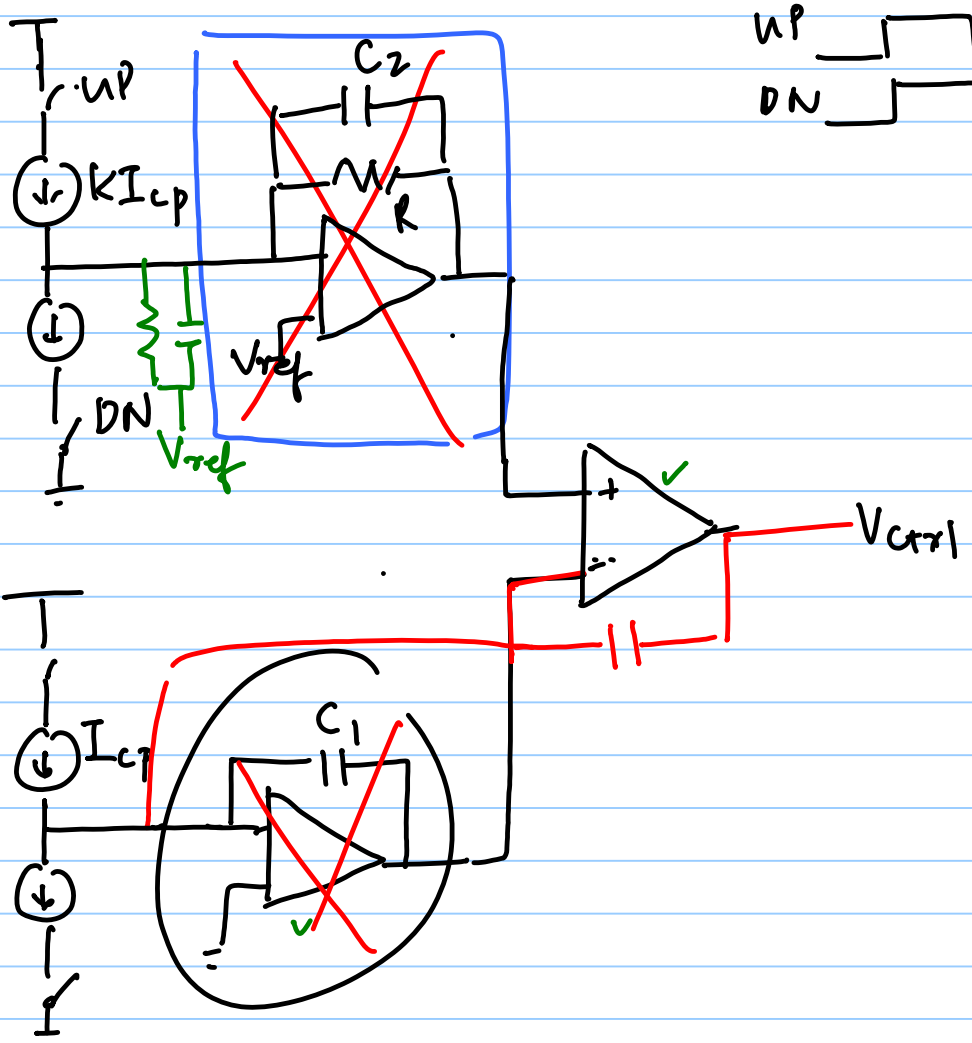
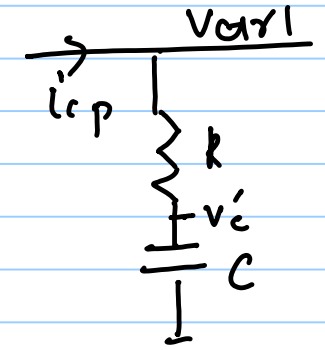
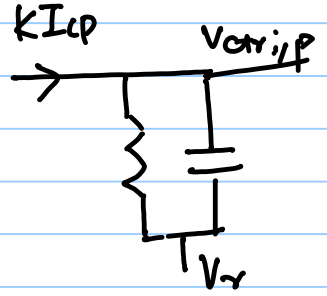
Lecture #39

