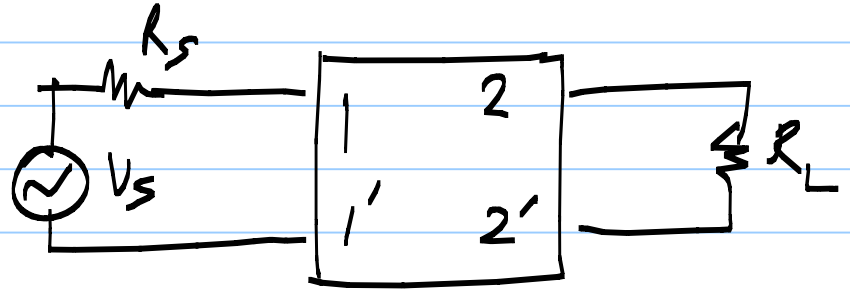
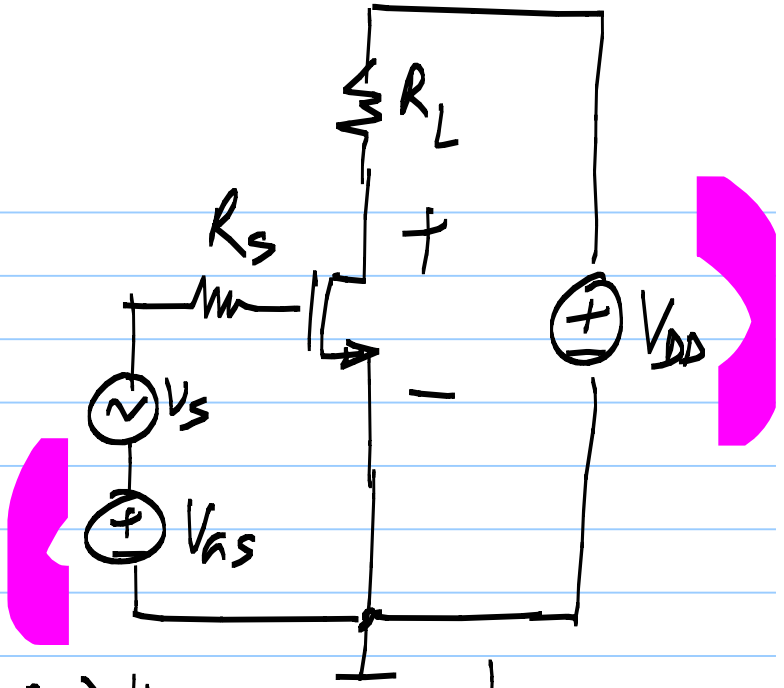
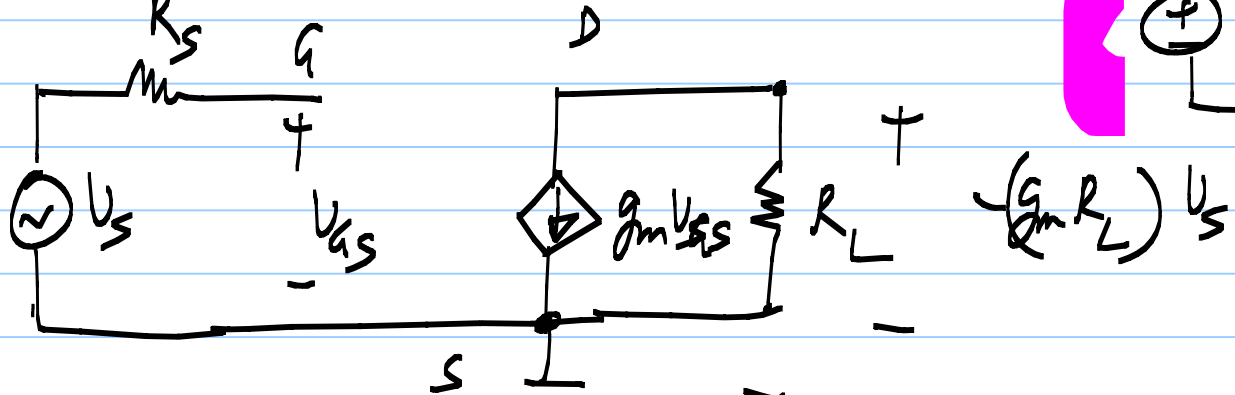
Amplifier: $V_o = k \cdot V_s$



