EE 209

8/3/2018

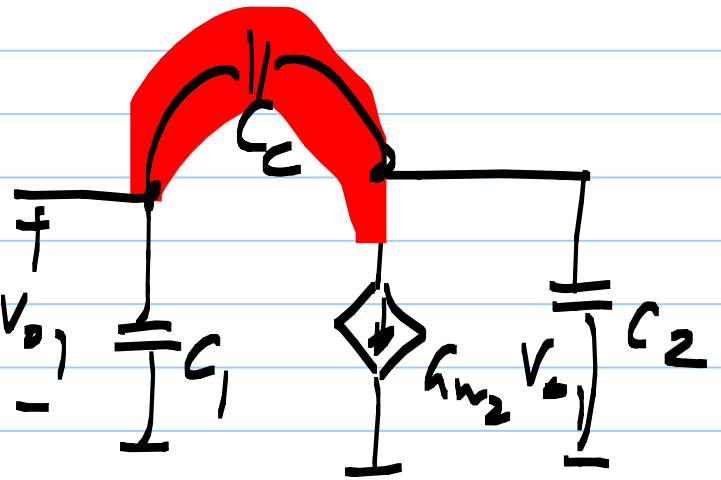
$C_c \gg C_1$

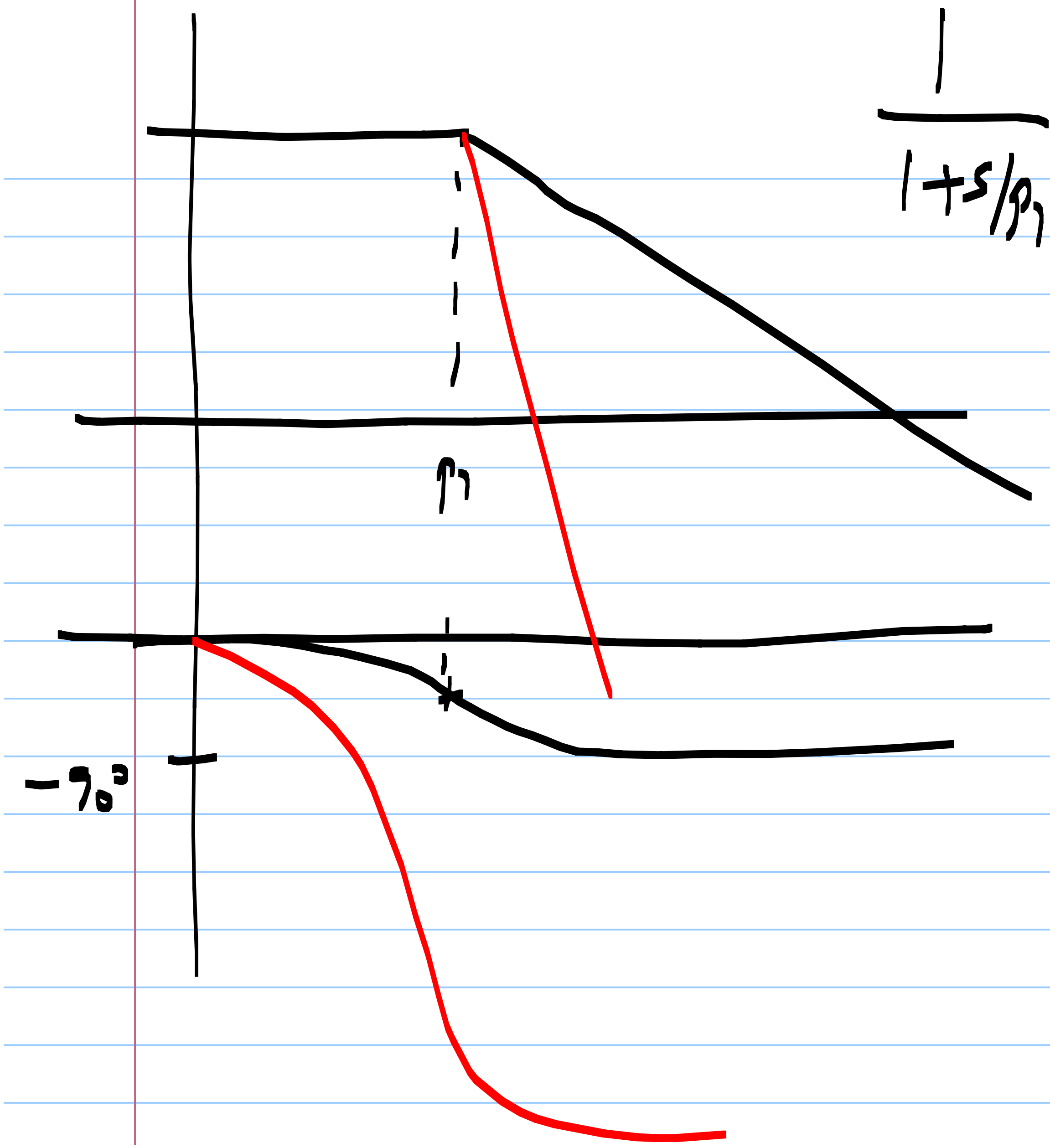
$$p_2 = \frac{g_{m_2} \cdot \frac{C_c}{C_1 + C_c}}{C_2 + \frac{C_c \cdot C_1}{C_c + C_1}}$$

