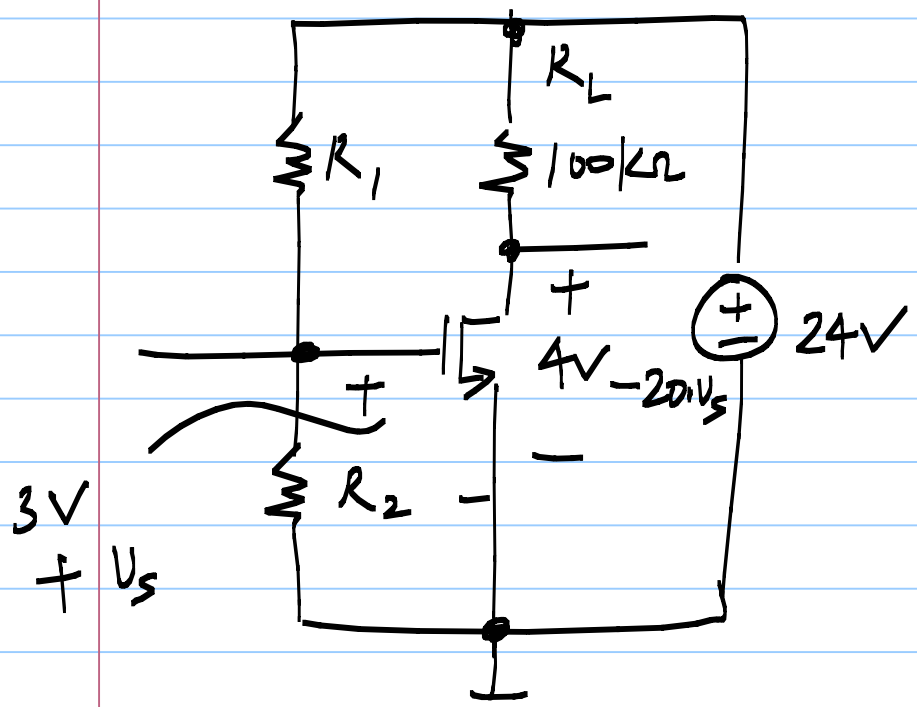
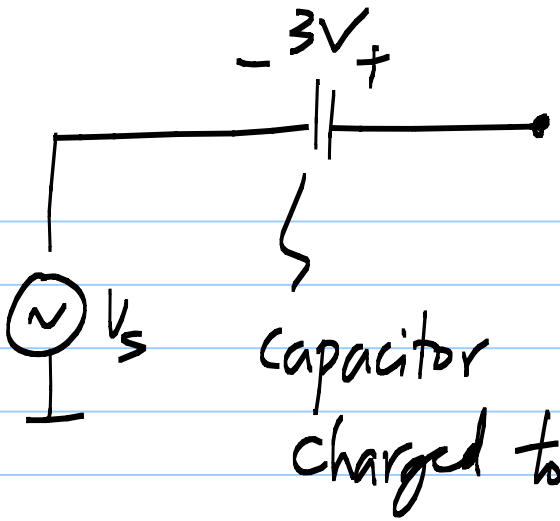
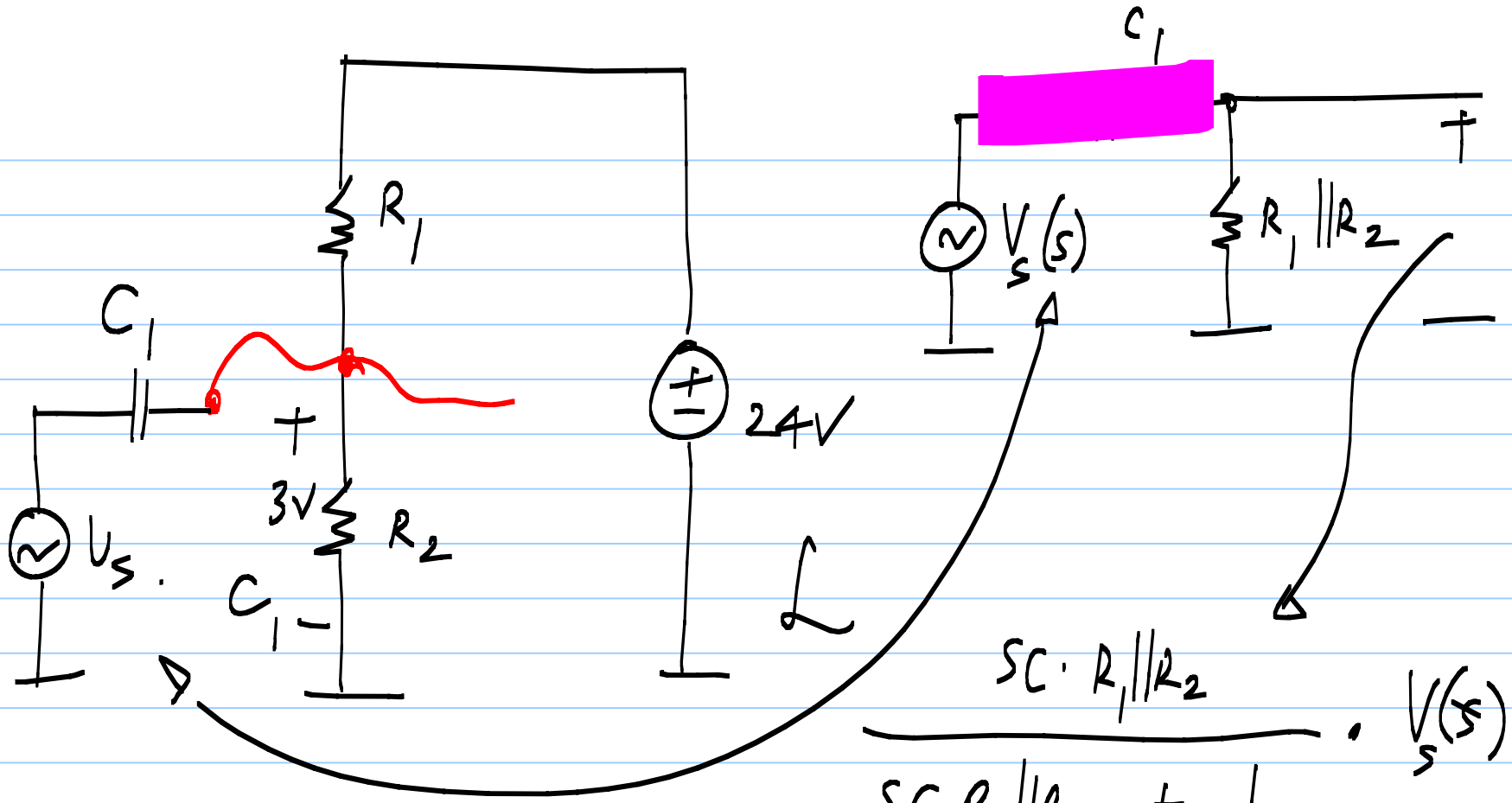
$V_{GS} = 3V$, $V_{DS} = 4V$



