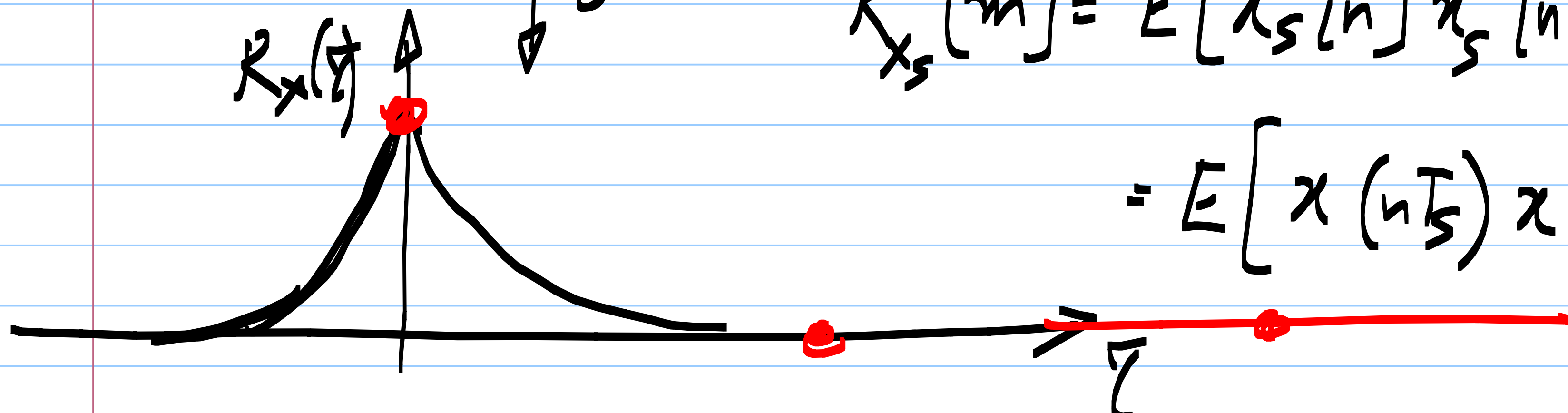
$$x_s[n] = x(nT_s)$$

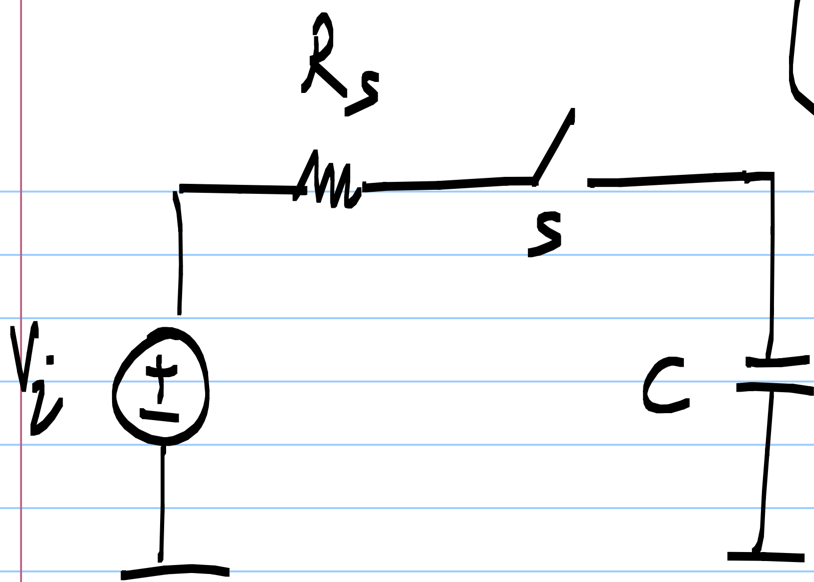


$\mathcal{F}^{-1}$

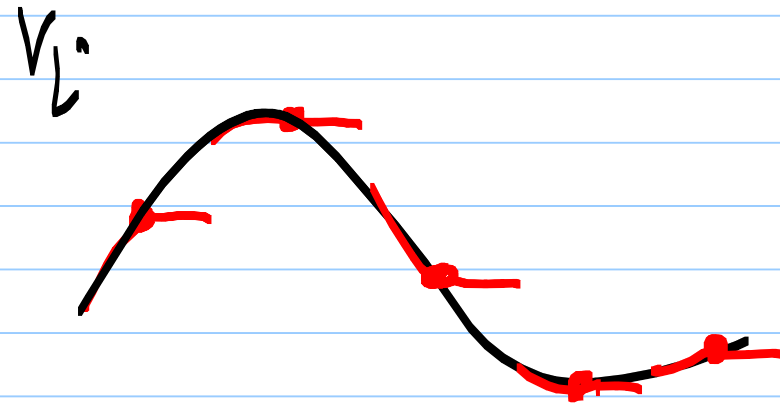
$$R_{x_s}[m] = E\left[x_s[n]\,x_s[n-m]\right]$$

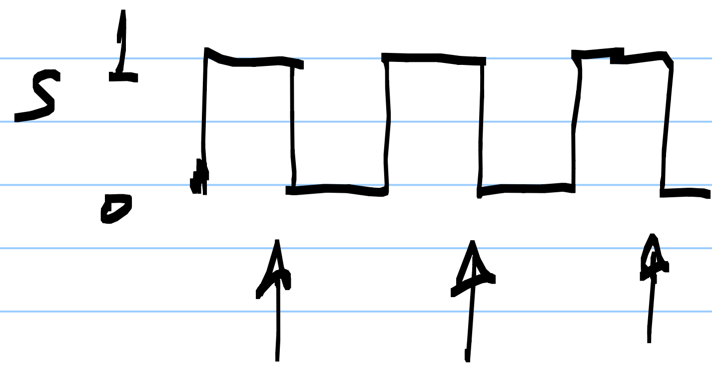
$$= E\left[x(nT_s)\,x(nT_s - mT_s)\right]$$



