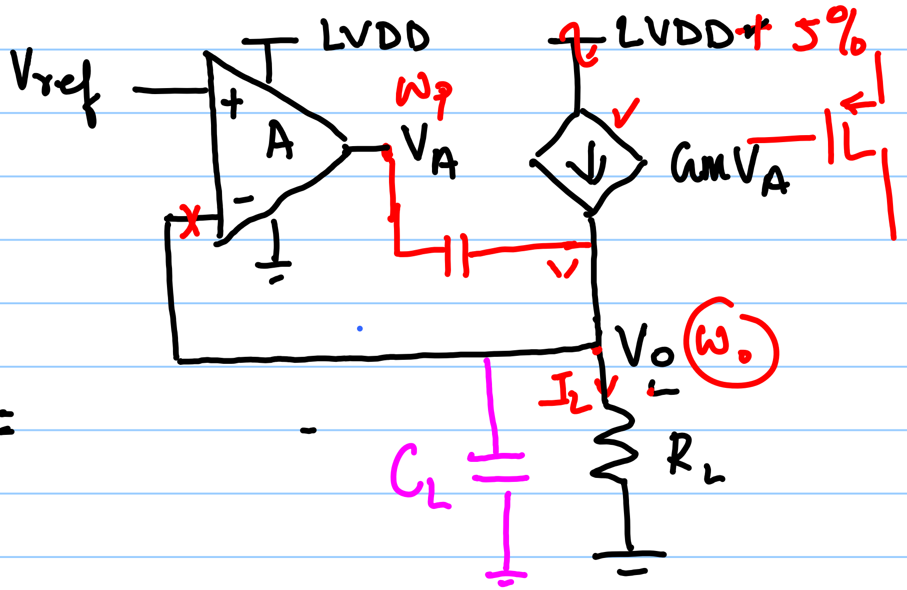
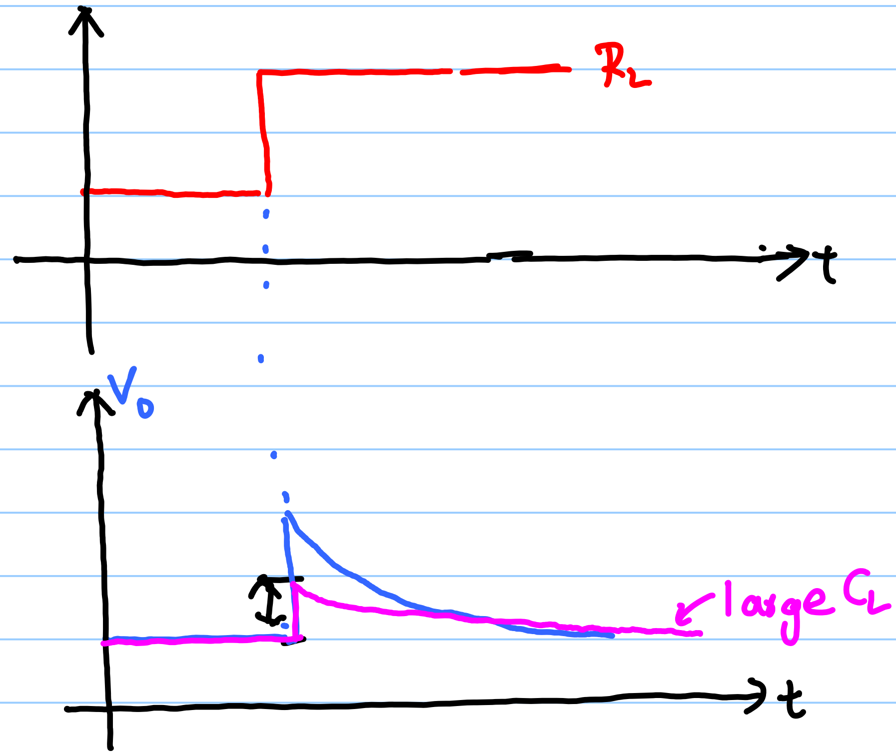
Note Title: Lecture #30 — 08-04-2021

Low Dropout Regulator

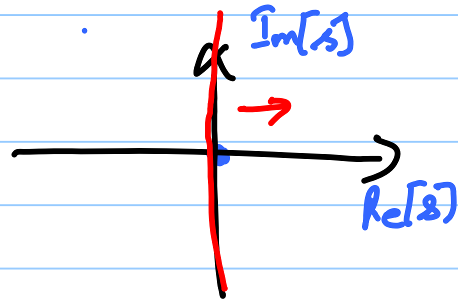
$$\frac{\Delta V_o(s)}{\Delta R_L(s)} =$$

