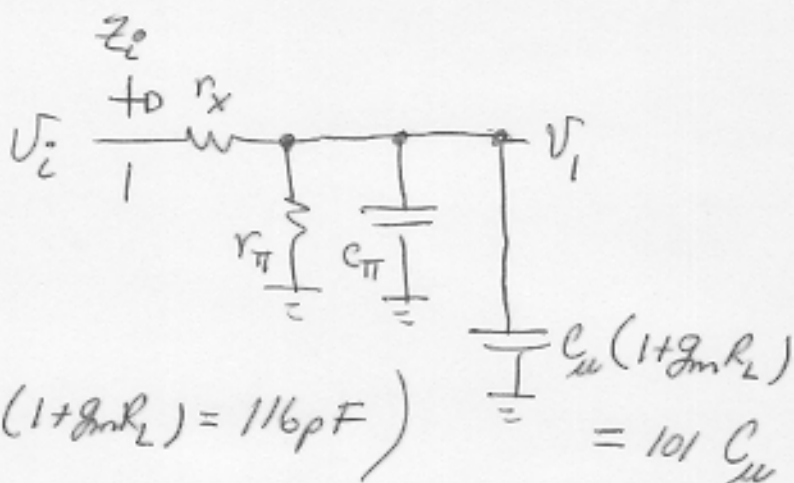
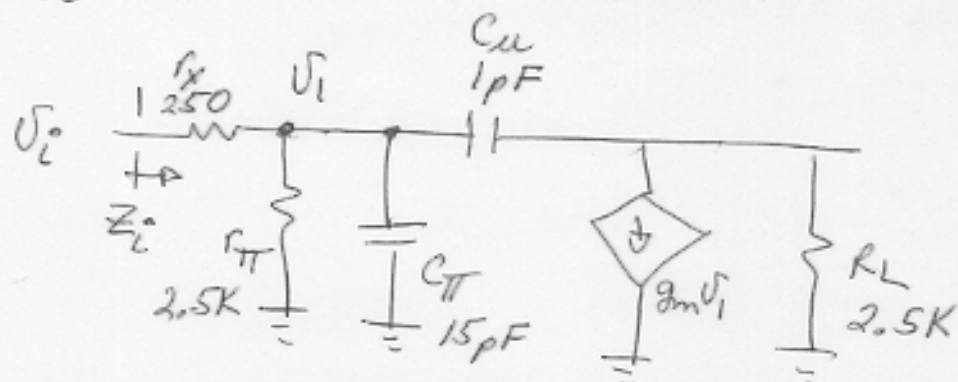


Jaeger 3rd ed

16.52

$g_m = 40 \text{ mS}$



$C_T \equiv C_{\pi} + C_{\mu}(1 + g_m R_L) = 116 \text{ pF}$
 $= 101 C_{\mu}$

$Z_i(s) = r_x + \frac{r_{\pi}}{1 + s r_{\pi} C_T} = (r_x + r_{\pi}) \frac{1 + s R_x' C_T}{1 + s r_{\pi} C_T}$

$(R_x' \equiv r_x \parallel r_{\pi} = 227 \Omega)$

$Z_i(j\omega) = (2750 \Omega) \frac{1 + j\omega \tau_1}{1 + j\omega \tau_2}$

$\tau_1 = R_x' C_T = 26 \text{ ns}$

$\tau_2 = r_{\pi} C_T = 290 \text{ ns}$

f	$ Z_i $	$\angle Z_i$
0	2750 Ω	0°
(b) 50 kHz	2739 Ω	-5°
(c) 1 MHz	1341 Ω	-52°
10 MHz	292 Ω	-28°
100 MHz	251 Ω	-3°

(a) at $f = 1 \text{ kHz}$

$Z_i \approx 2750 \angle 0^\circ \Omega$

(d) - see prob 16.53