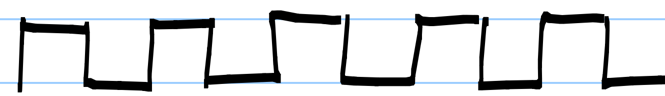


$\boxed{R_s C \ll T_s}$ $\quad V_i(nT_s + T)$





Sampling instant

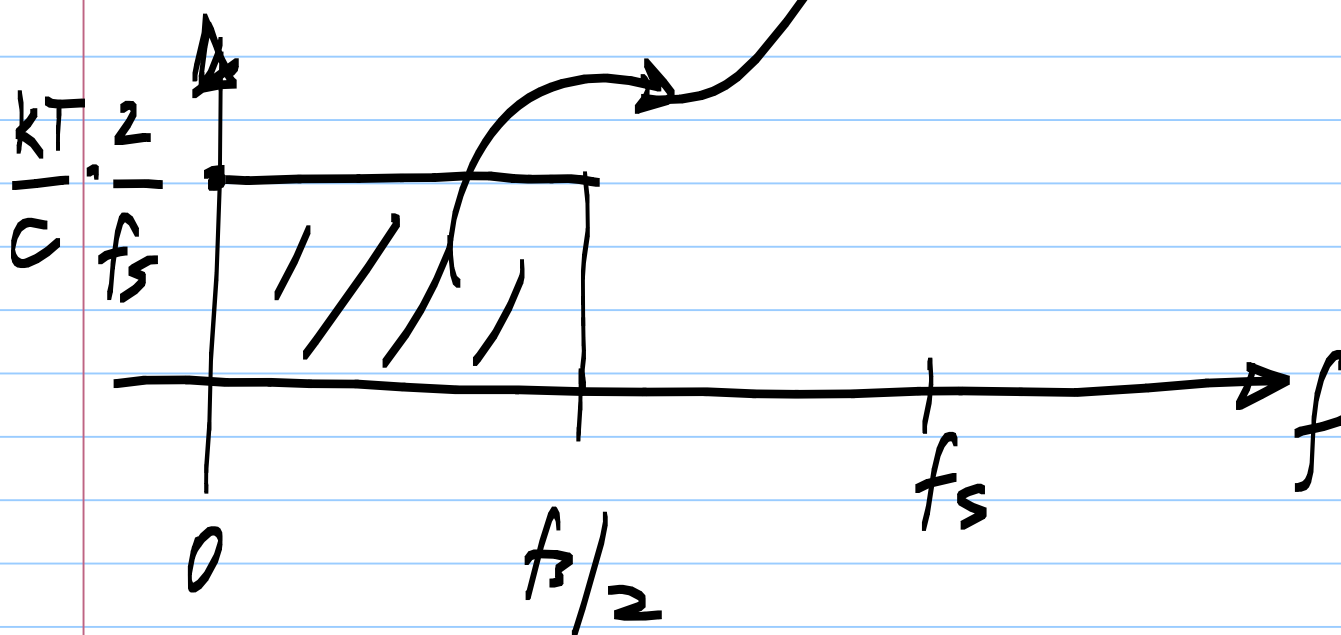


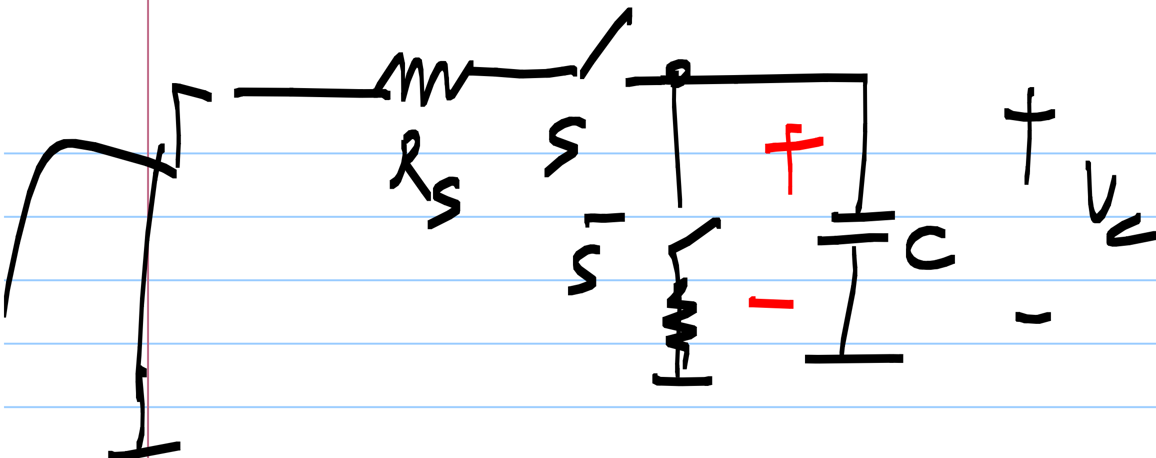
Held value on C;