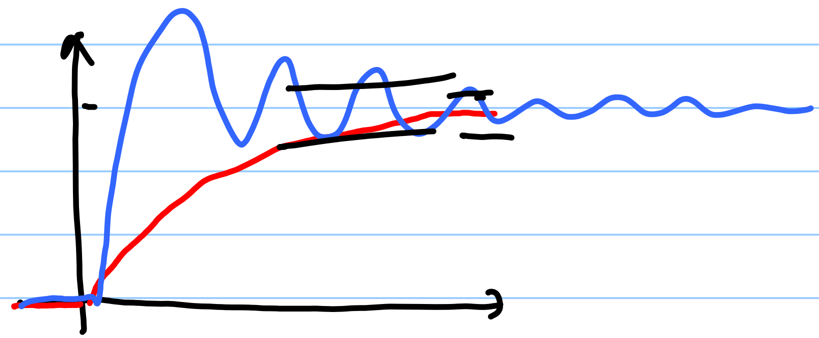
$$\frac{V_A(s)}{\Delta I_L(s)} =$$





$$LG(s) = \frac{G_m R_A}{1 + sR_L C_L} \cdot A = \frac{G_m R_A}{1 + sR_L C_L} \cdot \frac{A_0}{1 + s/\omega_p}$$





$\omega_o = \frac{1}{R_L C_L}$, ω_p

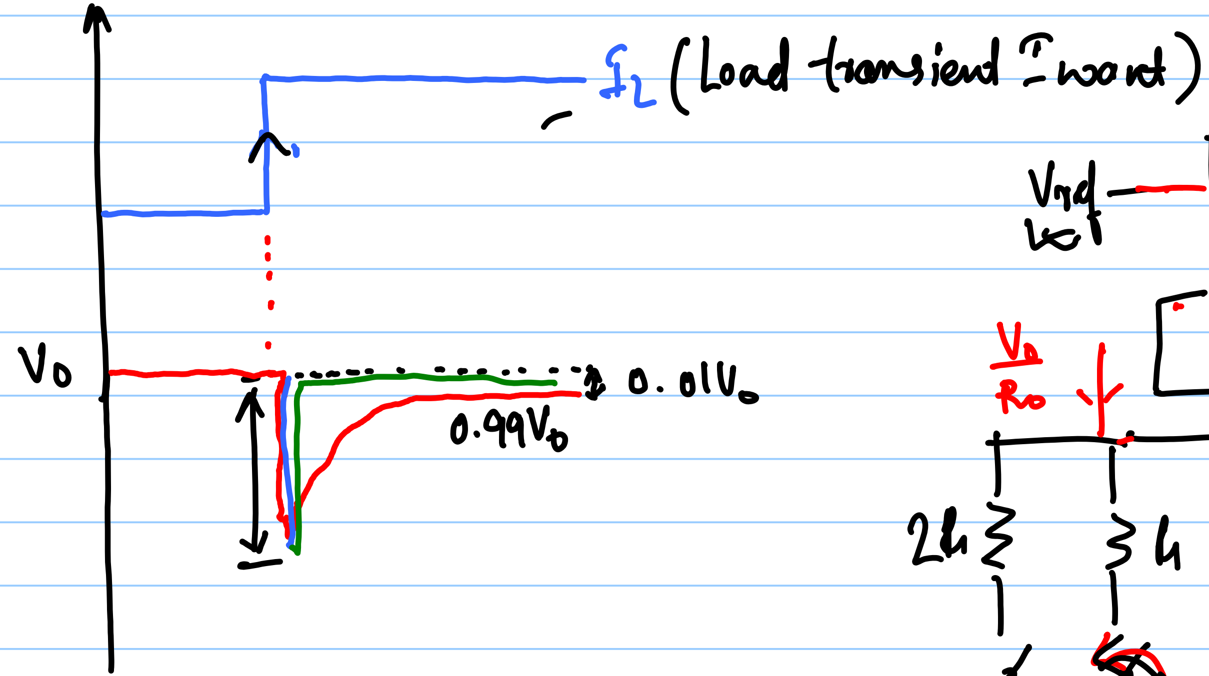
if $\omega_o \gg \omega_p$, $\phi_m = 30^\circ$ | $\omega_o \ll \omega_p$, $\phi_m = 30^\circ$

