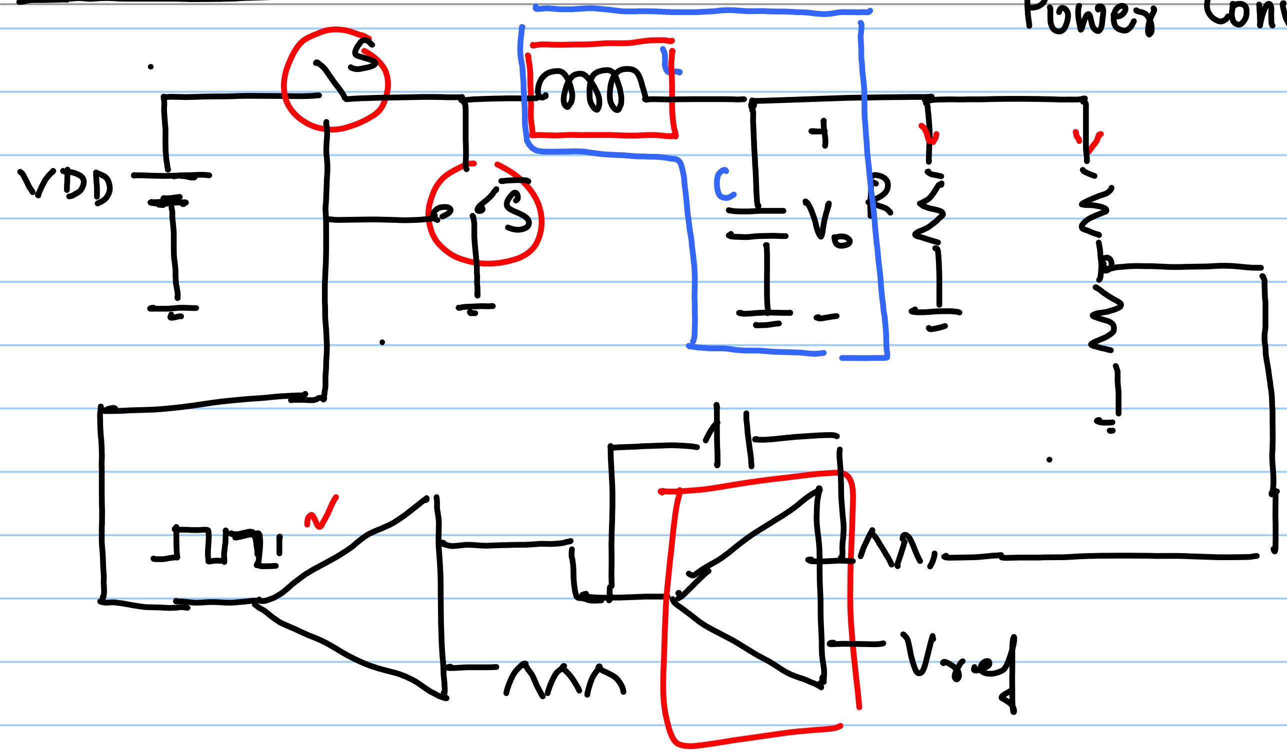
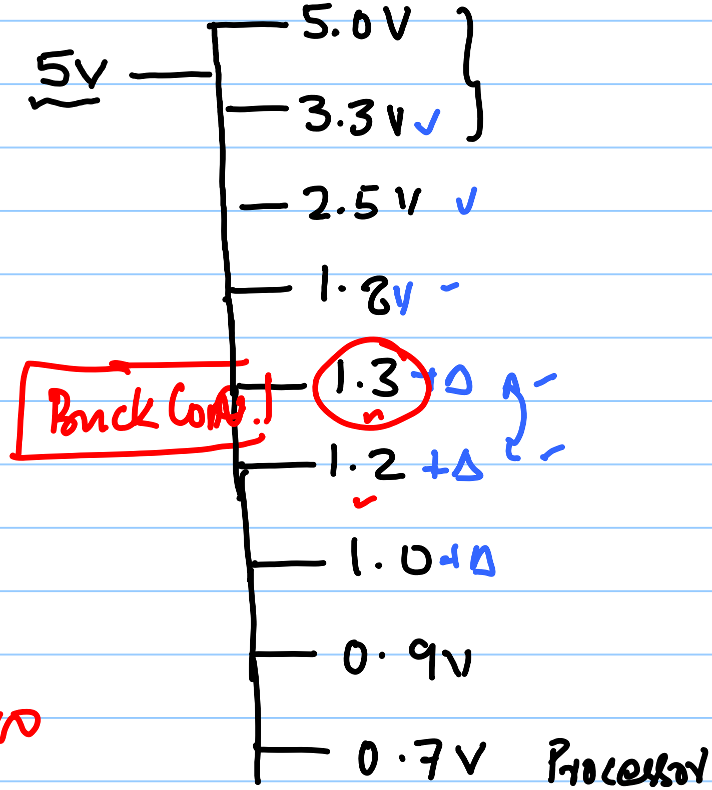
Note Title 07-04-2021