Noise samples $v_n[k]$

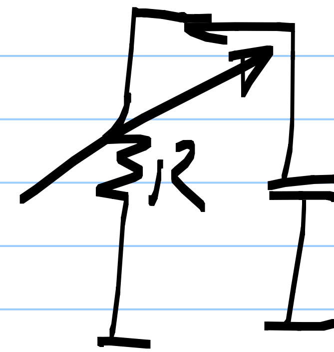
Noise sampled at $f_s = 1/T_s$

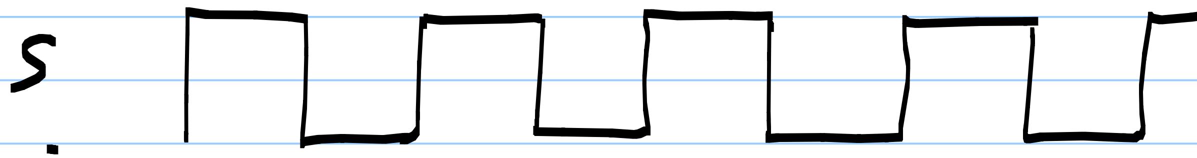
Variance $= kT/C$

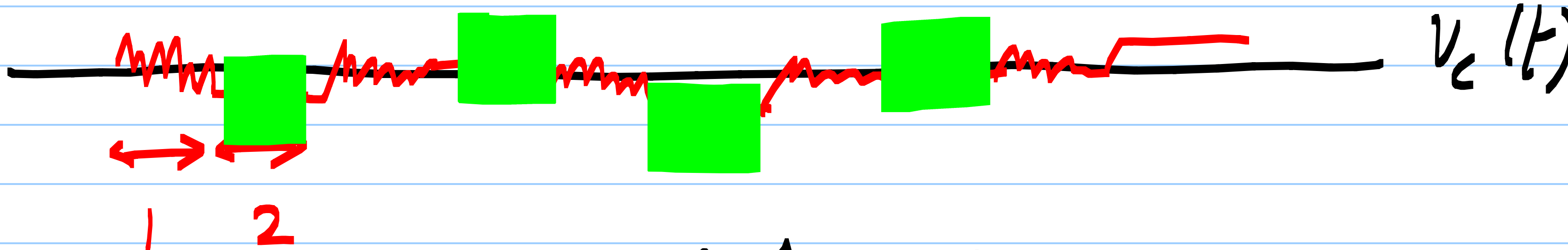


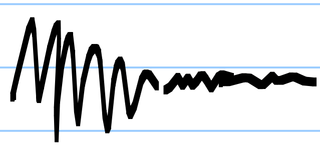


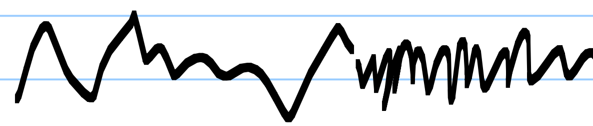
$$\frac{4kR_s}{4R_sC}$$



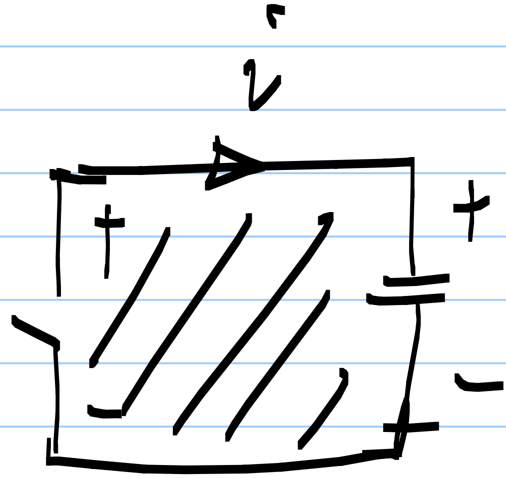




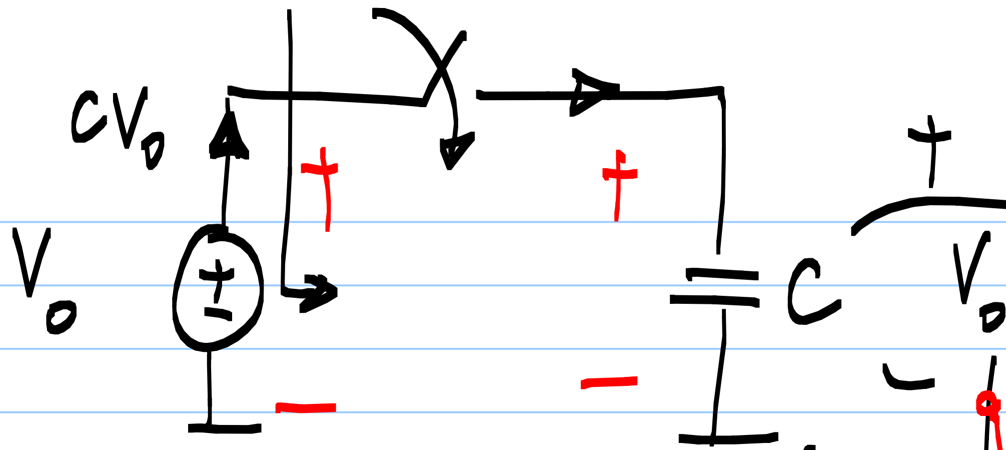




$$\frac{kT}{2} = \frac{1}{2} C \overline{V^2} \qquad \overline{V^2} = \frac{kT}{C}$$