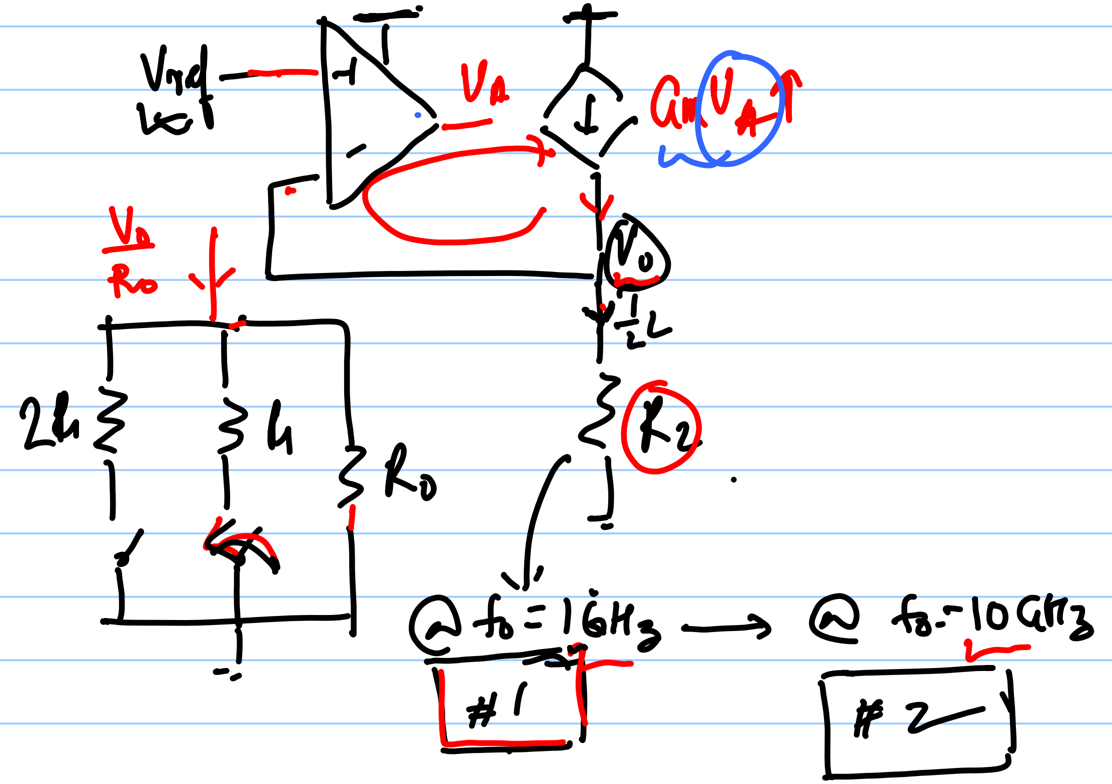
$\phi_m = 70^\circ$ | $\phi_m = 70^\circ$

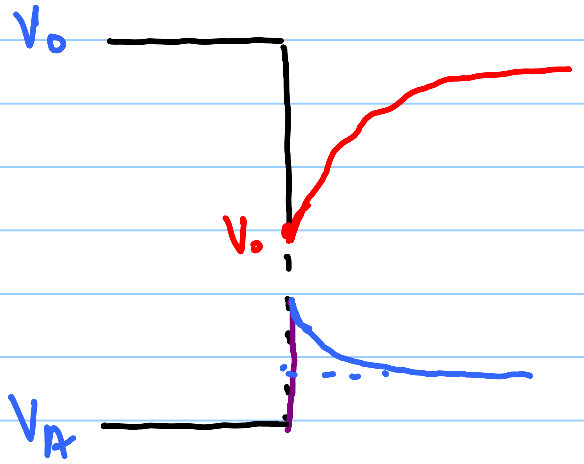
Line Regulation = $\frac{\Delta V_o}{\Delta VDD}$ Change in O/p voltage w.r.t change in VDD.