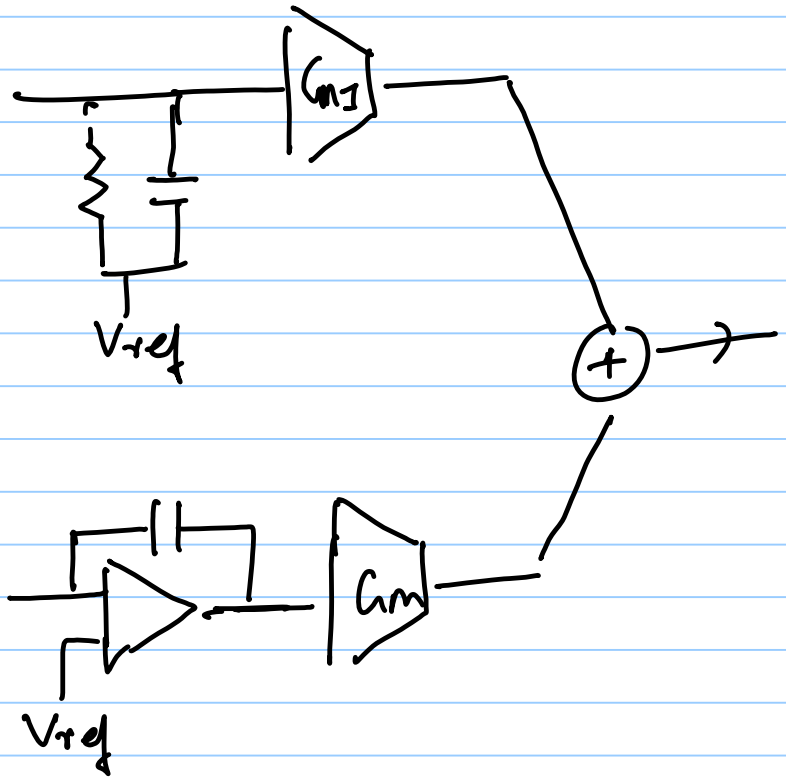
Note Title 24-10-2018

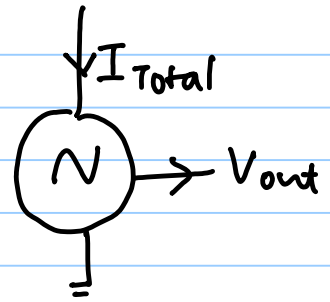
Dual path loop filter (DPLF)