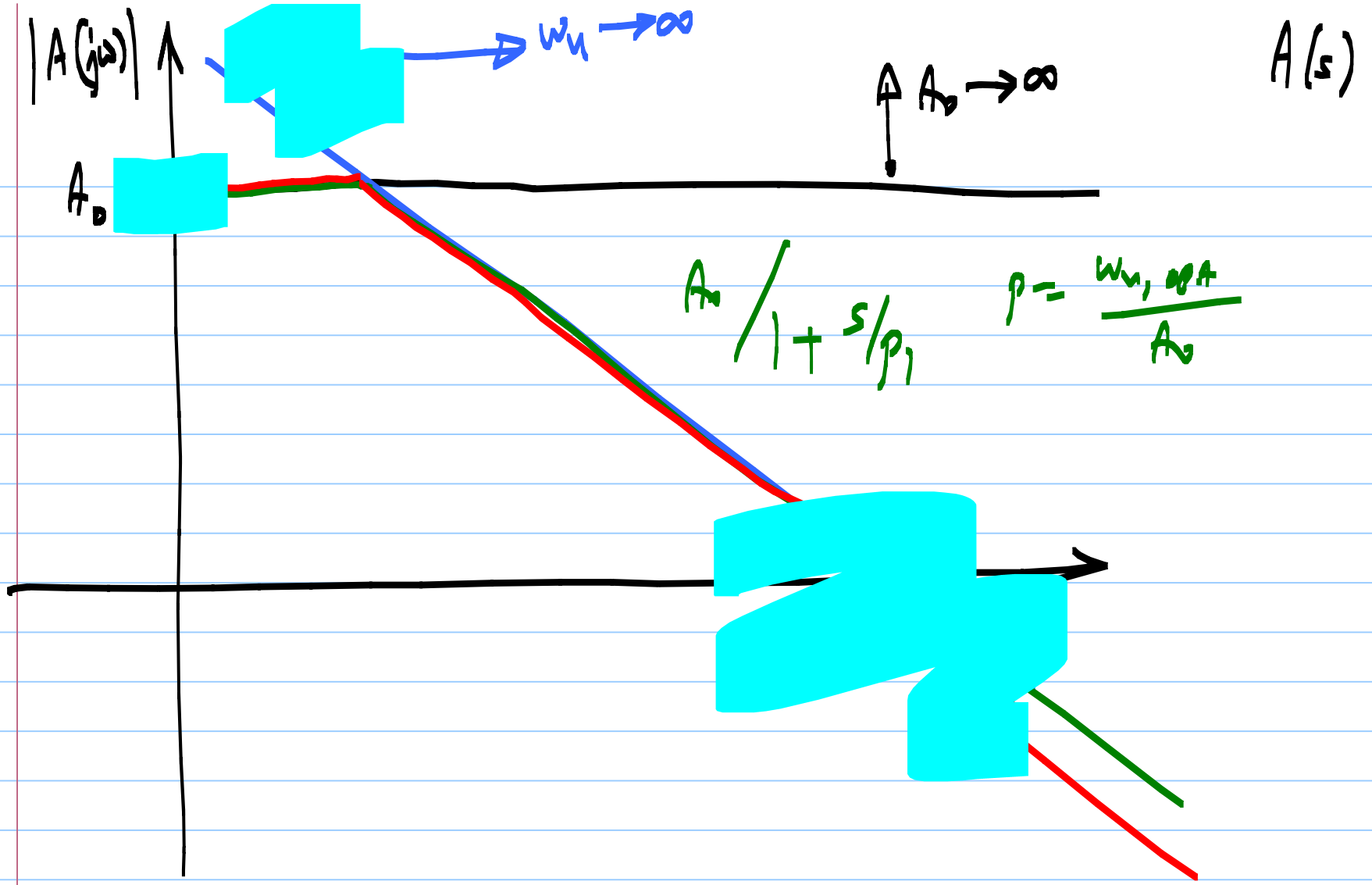
$$\tan^{-1}\frac{p_2}{\omega_{u,loop}} = \phi_M$$