Lecture # 29

"Power Converter" (95%)

$V_o = \alpha . VDD$

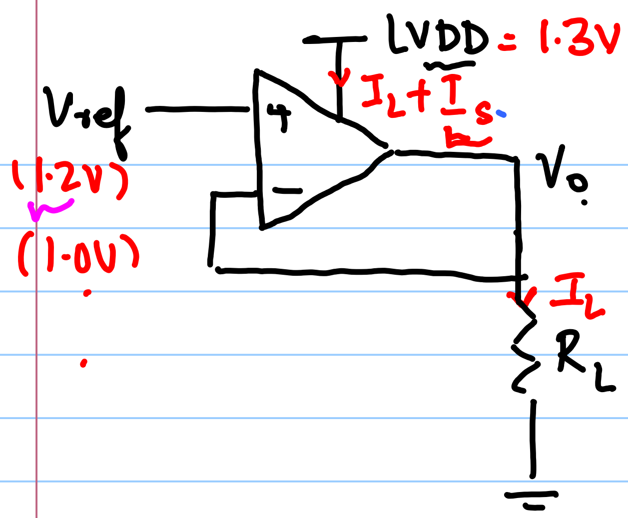




$$\eta \, (\%) = \frac{\text{Power delivered to load}}{\text{Total power drawn from supply}} \times 100$$

"Large area"

"Linear Regulator"