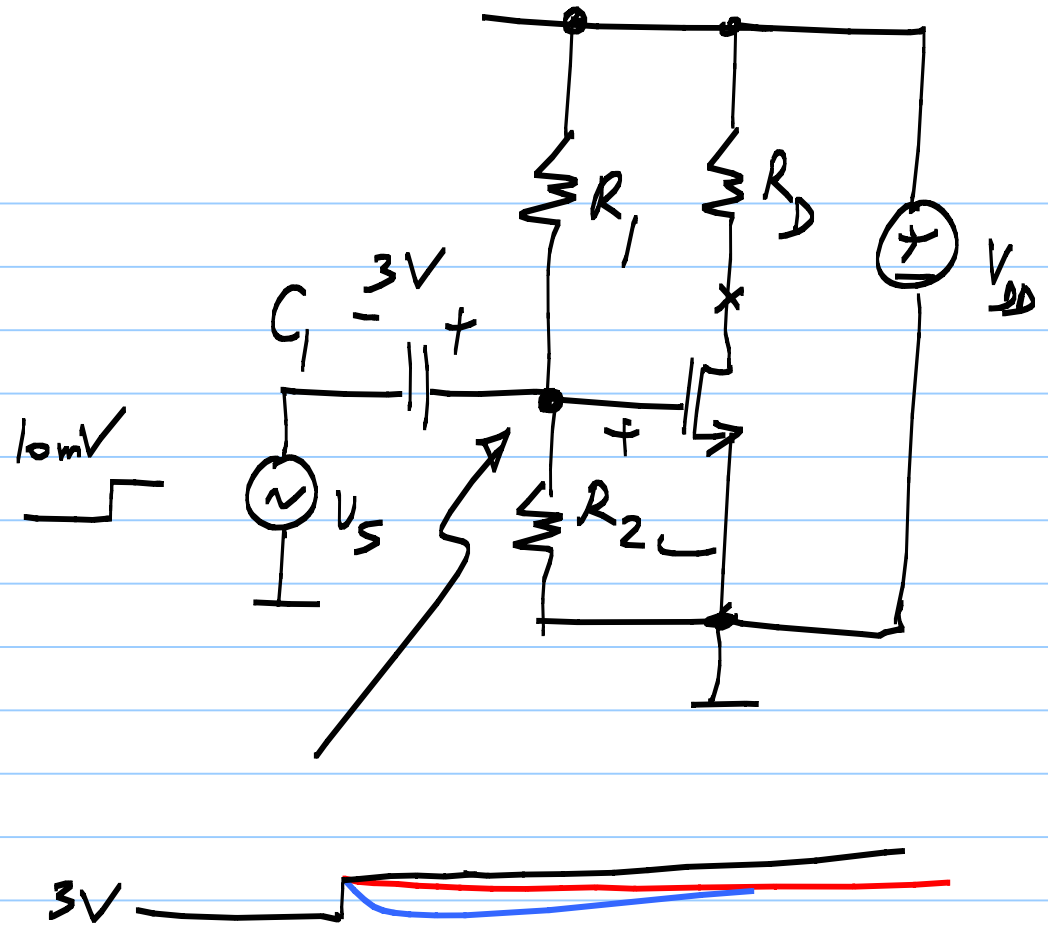




$-(g_m R_L) V_s$

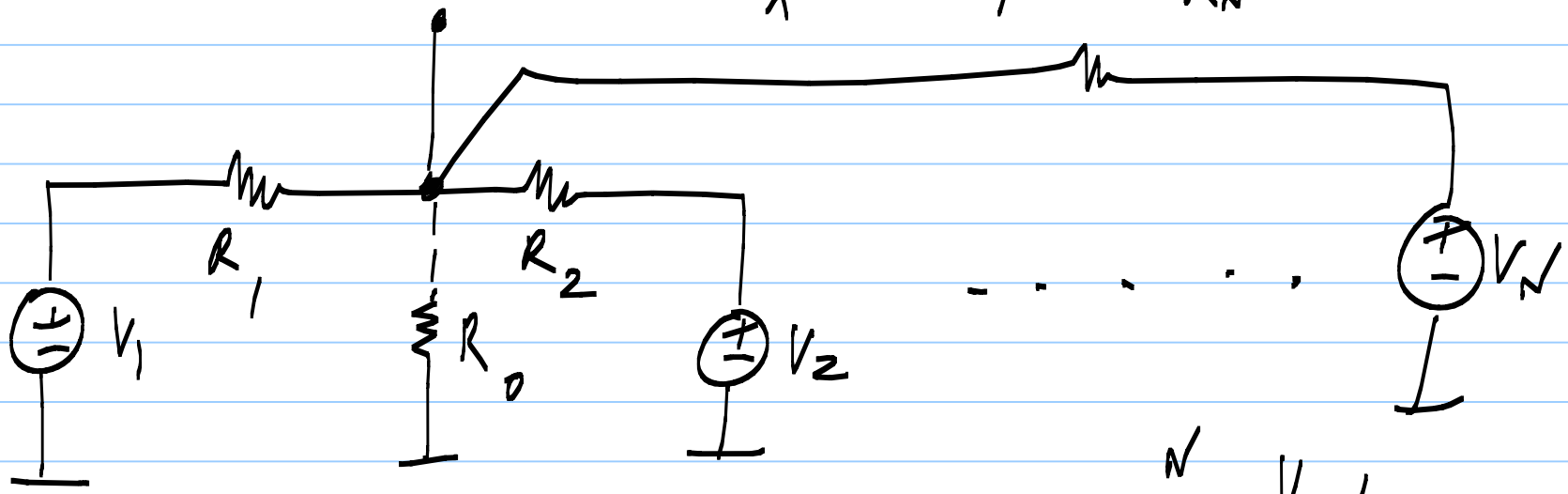