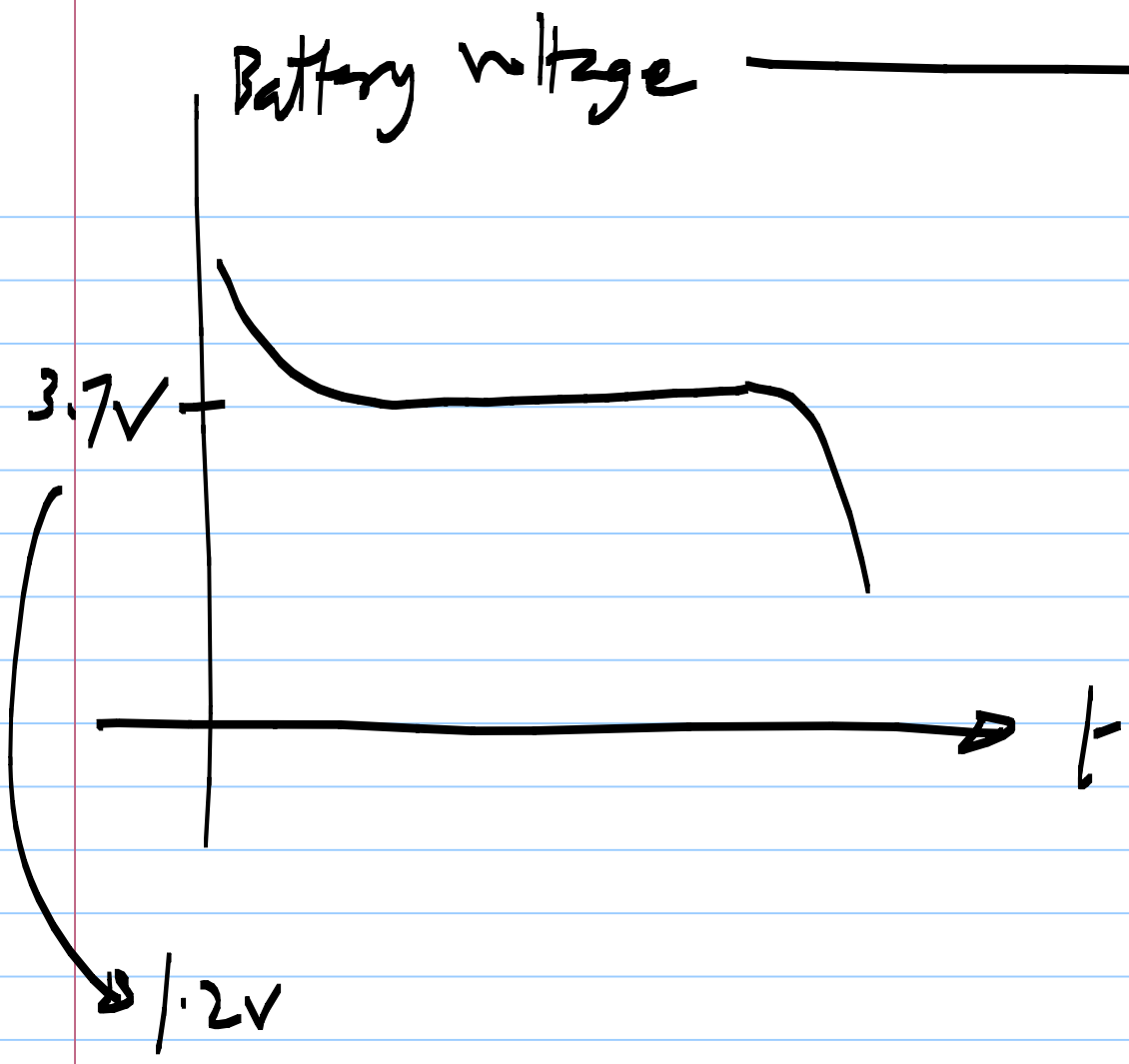
$$p_2 \simeq \frac{g_{m_2}}{C_2 + C_1}$$