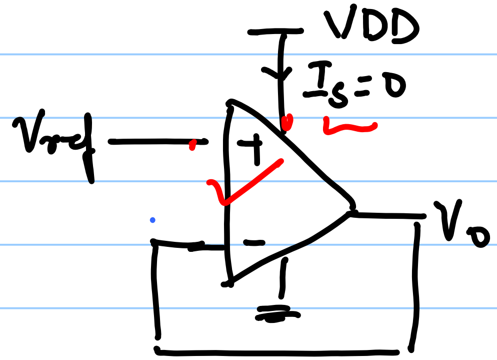


$V_o = V_{in}$

$I_s = 0.1 I_L$

Best $\eta = \frac{1.2}{1.3} \times \frac{I_L}{I_L} \times 100$

$\eta = \frac{1.2}{1.3} \times \frac{I_L}{I_L + I_s} \times 100$



$V_o = V_{ref}$

Power delivered to load $= V_o \times I_L$

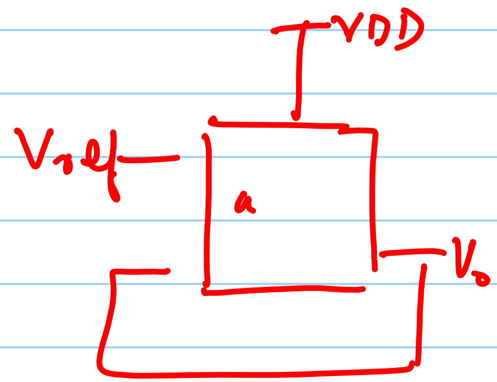
$= V_{ref} \times I_L$

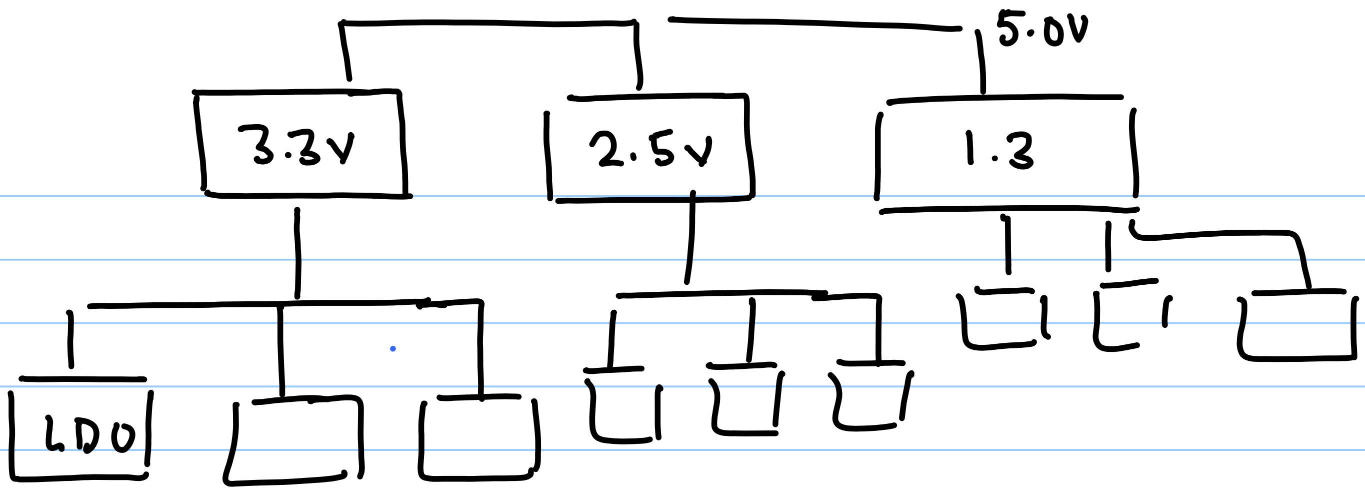
Power drawn from supply $= (I_L + I_s)$ LVDD