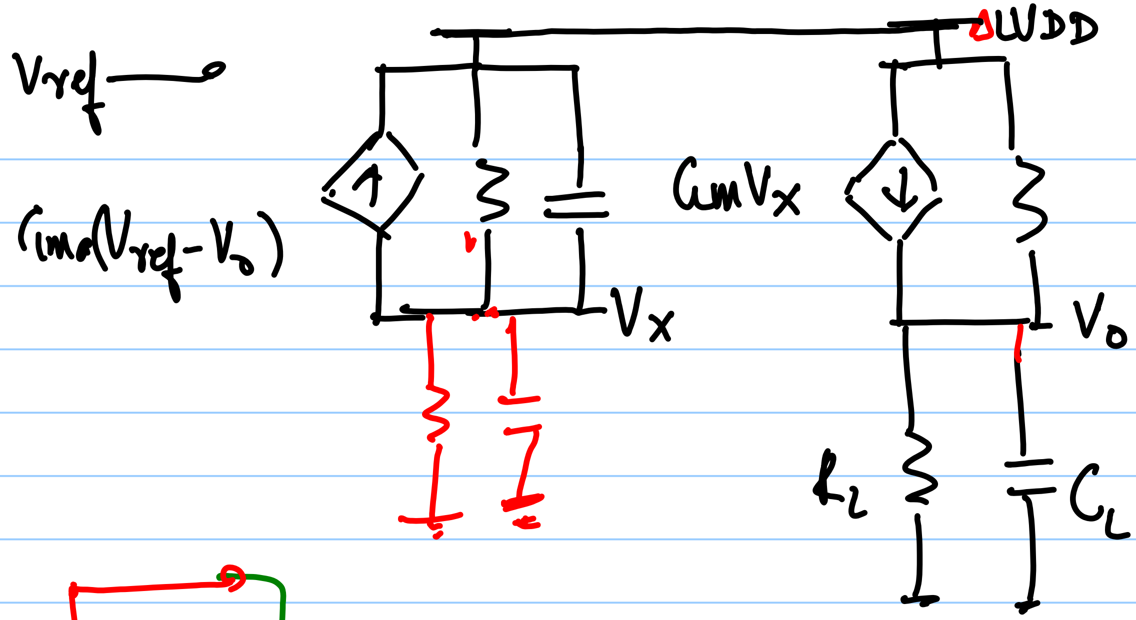
✓ Load Regulation = $\frac{\Delta V_o}{\Delta I_L}$ Change in o/p voltage due to change in load current.

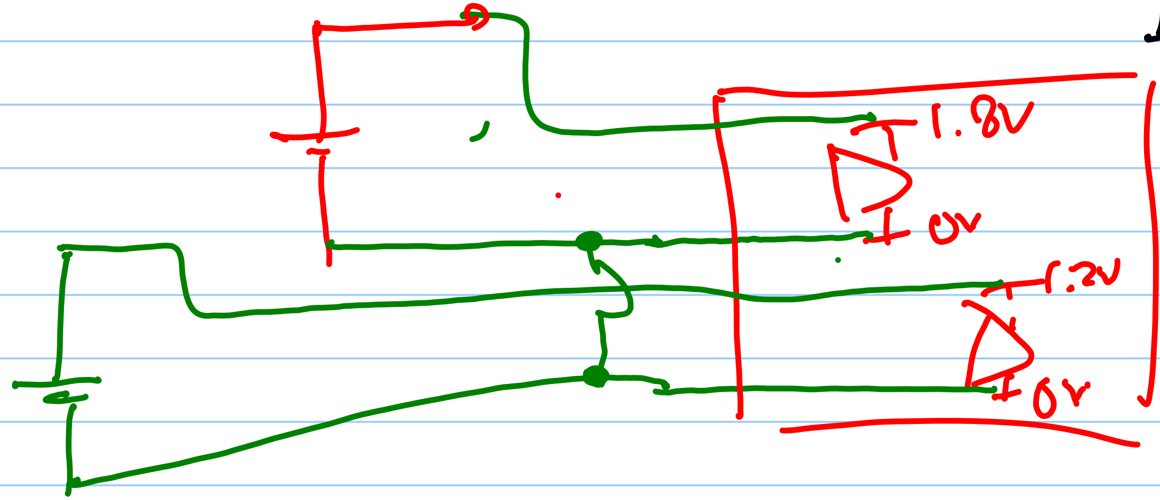
✓ Load Transient = change in o/p due to change in load current.






Vo
Vo
VA


Vref
Gma(Vref-Vo)
Vx
GmVx
WDD
Vo
R2
CL


1.8V
0V
1.2V
0V