C_c'




$\frac{1}{1+s/p_1}$
p_1
$-90°$

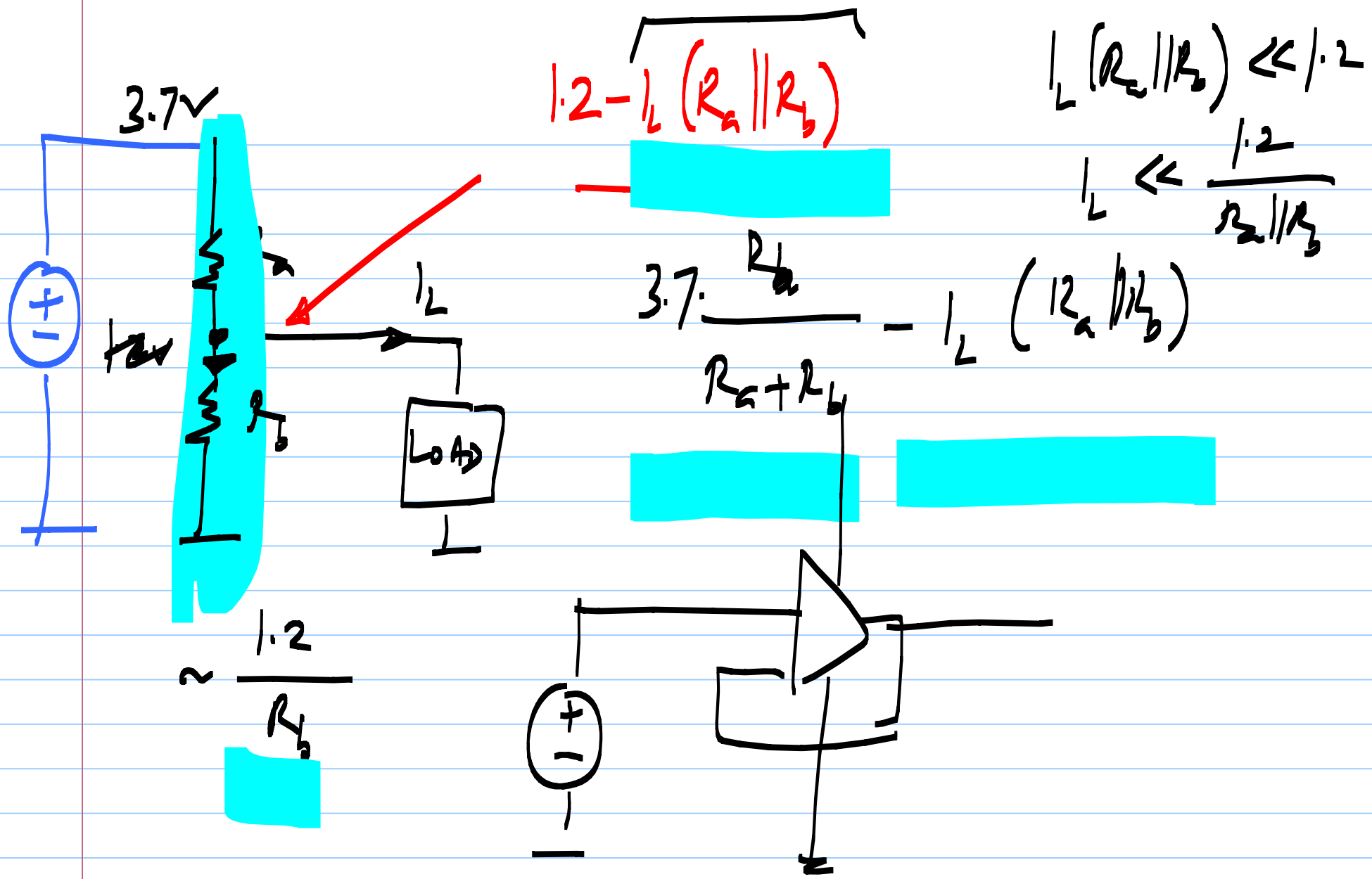

$|A(j\omega)|$
$A(s)$
$\omega_1 \to \infty$
$A_0 \to \infty$
A_0
$A_0 / 1 + s/p_1$
$p = \frac{\omega_{1,dB}}{A_0}$