$V_o = V_{ref}$ will require $I_s + I_L \gg I_L$

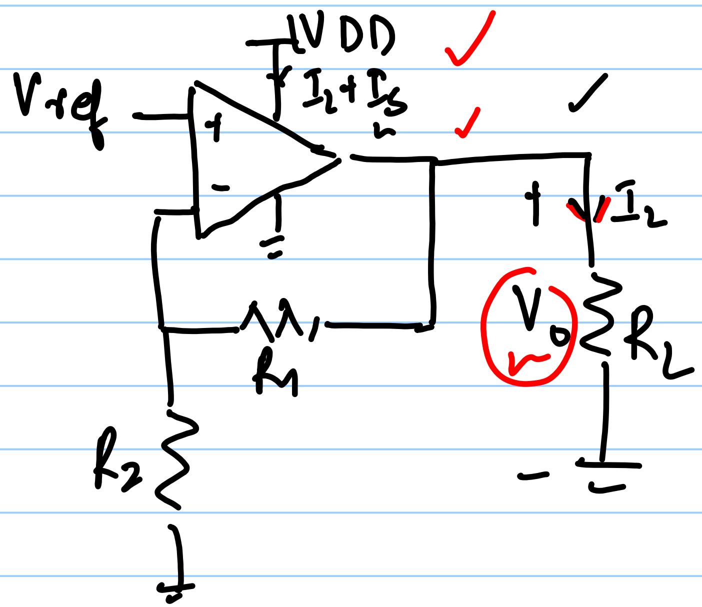
$I_s \gg 0$

$$\eta = \frac{V_o \times I_L}{(I_s + I_L)\ LVDD} \times 100\ \%$$

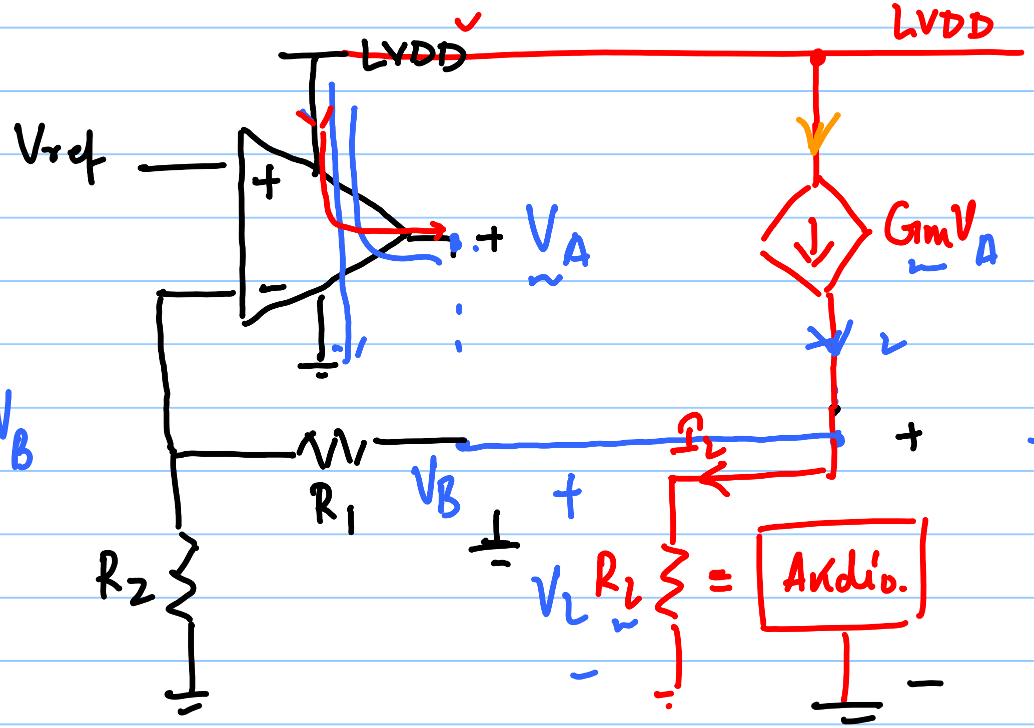




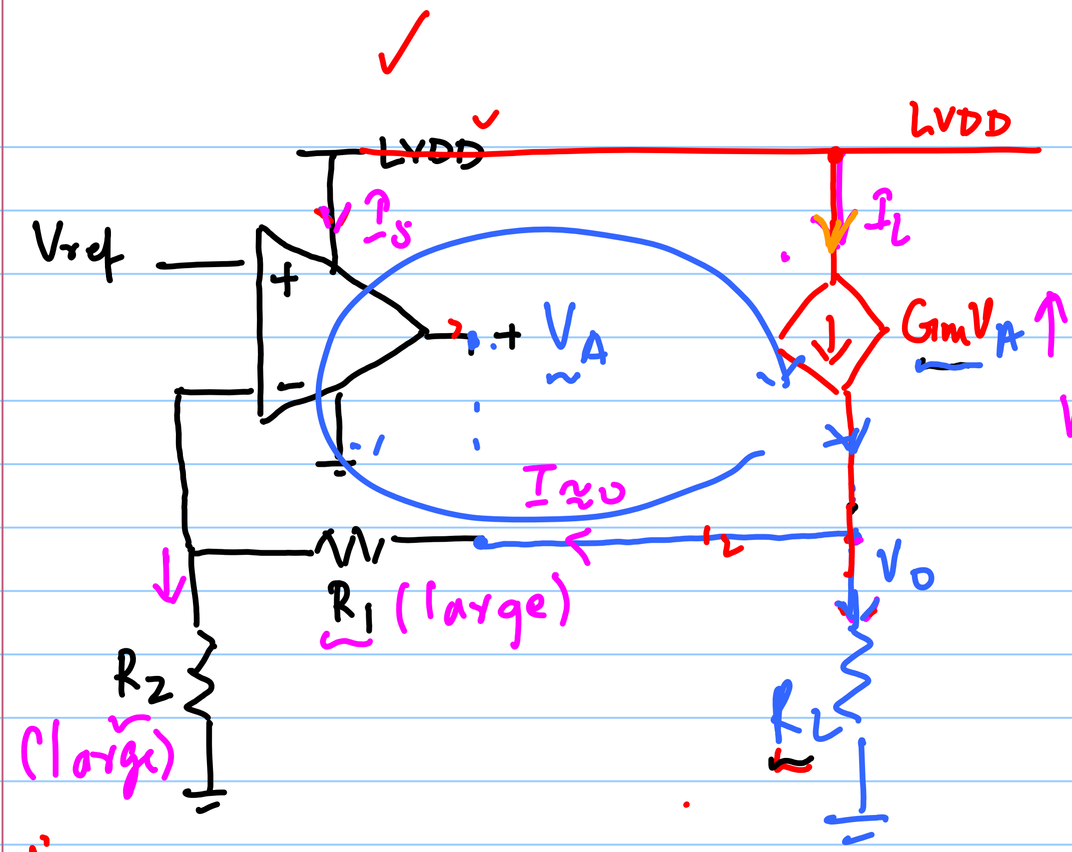
Linear dropout regulator