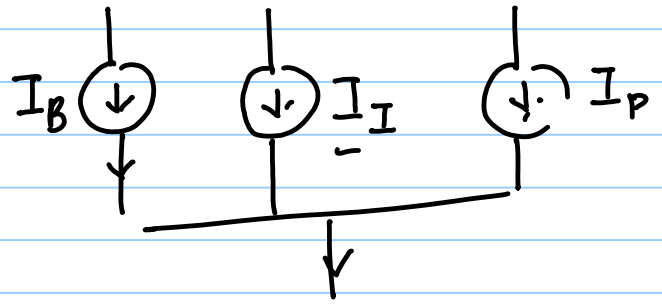




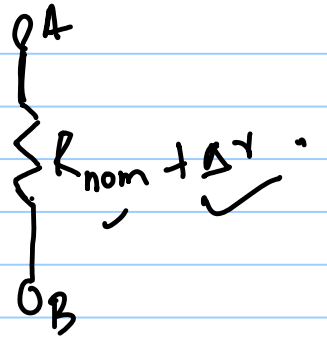


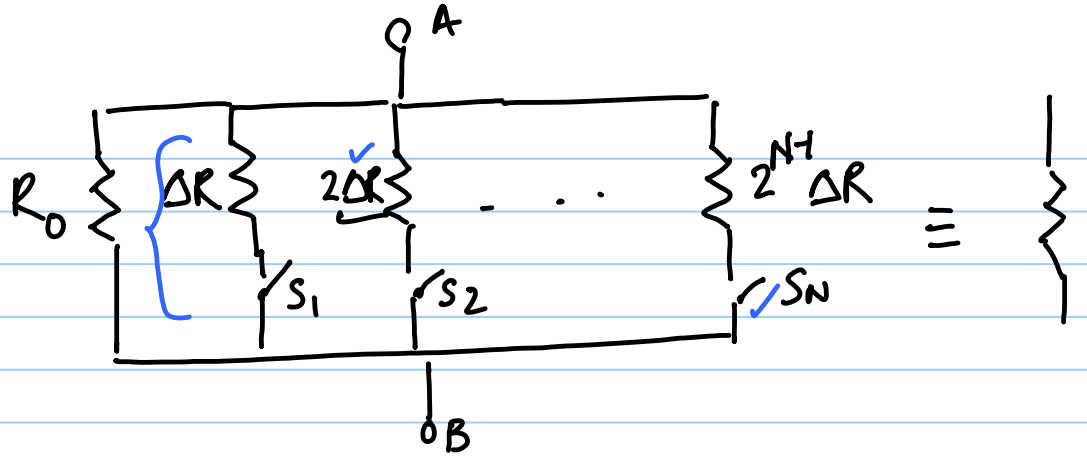


CCO: Current controlled Osc



$$V_{Ctrl} = \underbrace{i_{cp} R}_{G_m \rightarrow I_p} + \underbrace{i_{cp} \frac{\pi}{\Delta C}}_{G_m \rightarrow I_I}$$

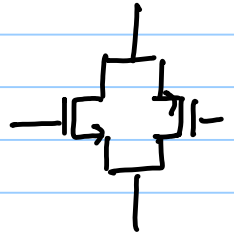




$\pm 25\%$ $\quad R_{max} = 1.25\, R_{nom}$ $\quad R_{min} = 0.75\, R_{nom}$

max. $R_{eq} = \dfrac{1}{\frac{1}{1.25}\left(\frac{1}{R_0} + \frac{1}{\Delta R} + \frac{1}{2\Delta R} + \cdots + \frac{1}{2^{N-1}\Delta R}\right)}$

$\approx R_{nom}$

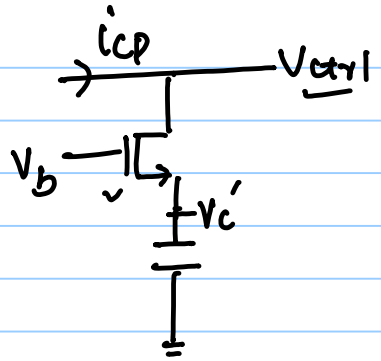


$\Delta R' = \Delta R + R_{SW}$

$2\Delta R' = 2\Delta R + 2R_{SW}$

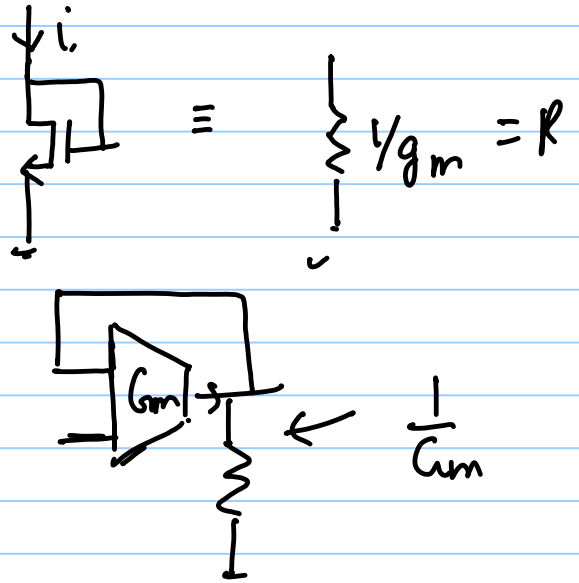
min. $R_{eq} = \dfrac{1}{\frac{1}{0.75}\frac{1}{R_0}}$