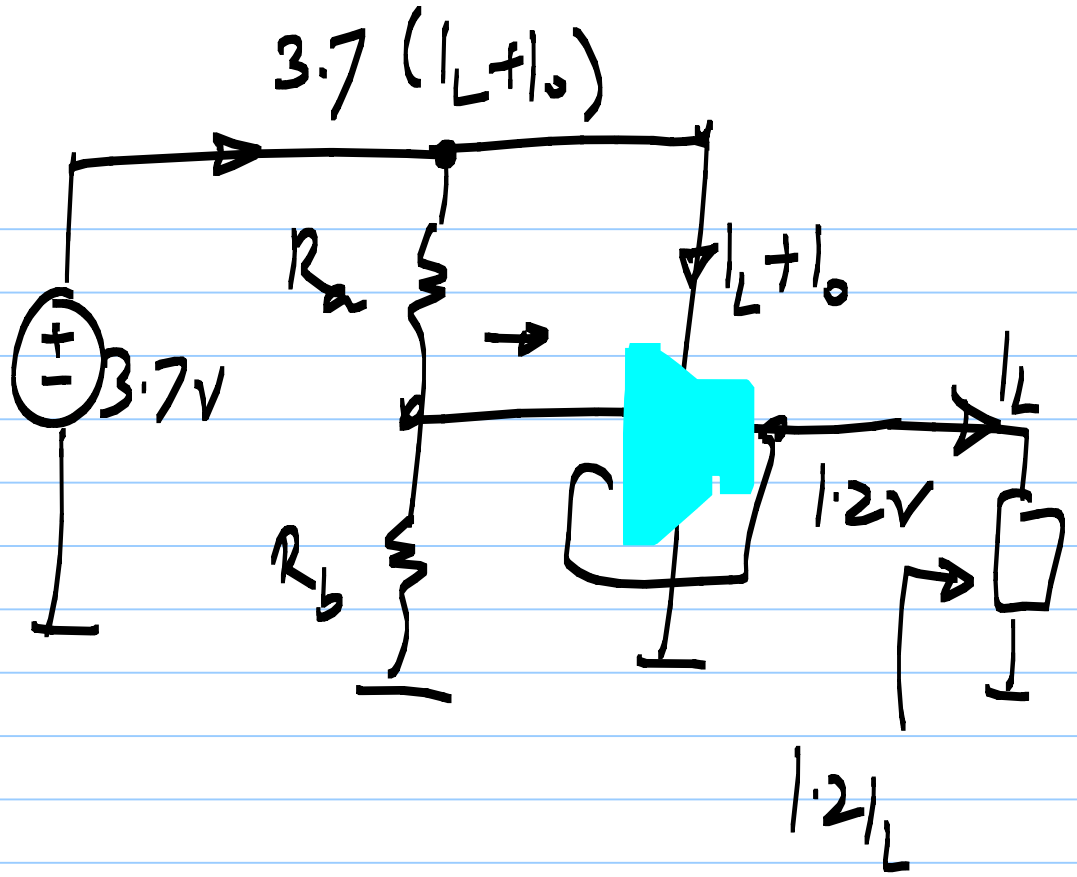


Generate different voltages from a single voltage

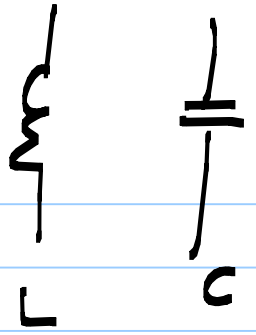
Regulate them accurately

Power management system


3.7V
R_a
R_b
I_L
LOAD
$1.2 - I_L(R_a \| R_b)$
$I_L(R_a \| R_b) \ll 1.2$
$I_L \ll \frac{1.2}{R_a \| R_b}$
$3.7 \cdot \frac{R_b}{R_a + R_b} - I_L(R_a \| R_b)$
$\sim \frac{1.2}{R_b}$