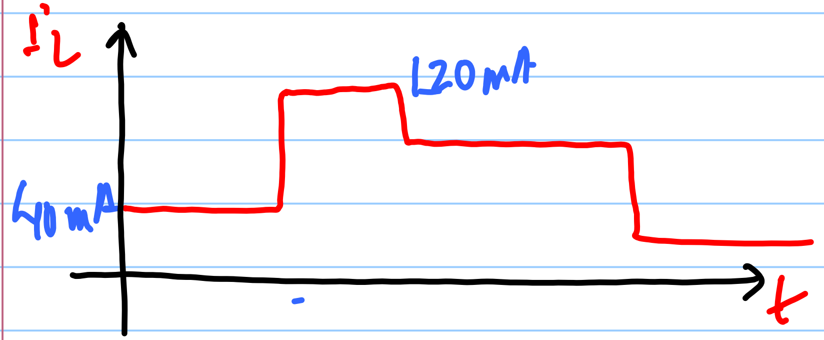


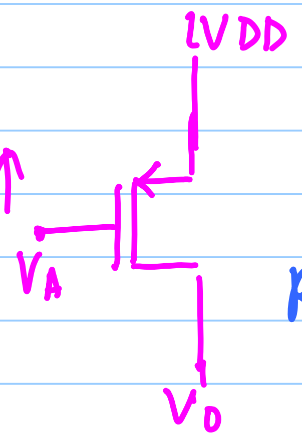
$$\frac{R_2}{R_1+R_2} V_B$$

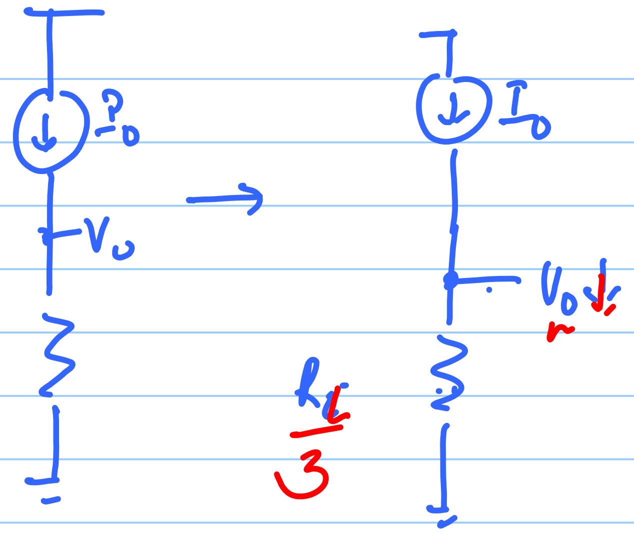


$$G_m V_o = I_L = \frac{V_o}{R_L}$$









$$\eta = \frac{V_o \times I_L}{LVDD \times I_L + LVDD \times I_s} \times 100$$

I_s is n't proportional to I_L