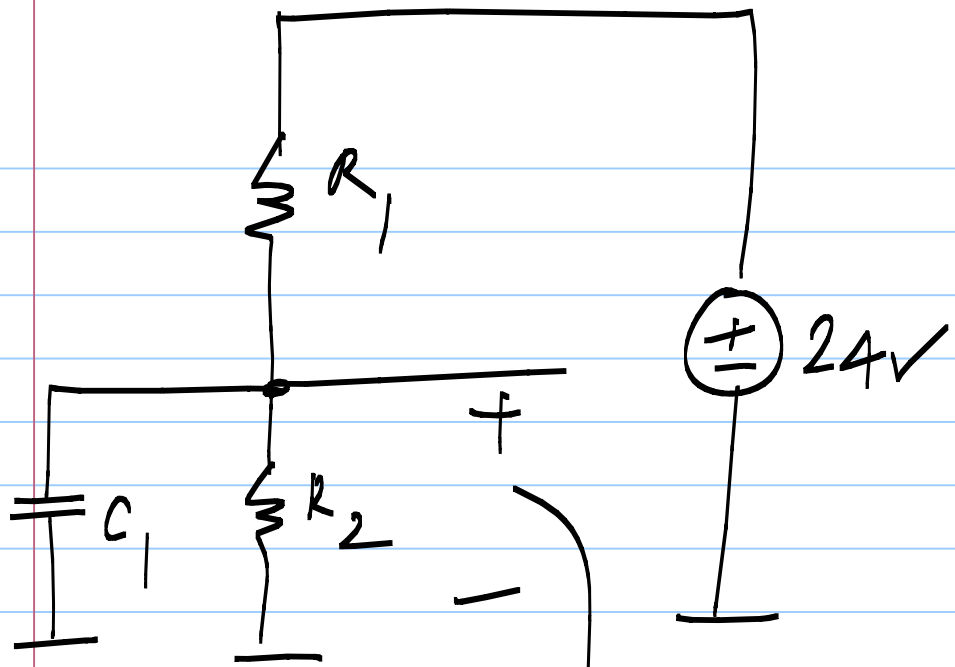


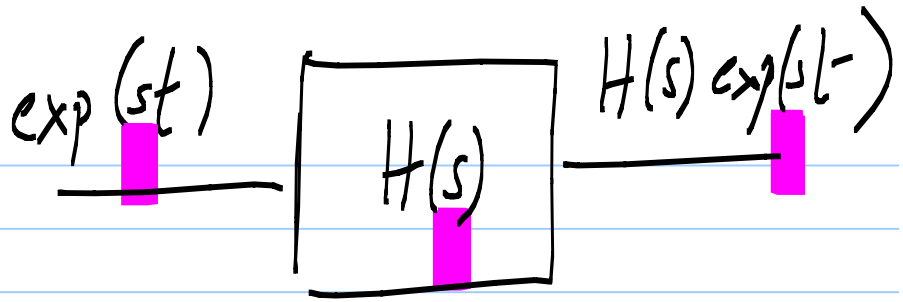
$$\frac{R_2}{R_1 + R_2} = \frac{3V}{24V}$$