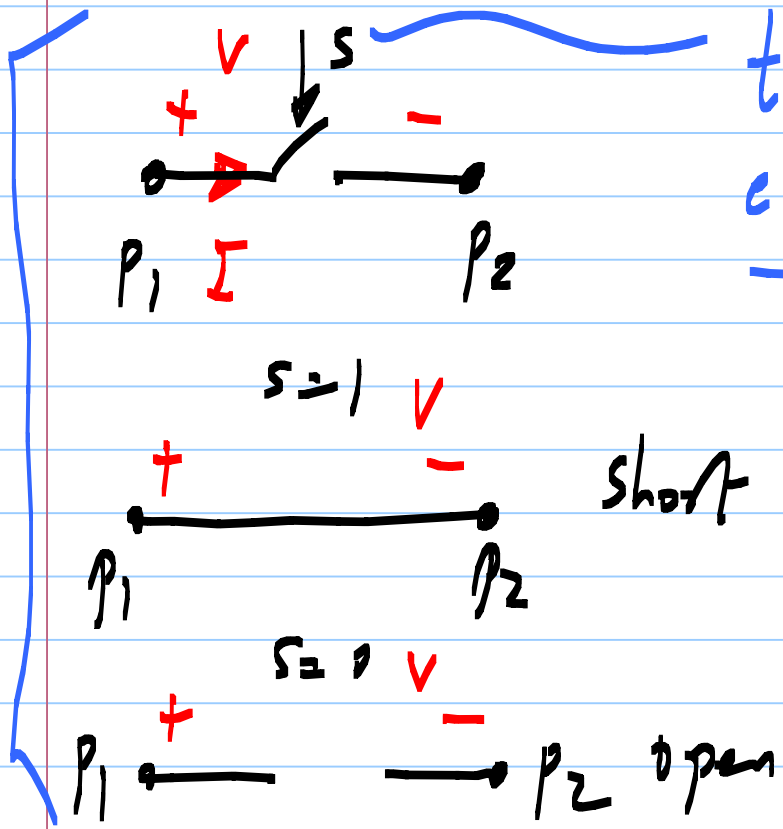

3.7 (I_L + I_b)
R_a
I_L + I_b
3.7V
I_L
1.2V
R_b
1.2 I_L

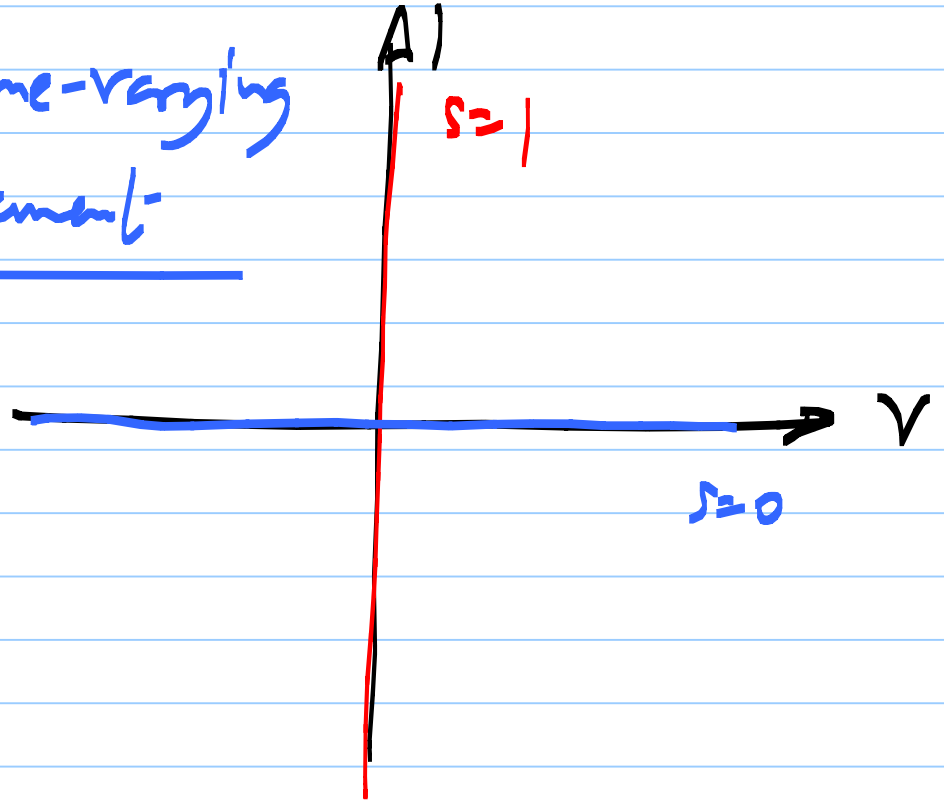
Use lossless components



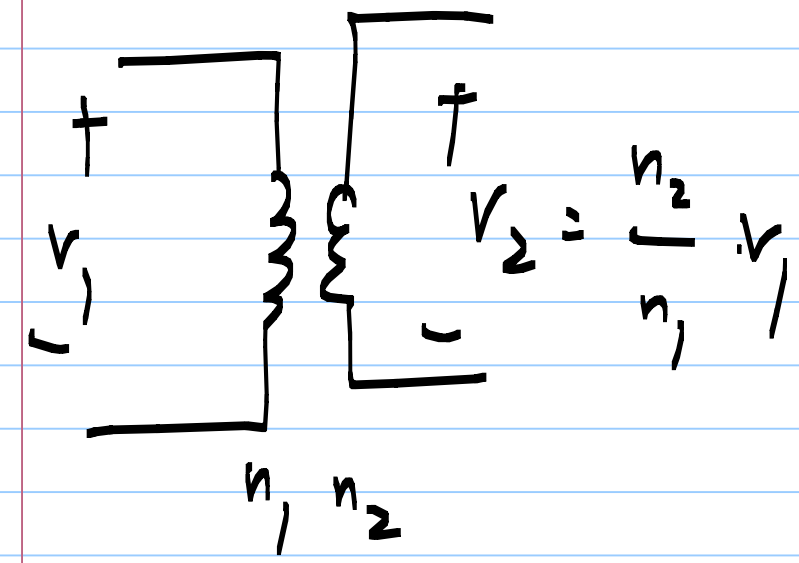
Ideal switch

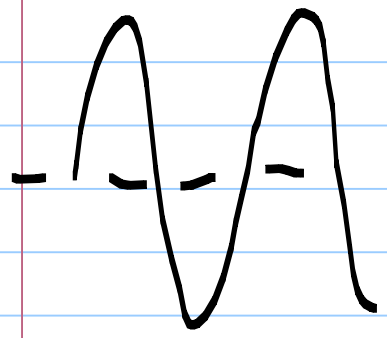
linear time-varying element



