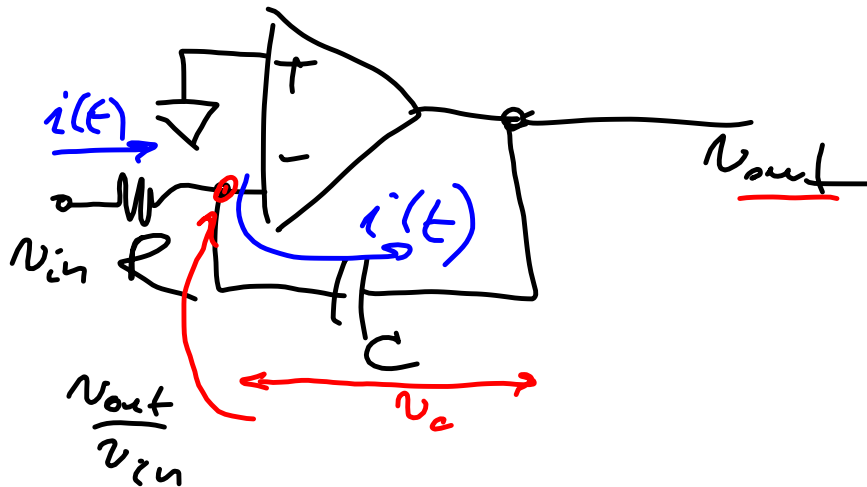


CPE381 #9

Have 63
max 96

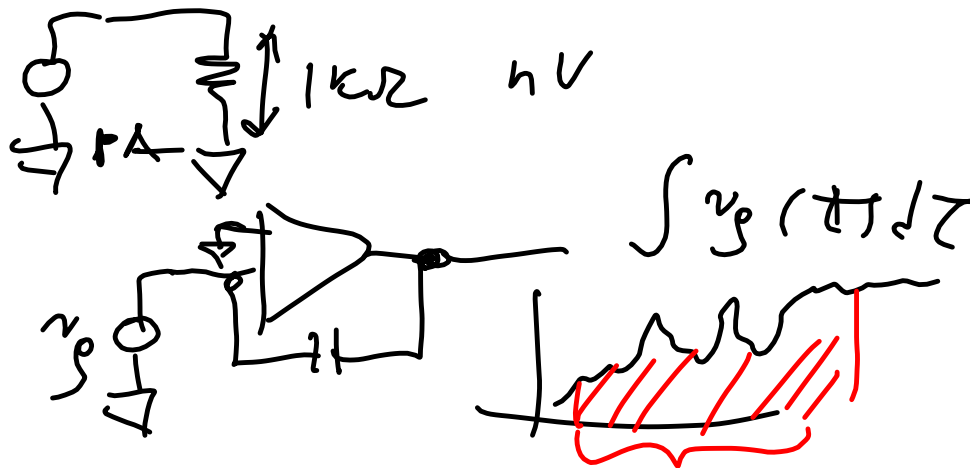
10.

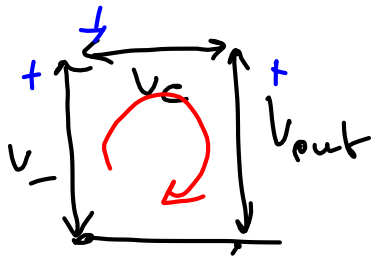


$$v_{out} = (\quad) v_{in} \Rightarrow (\quad) = \frac{v_{out}}{v_{in}}$$

$$i(t) = \dots$$

$$v_c(t) = \frac{1}{C} \int_0^t i(\tau) d\tau$$





$$V_{out} + V_c + V_- = 0$$

$$V_{out} = -V_c$$

4. Laplace

1. READ

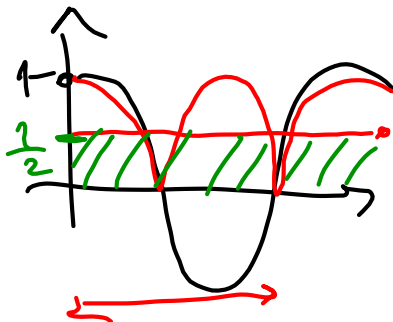
2. $\cos(ax)$

$$\int_0^x \cos^2(ax) = \frac{x}{2} + \frac{\sin(2ax)}{4a}$$

$$\int_0^T \cos^2(ax) dx = \left. \frac{x}{2} + \frac{\sin(2ax)}{4a} \right|_0^T$$