$$\frac{R_1}{R_1 + R_2} = \frac{3V}{24V}$$

$$\frac{sC \cdot R_1 \| R_2}{sC \cdot R_1 \| R_2 + 1} \cdot V_s(s)$$





$$24V \cdot \frac{\frac{1}{sC_1} \| R_2}{\frac{1}{sC_1} \| R_2 + R_1} = 24V \frac{R_2}{R_2 + R_1}$$

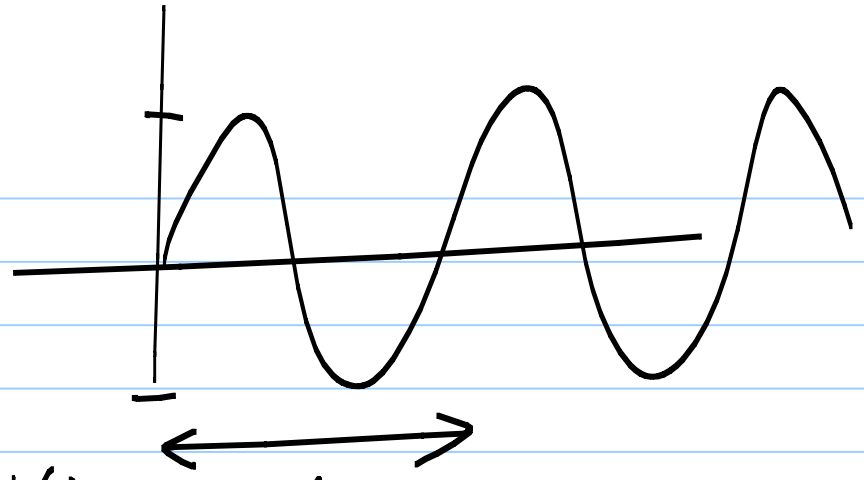
Voltage across R_2 = $3V$ due to 24V source + $V_s(s) \cdot \frac{sC_1(R_1 \| R_2)}{1 + sC_1(R_1 \| R_2)}$

{Laplace domain}

$$v_{R_2} \simeq 3V + v_s(t)$$

U_s: 1kHz sinusoid

$s = j \cdot 2\pi \cdot 10^3$ rad/s

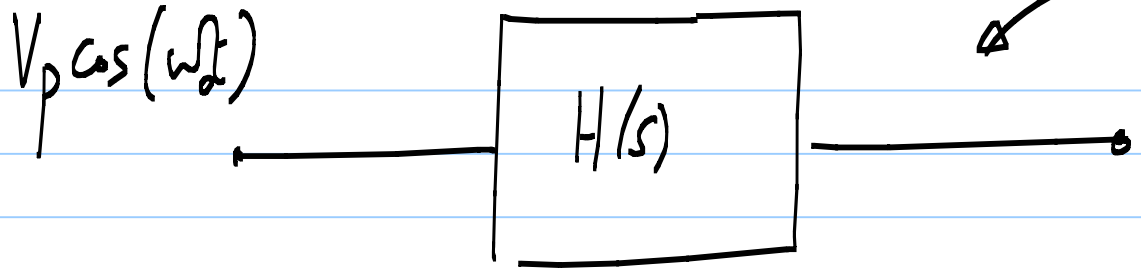


$\exp(st) \xrightarrow{H(s)} \exp(st)\, H(s)$

$s = \sigma + j\omega$

$\exp(\sigma t + j\omega t)$

$\exp(\sigma t)\, \exp(j\omega t)$



$V_p |H(j\omega_s)| \cdot \cos(\omega_s t + \angle H(j\omega_s))$

$$V_{R_2}(j\omega) = 3V + \frac{j\omega C_1 (R_1 \| R_2)}{1 + j\omega C_1 (R_1 \| R_2)}$$

$$\omega C_1 (R_1 \| R_2) \gg 1$$

$$C_1 \gg \frac{1}{\omega (R_1 \| R_2)}$$

$$R_1 \| R_2 \gg \frac{1}{\omega C_1}$$

$$|\cdot| \quad \frac{\omega C_1 (R_1 \| R_2)}{\sqrt{1 + \omega^2 C_1^2 (R_1 \| R_2)^2}}$$