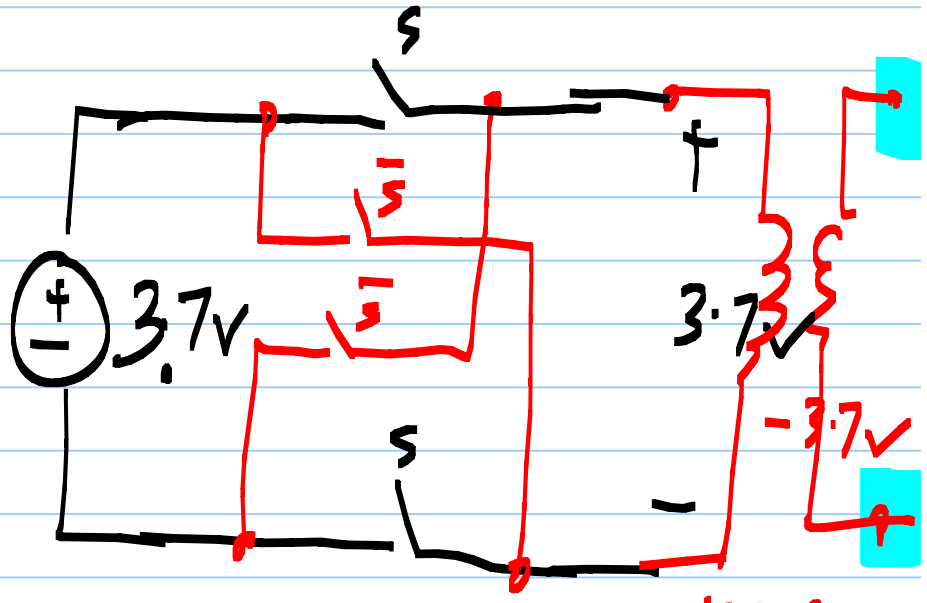


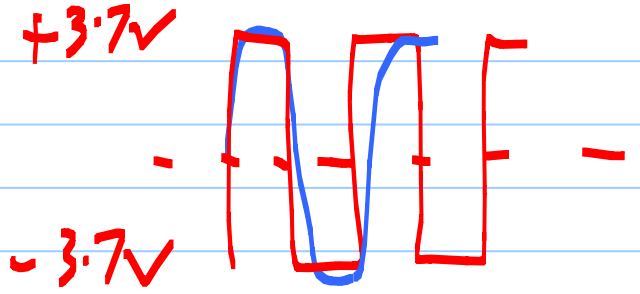
ac

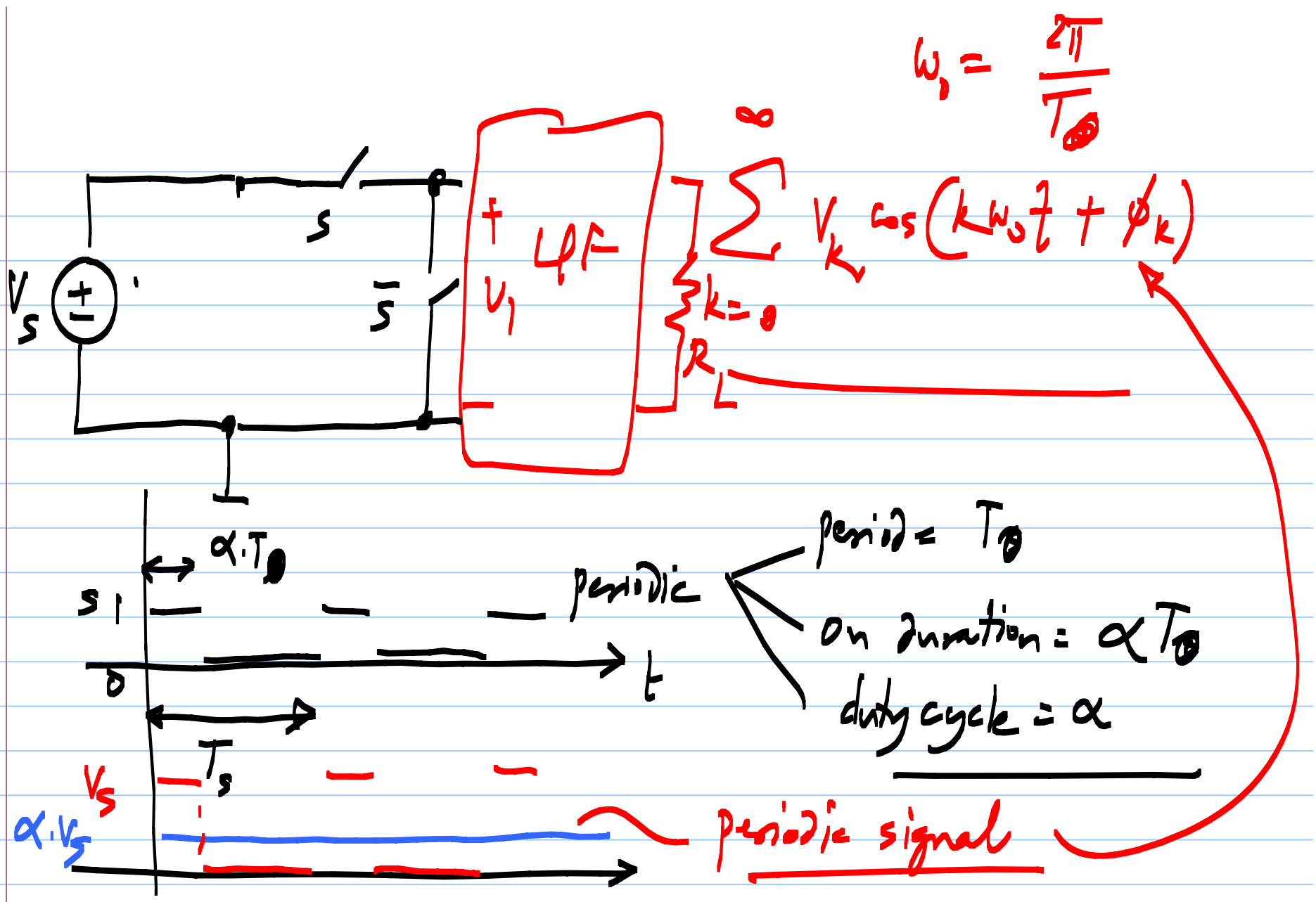




dc ?






$\omega_0 = \frac{2\pi}{T_0}$
V_s
S
$\bar{S}$
+
v_1
LPF
−
$\sum_{k=0}^{\infty} V_k \cos(k\omega_0 t + \phi_k)$
R_L
$\alpha \cdot T_0$
s_1
periodic
0
t
T_s
V_s
$\alpha \cdot V_s$
period = T_0
on duration = αT_0
duty cycle = α
periodic signal

$$v_y = \sum_{k=0}^{\infty} V_k \cos\left(k\omega_0 t + \phi_k\right) \qquad V_y = \alpha V_s$$

filter out all harmonics @ $k\omega_0$, $k \geq 1$

to retain only the dc component

Lowpass filter