Small signal eq.

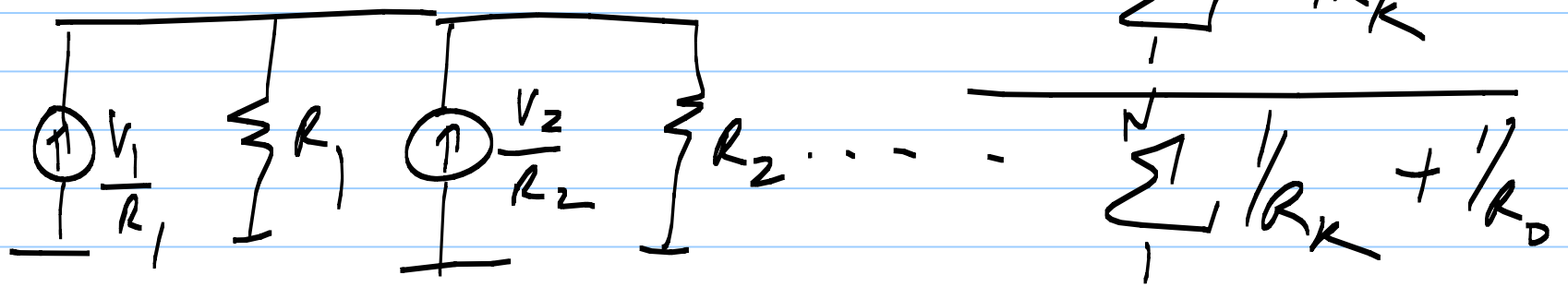
$$\frac{1}{\omega C_1} \ll (R_1 \| R_2)$$



