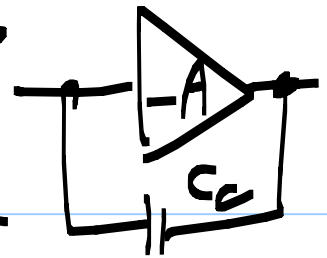
(A+1)C_c →

EE 201



6/3/2018

$(sC_1+G_{o1})(\quad)$ $-\frac{G_{m2}}{G_{o2}}$

$$\frac{V_1}{V_i} = \frac{g_{m1}(g_{m2}-sC_c)}{s^2(C_1C_2+C_2C_c+C_cC_1)+s(C_c(G_{m2}+G_{o2}+G_{o1})+C_1\cdot G_{o2}+G_2G_1)+G_{o1}G_{o2}}$$

a b c

$$p_1 \simeq -\frac{c}{b}$$

$$p_2 \simeq -\frac{b}{a}$$

w/o C_c	w/ C_c
Pole @ i/p first stage: $p_1 = -\dfrac{G_{o1}}{C_1}$	(lower freq.) $p_1 \simeq -\dfrac{c}{b} = -\dfrac{G_{o1}}{\left[C_c\left(\dfrac{G_{m2}}{G_{o2}}+1+\dfrac{G_{o1}}{G_{o2}}\right)+C_1+C_2\cdot\dfrac{G_{o1}}{G_{o2}}\right]}$ (Miller effect)
Pole @ o/p of the 2^{nd} st.: $p_2 = -\dfrac{G_{o2}}{C_2}$	(higher freq.) $p_2 \simeq -\dfrac{b}{a} = \dfrac{C_c(G_{m2}+G_{o2}+G_{o1})+C_1\cdot G_{o2}+C_2\cdot G_{o1}}{C_1C_2+C_2C_c+C_cC_1}$

Miller compensation

pole-splitting compensation

$$p_2 \simeq -\frac{b}{a} = -\frac{C_c\left[g_{m_2} + g_{o_2} + g_{-1}\right] + C_2 g_{o_1} + g_1 \cdot g_{o_2}}{}$$

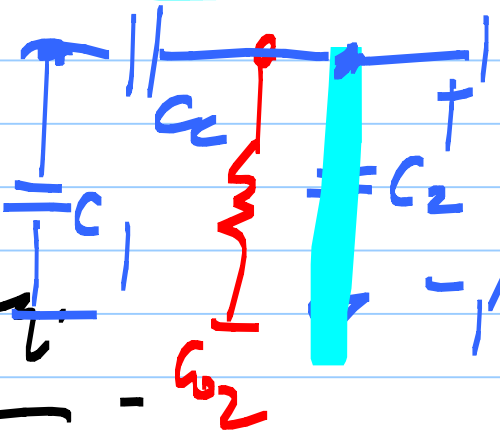
$$= -\frac{\left(g_{m_2} \cdot \frac{C_c}{C_1 + C_c} + g_{o_2}\right)\left(g_{o_1}\frac{C_2 + C_c}{C_1 + C_c}\right)}{}$$