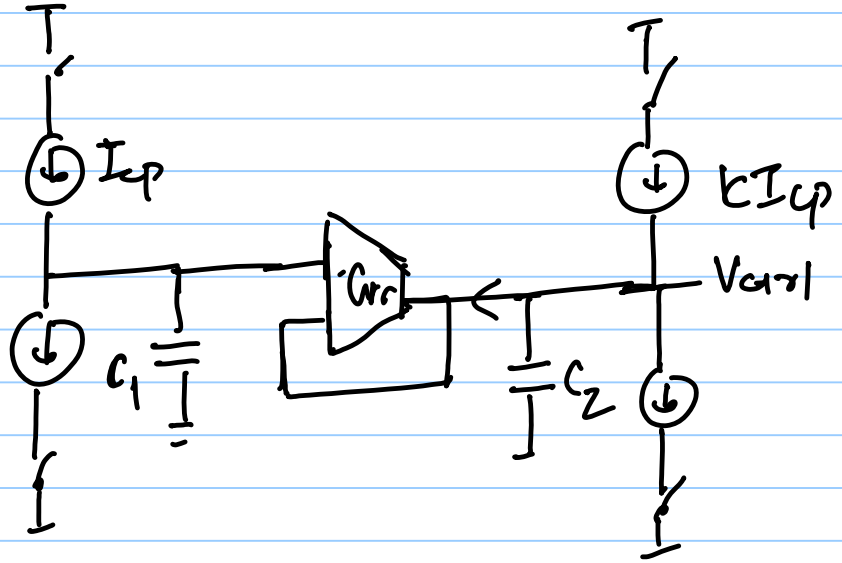
typ. $R_{eq} = \dfrac{1}{\left(\frac{1}{R_0} + \frac{1}{\Delta R} + \cdots + \frac{1}{2^{M-1}\Delta R}\right)}$ $M < N$