$$V_x = \alpha V_1 + \beta V_2$$

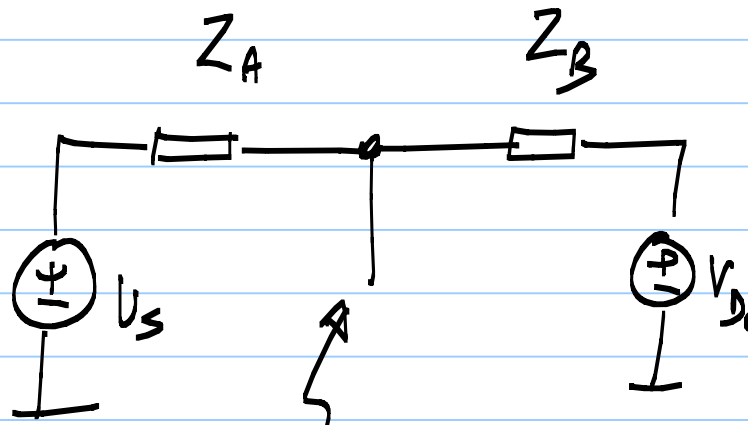
$$V_x = \alpha V_1$$





$$\frac{\sum_1^N V_K/R_K}{\sum_1^N 1/R_K + 1/R_D}$$

Across G-S of the MOS transistor: $v_s + V_{DC}$



freq = 0

$$\left[V_s(s)\right]\left[\frac{Z_B}{Z_A+Z_B}\right] + \left[V_{DC}\right]\left[\frac{Z_A}{Z_A+Z_B}\right]$$