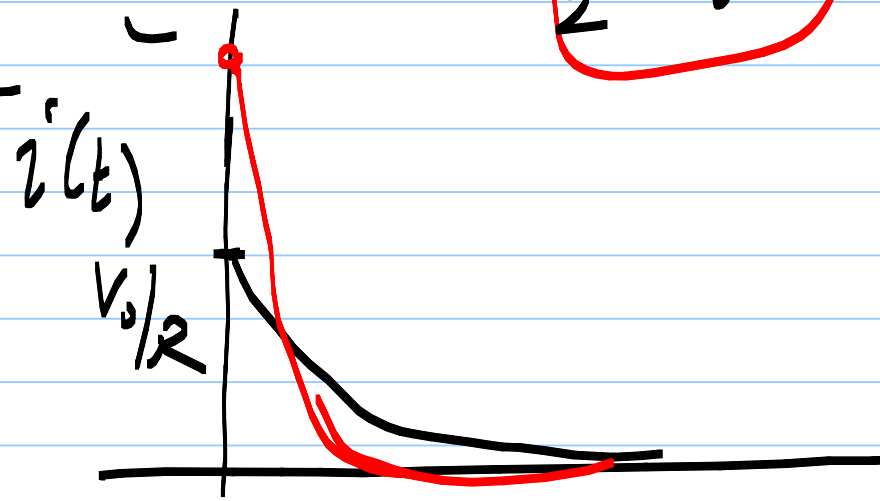


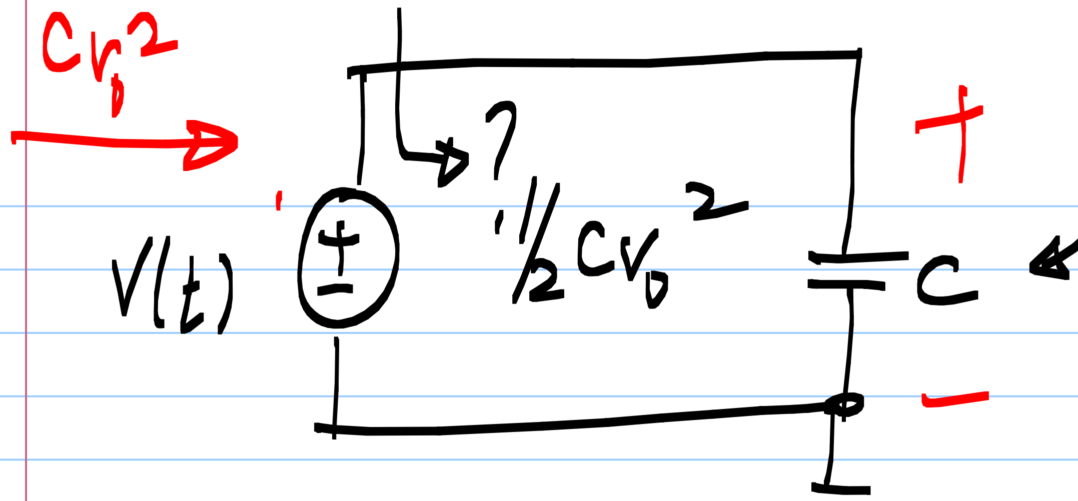
$$\frac{di}{dt} \longrightarrow \infty$$



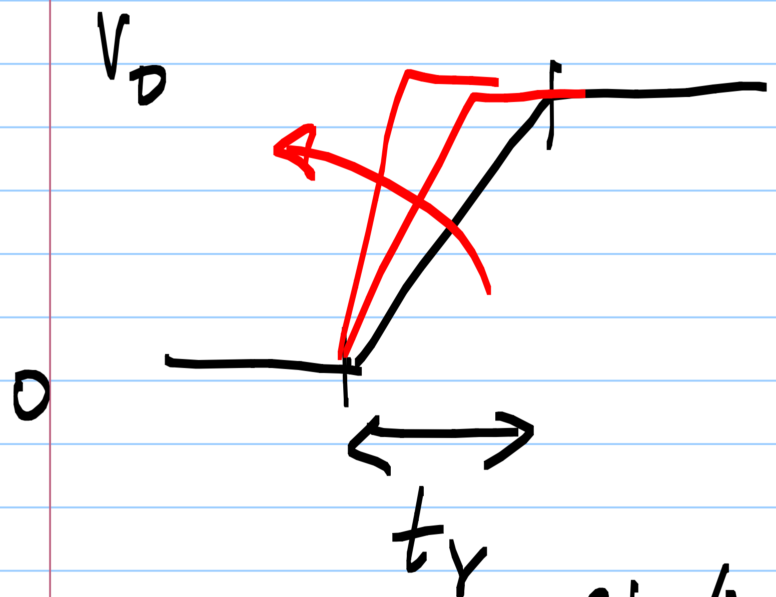
$$\boxed{\frac{1}{2} C V_0^2}$$

$\rightarrow C V_0^2$





$\frac{1}{2}Cv_0^2$



Cv_0/t_r