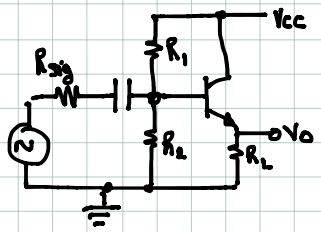
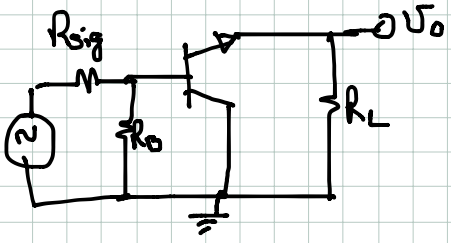
CC

SCHEMATIC



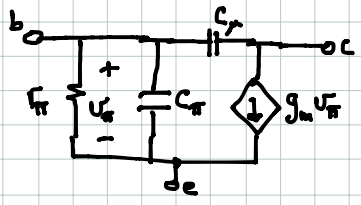
shows dc and ac connections

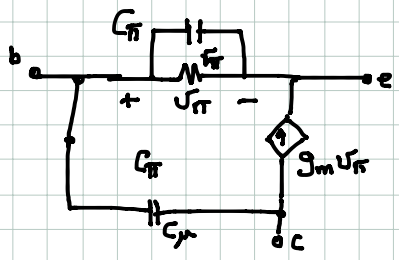
AC equivalent



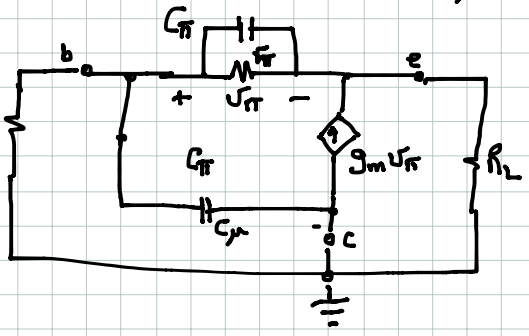
$R_D = R_1 // R_2$

Now substitute high-frequency model



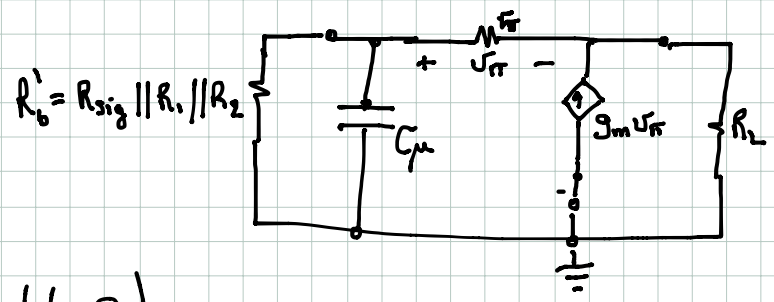


$R_b' = R_{sig} // R_1 // R_2$

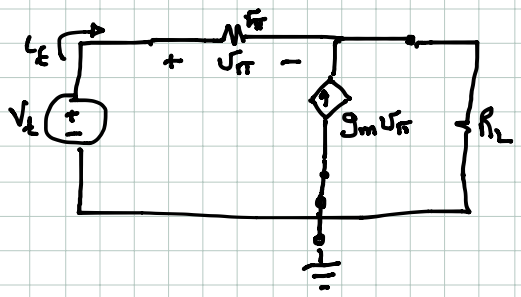


Now use open-circuit t.c. method

R_μ Resistance seen by C_μ



$R_b' \,||\, R_{eq}'$



$$v_\pi = i_t r_\pi$$

$$v_t = v_\pi + (i_t + g_m v_\pi) R_L$$

$$R_{eq}' = \frac{v_t}{i_t} = r_\pi + (1 + g_m r_\pi) R_L$$

$$R_\mu = \left[r_\pi + (1 + g_m r_\pi) R_L \right] || R_{sig} || R_1 || R_2$$

$$f_{p_1} = \frac{1}{2\pi C_\mu \left\{ \left[r_\pi + (1 + g_m r_\pi) R_L \right] || R_{sig} || R_1 || R_2 \right\}}$$

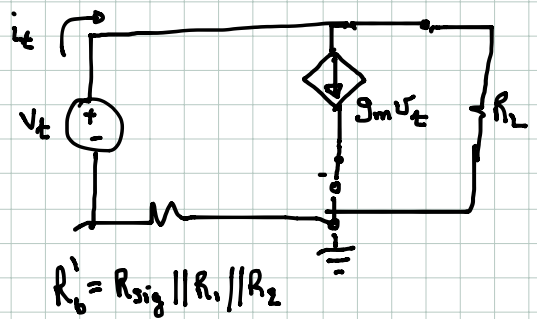
R resistance seen by C

π π

$$v_t = -v_\pi$$

$$R_\pi = r_\pi \,||\, R_{eq}$$

$$R_{eq} = v_t / i_t$$



$$R_b' = R_{sig} \,||\, R_1 \,||\, R_2$$

$$v_t = i_t R_b' + (i_t - g_m v_t) R_L$$

$$v_t(1 + g_m R_L) = i_t (R_b' + R_L)$$

$$R_{eq} = \frac{R_b' + R_L}{1 + g_m R_L}$$

$$f_{p_2} = \frac{1}{2\pi C_\pi \left(r_\pi \,||\, \dfrac{R_b' + R_L}{1 + g_m R_L} \right)}$$