freq ≠ 0

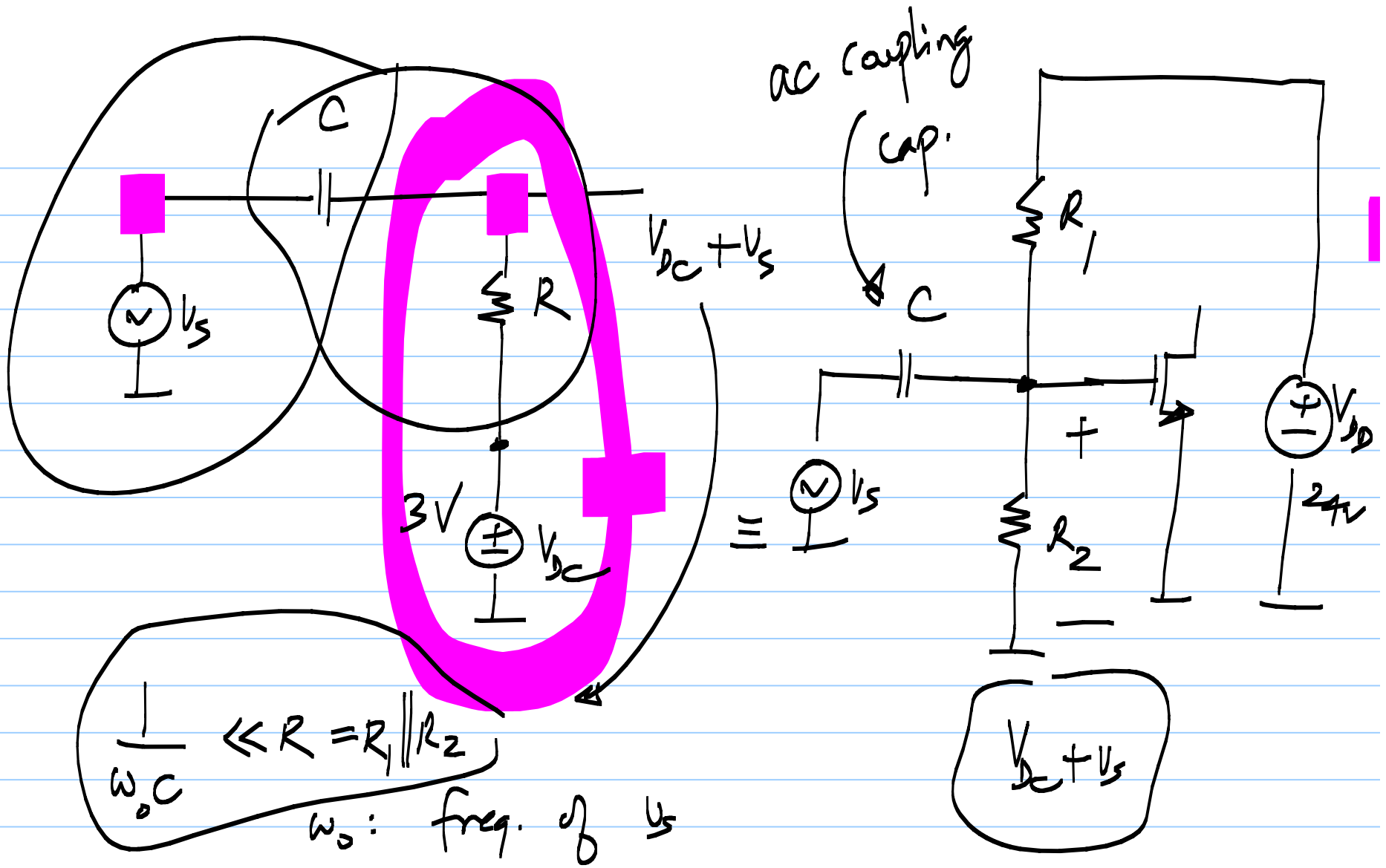
$Z_B \to 0$ @ $s=0$

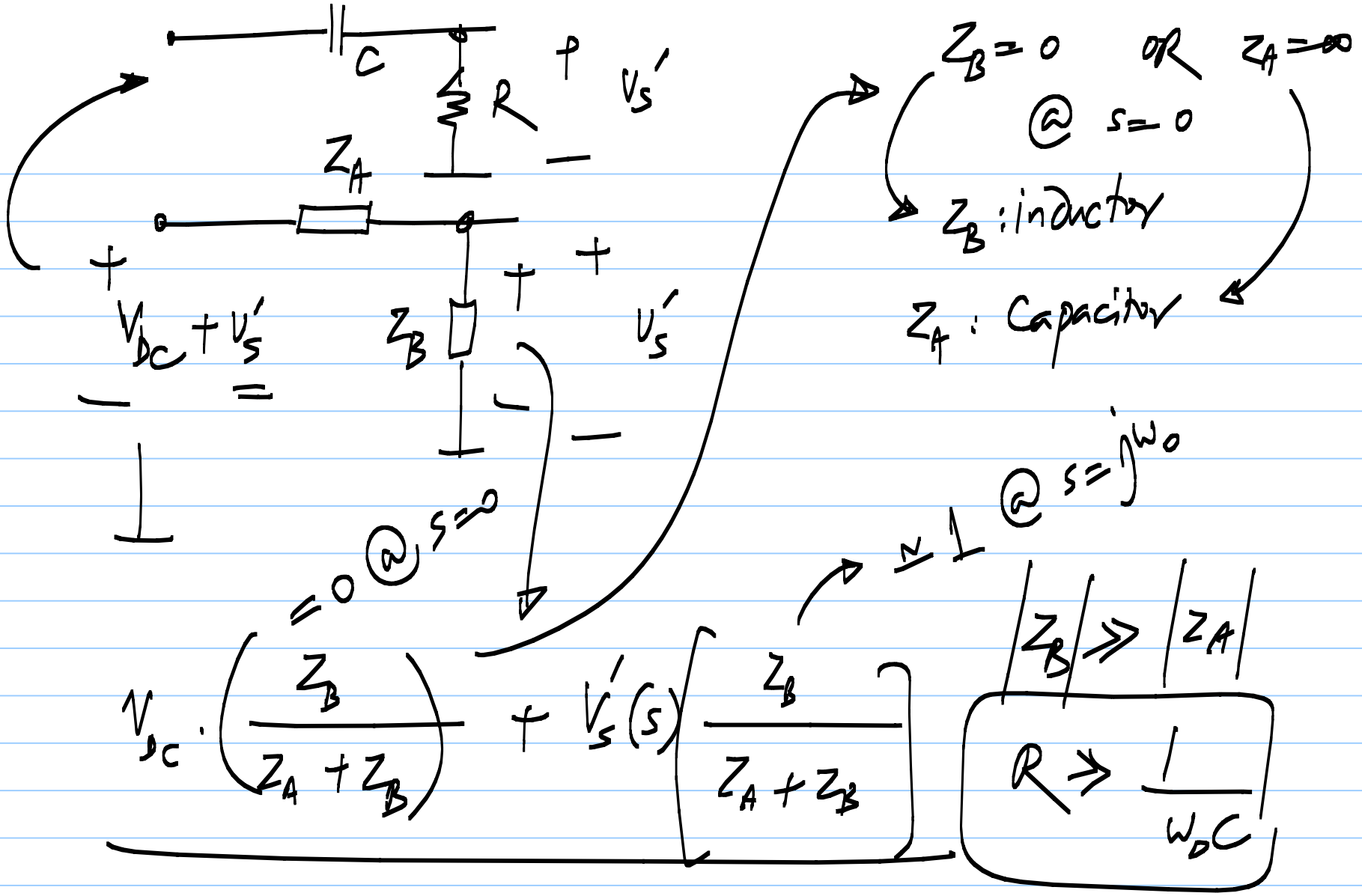