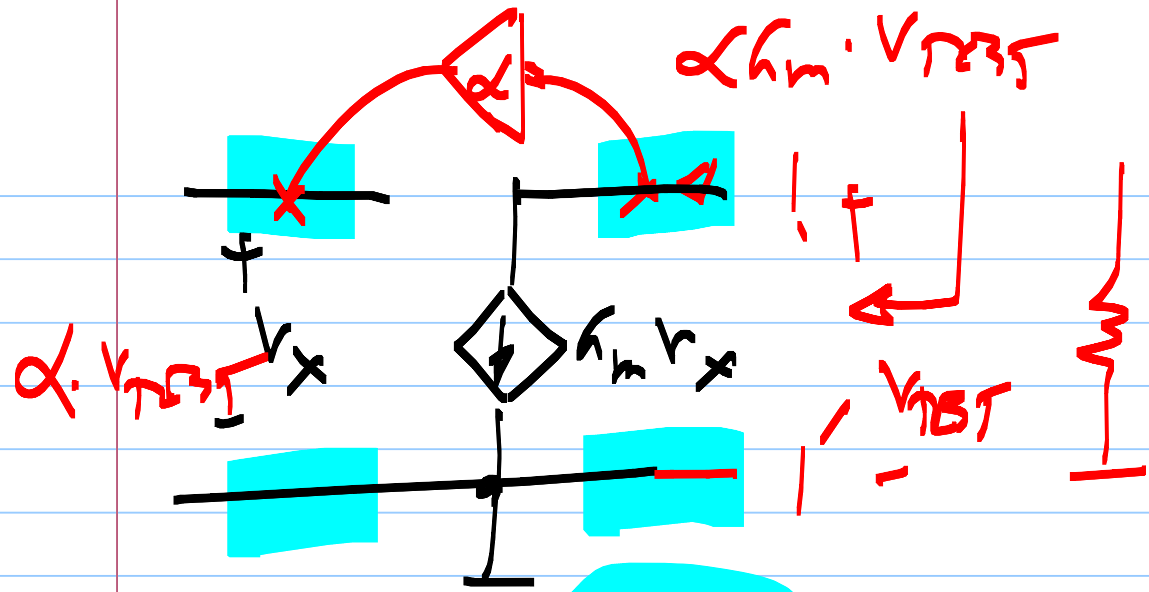
$$+ C_2$$

$$C_1 + C_c \qquad A$$

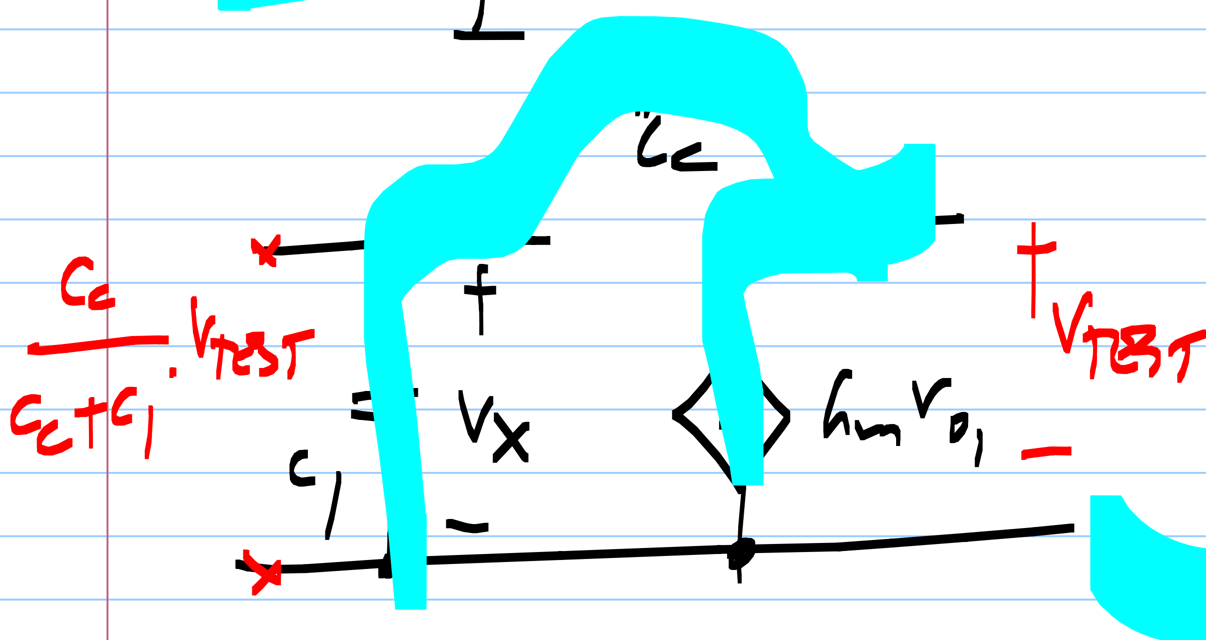
$$p_2\Big|_{C_c = 0} = -\frac{}{C_2}$$

higher freq.