$$= \frac{T}{2} - \frac{0}{2} + \frac{\sin(2aT)}{4a}$$

$b=T \quad \int = \frac{1}{2}$



$$P_{ave} = \frac{1}{T} \int_0^T x^2 dt = \frac{1}{2}$$

$$P_{ave} = A \cdot \cos(16\pi t) \Rightarrow$$

$$P_{ave} = \frac{1}{T} \int_0^T x^2(t) dt$$

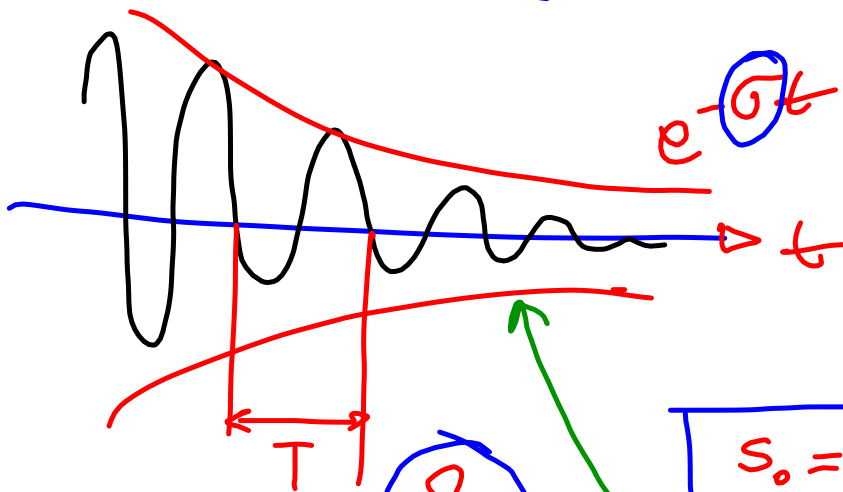
$$= \frac{1}{T} \int_0^T (4 \cdot \cos(16\pi t))^2 dt$$

$$= \frac{1}{T} \int_0^T 16 \cdot \cos^2(16\pi t) dt$$

$$P_{ave} = 16 \left[\frac{1}{T} \int_0^T \cos^2(16\pi t) dt \right] = 8$$

$$x(t) = 3 \cdot \cos(8\pi t) + 2 \cdot \cos(32\pi t)$$

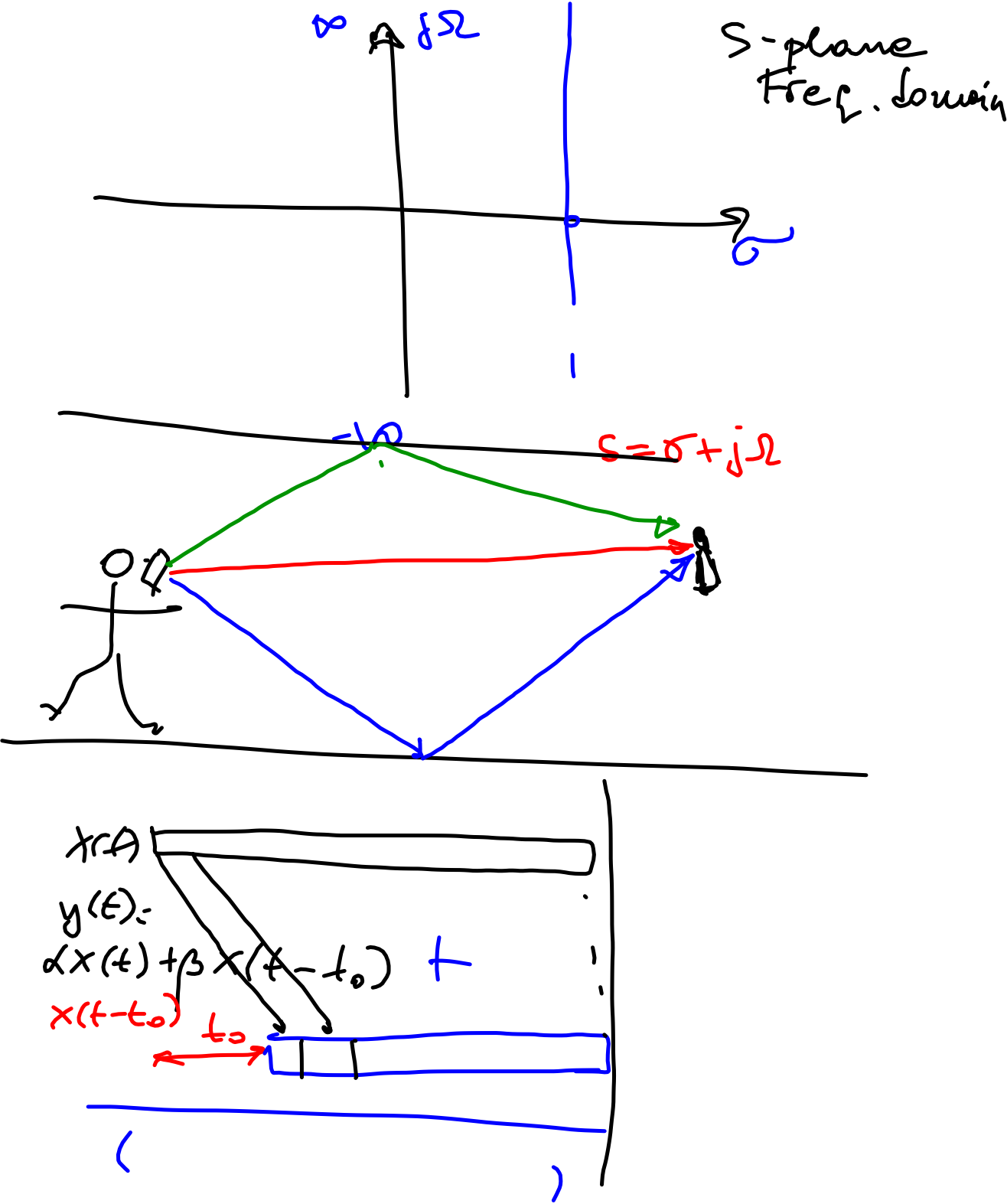
$$P_{ave} = \frac{1}{2} \cdot 3^2 + \frac{1}{2} \cdot 2^2 = 4.5 + 2 = \underline{\underline{6.5}}$$