$|Z_A| \gg |Z_B|$ @ dc. ($s=0$) so that $V_{DC} \cdot \frac{Z_A}{Z_A + Z_B} \simeq V_{DC}$

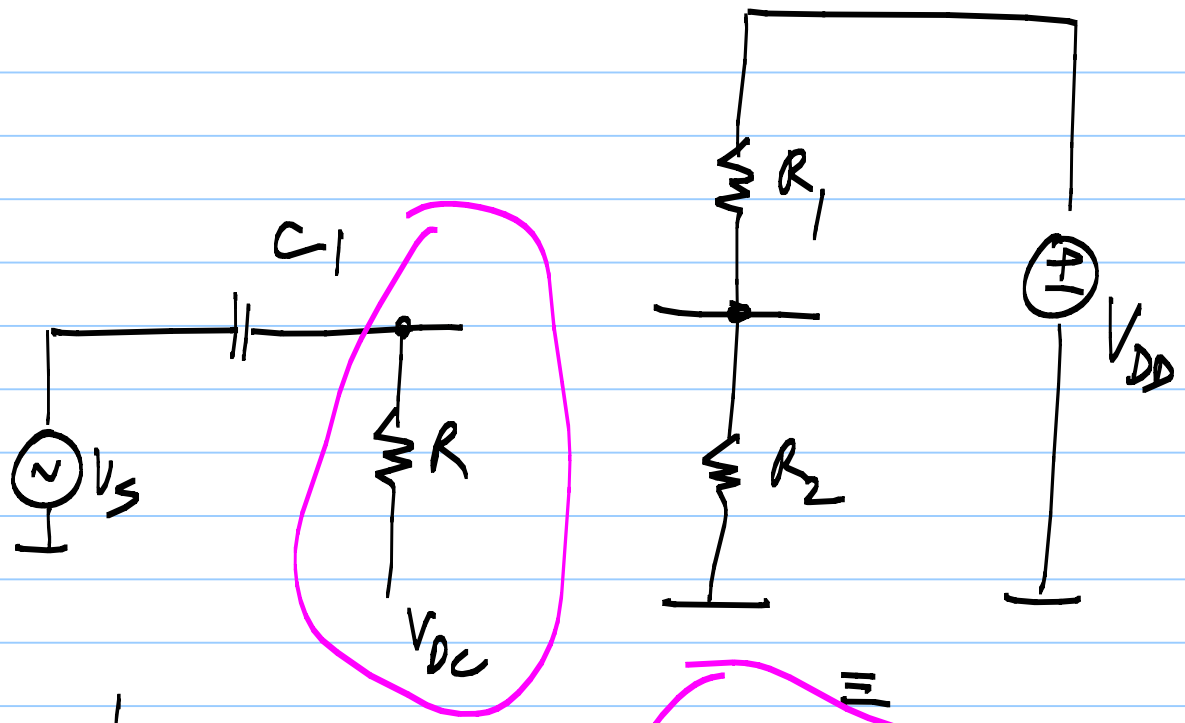
$|Z_B| \gg |Z_A|$ @ the freq. of V_s (ω_0) so that $V_s(s) \cdot \frac{Z_B}{Z_A + Z_B} \simeq V_s(s)$