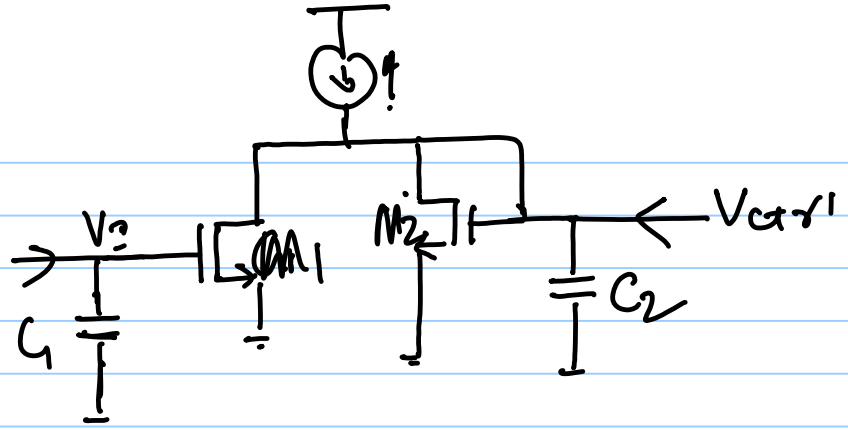


$$V_b - V_{ctrl} - V_t \geq 0$$

$$V_{ctrl} \leq V_b - V_t$$



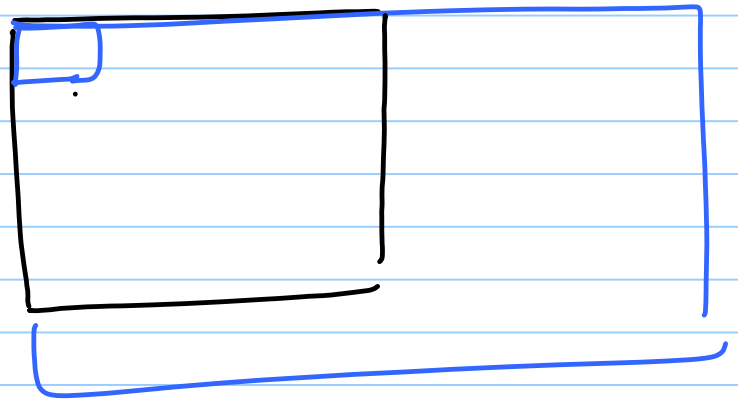




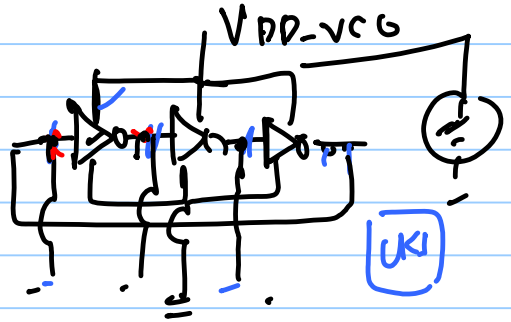
$$V_I = -I_{cp} \times \frac{1}{sC_1}$$

$$V_{ctrl} = \left(G_{m1} V_I + K I_{cp}\right) \times \left(\frac{1}{G_{m2}} \parallel \frac{1}{sC_2}\right)$$

Capacitor "THE"



$$V_{ctrl} = i_{cp} \cdot R + i_{cp} \times \frac{1}{sC}$$



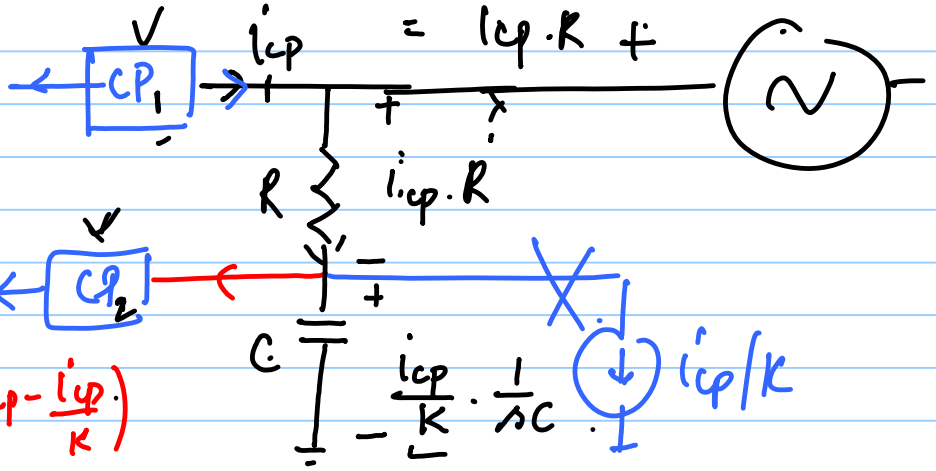
- transient noise

- transient

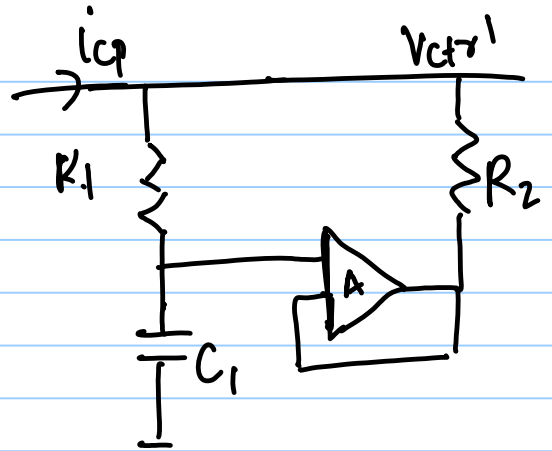
$$V_{ctrl} = i_{cp} \cdot R + \frac{i_{cp}}{s(KC)}$$

$$= i_{cp} \cdot R + \frac{(i_{cp}/K)}{sC}$$

$$= i_{cp} \cdot R +$$



IFF IF



$$C_{eff} = C_1 \left(1 + \frac{R_2}{R_1}\right)$$