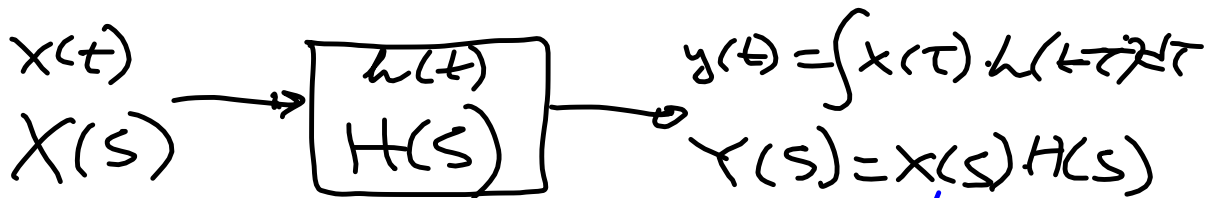


$$e^{s_0 t} = e^{(\sigma_0 + j\omega_0)t} = e^{\sigma_0 t} \cdot e^{j\omega_0 t}$$

σ_0 $s_0 = \sigma + j\omega_0$

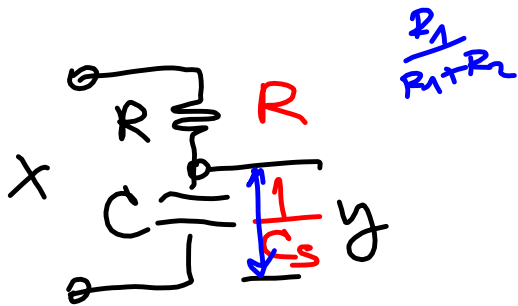
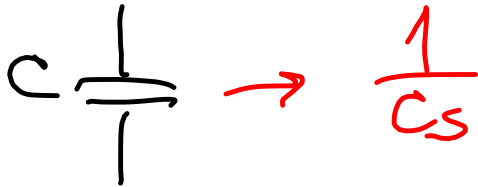
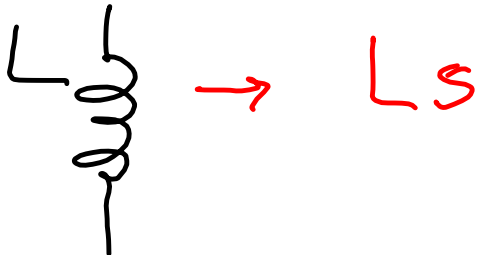
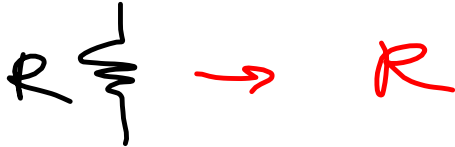
$\cos \omega_0 t + j \sin \omega_0 t$





LAPLACE

$$H(s) = \frac{Y(s)}{X(s)}$$



$$\frac{\frac{1}{Cs}}{R + \frac{1}{Cs}} = \frac{1}{Rc s + 1}$$

$$H(s) = \frac{\frac{1}{Rc}}{s + \frac{1}{Rc}}$$

$$Y(s) = X(s) \cdot H(s)$$

$$= \frac{1}{s} \cdot \frac{\frac{1}{Rc}}{s + \frac{1}{Rc}}$$

$$y(t) = \mathcal{L}^{-1}[Y(s)]$$