	Z_A	Z_B	$\frac{Z_A}{C}$	$\frac{Z_B}{R}$
①	Capacitor	Resistor / Inductor		
②	Cap / resistor	Inductor		

$R \gg \frac{1}{\omega C}$


C
V_s
R
$V_{DC}+V_s$
3V
V_{DC}
$\frac{1}{\omega_0 C} \ll R = R_1 \| R_2$
ω_0: freq. of V_s
ac coupling cap.
C
R_1
R_2
V_{DD}
2V
$V_{DC}+V_s$


C
R
Z_A
Z_B
$V_{DC} + V_s'$
V_s'
$Z_B = 0$ OR $Z_A = \infty$
@ $s = 0$
Z_B : inductor
Z_A : Capacitor
@ $s = j\omega_0$
≈ 1
$= 0$ @ $s = 0$
$V_{DC} \cdot \frac{Z_B}{Z_A + Z_B} + V_s'(s) \frac{Z_B}{Z_A + Z_B}$
$|Z_B| \gg |Z_A|$
$R \gg \frac{1}{\omega_0 C}$



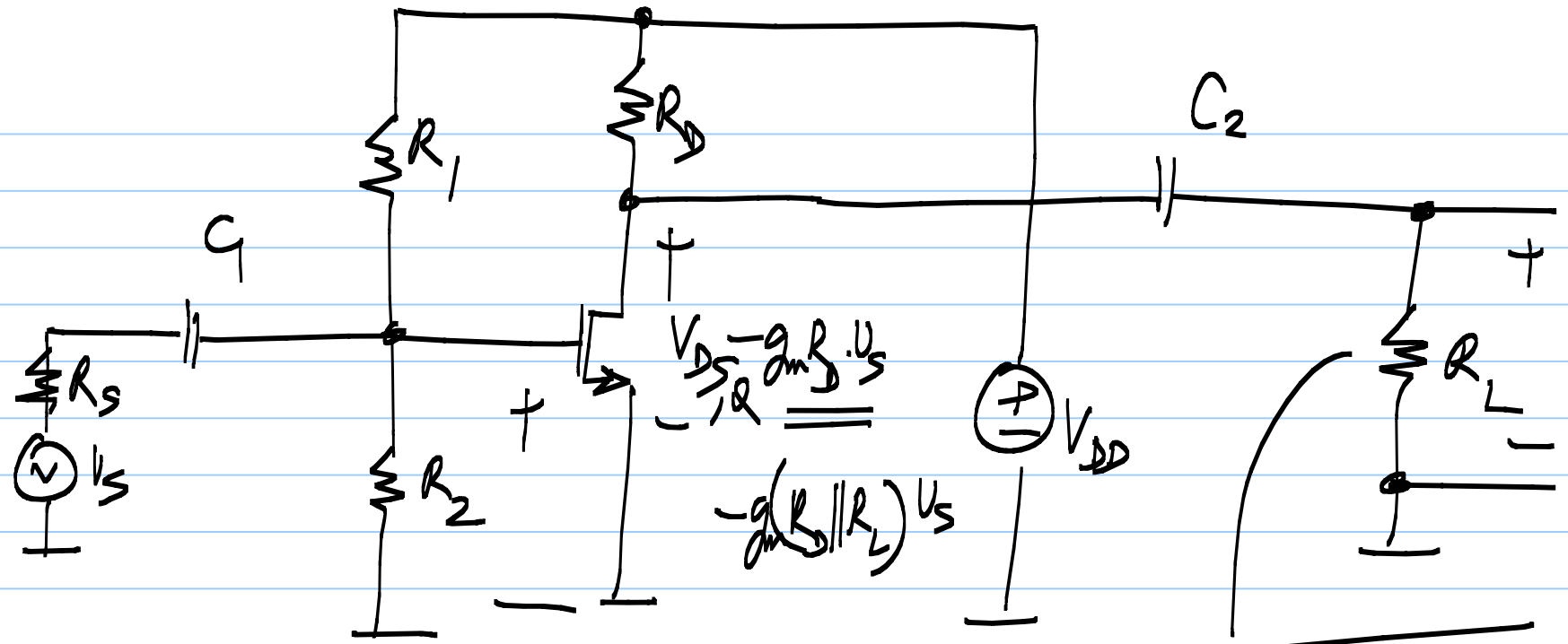
Combine V_s, V_{DC}

$$\frac{1}{\omega_s C_1} \ll R$$

$\equiv$

$R_1 \| R_2$

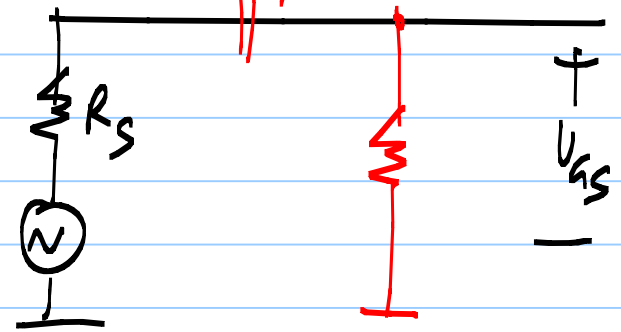
$V_{DD} \cdot \dfrac{R_2}{R_1 + R_2}$



$(R_1 \| R_2) \gg R_S$

$-g_m (R_D \| R_L) V_S$

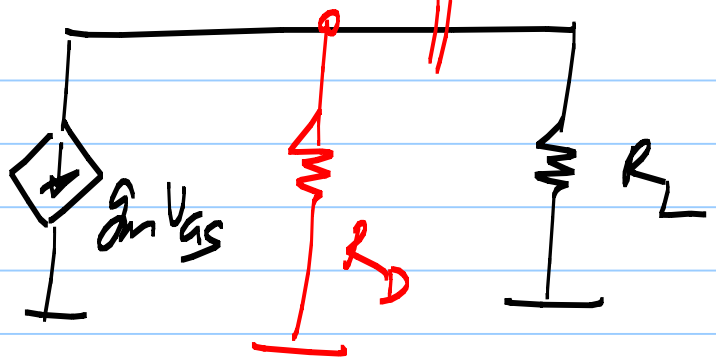
✓ $\left[\frac{1}{\omega C_1} \ll R_s + (R_1 \| R_2)\right]$



$(R_1 \| R_2)$

$R_1 \| R_2 \gg R_s$

$\frac{1}{\omega C_2} \ll R_D + R_L$



$R_D \gg R_L$