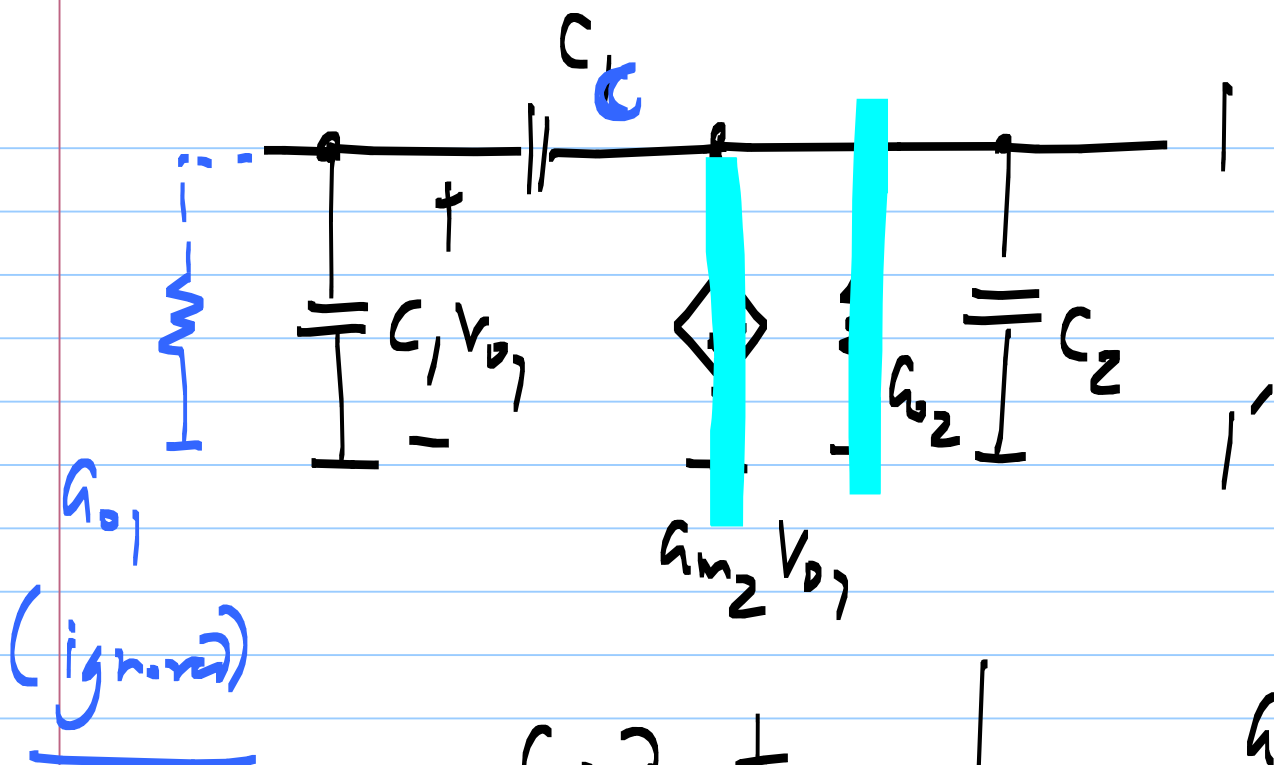




Conductance = αG_m



$$G_m \cdot \frac{C_c}{C_c + C_1}$$



$$\left.\frac{\text{Conductance}}{\text{Capacitance}}\right|_{\text{across } 1-1'} = \frac{G_{o2} + G_{m2} \cdot \frac{C_c}{C_c + C_1}}{C_2 + \frac{C_c C_1}{C_c + C_1}}$$