

$$v_s = 8 \text{ mV} (1 + 0.6 \cos(9 \times 10^4 t)) \cos(2 \times 10^7 t)$$

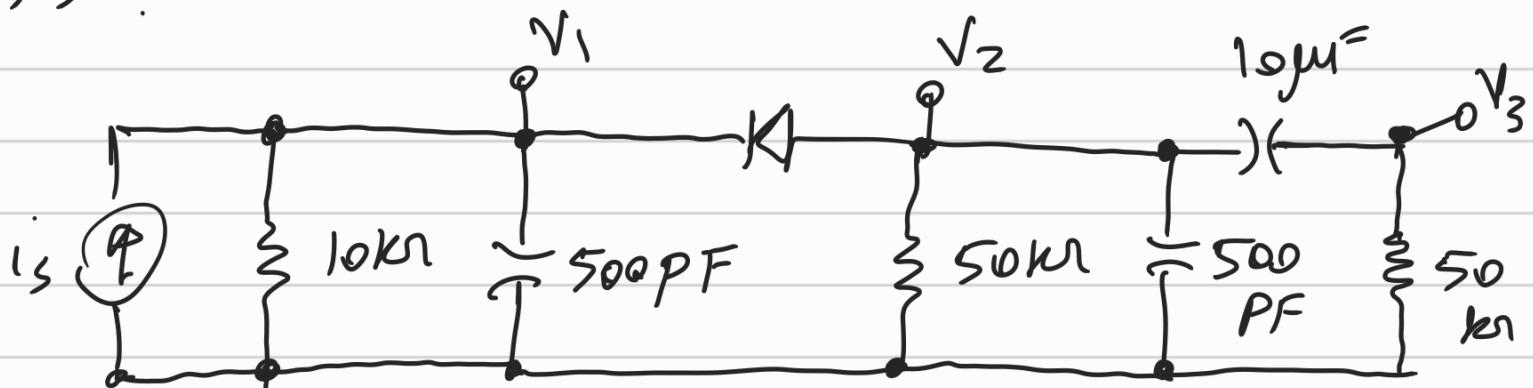
$$g_m = \frac{I_C}{V_T} = \frac{1.95}{25} = 78 \text{ mS}$$

$$i_c(t) = g_m v_s(t)$$

$$= 0.624 (1 + 0.6 \cos(9 \times 10^4 t)) \cos(2 \times 10^7 t) \text{ mA}$$

$$n = \frac{M_{12}}{L_2} = \frac{2.5 \mu\text{H}}{5 \mu\text{H}} = 0.5$$

(1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)



$$Z_T(j\omega) = \frac{10k\Omega \parallel \frac{50 \parallel 50}{2} k\Omega}{1 + j(10k\Omega \parallel \frac{50 \parallel 50}{2} k\Omega) \times (2 \times 500\text{PF} + 2 \times 500\text{PF})_w}$$

$$Z_T(j\omega) = \frac{5.55k\Omega}{1+j 5.55k\Omega \times 2000PF\omega} = \frac{5.55k\Omega}{1+j 11.1 \times 10^{-6}}$$

$$Z_T(j_0) = 5.55k\Omega \quad \text{در فرکانس} \quad 1,6$$

$$Z_T(j9 \times 10^4) = \frac{5.55k\Omega}{1+j 11.1 \times 10^{-6} \times 9 \times 10^4} \approx \frac{5.55k\Omega}{1+j}$$

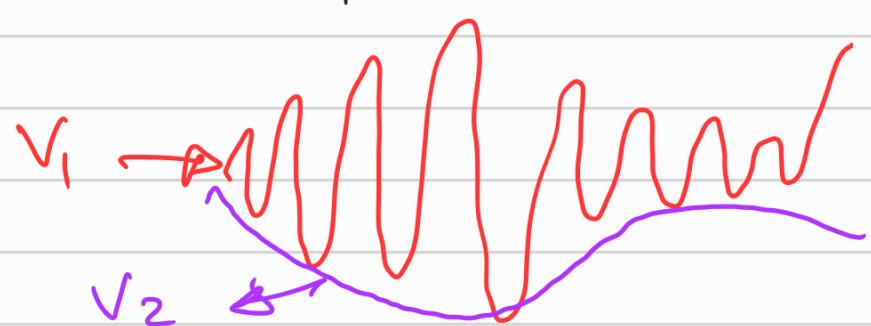
$$= 3.92 \angle -\pi/4$$

$$V_2 = -I_S Z_T(j_0) + I_1 Z_T(j9 \times 10^4)$$

$$V_2(t) = \underline{0.624 \times 5.55} + 0.624 \times 0.6 \times 3.92$$

$$V_2(t) = 3.46 \cos(9 \times 10^4 t - \pi/4)$$

$$V_3 = 1.46 \cos(9 \times 10^4 t - \pi/4)$$



$$V_1(t) = 3.46 \left(1 - 1.46 \cos(9 \times 10^4 t - \pi/4) \right) \cos(2 \times 10^7 t)$$

پارزیت، مونیت

$$i_D(t) = I_P \frac{Z}{T_0} + 2 \sum \frac{I_P}{n\pi} \sin(n\omega_0 \frac{Z}{2}) \cos(n\omega_0 t)$$

$$i_D(t) = 2 \frac{I_P}{2\pi} \sin(2\omega_0 \frac{Z}{2}) \cos(2\omega_0 t)$$

حروفی مونیت

$$i_D(t) \approx 2 \frac{I_P}{2\pi} (\omega_0 Z) \cos(2\omega_0 t)$$

حروفی مونیت

$$i_D(t) \approx 2 I_P \frac{Z}{T_0} \cos(2\omega_0 t)$$

حروفی مونیت

$$V_o = I_{D_0} R_o = V_1$$

$$I_{D_0} = V_1 / R_o$$

$$Z(j2\omega_0) = \frac{V_1}{2V_1/R_o} = R_o/2$$

اعلیٰ سینہ اس کا درجہ درجہ
کے
ز

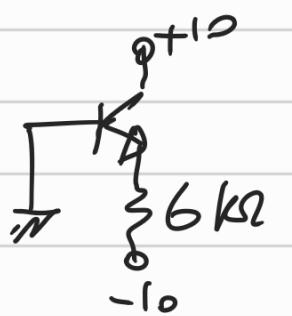
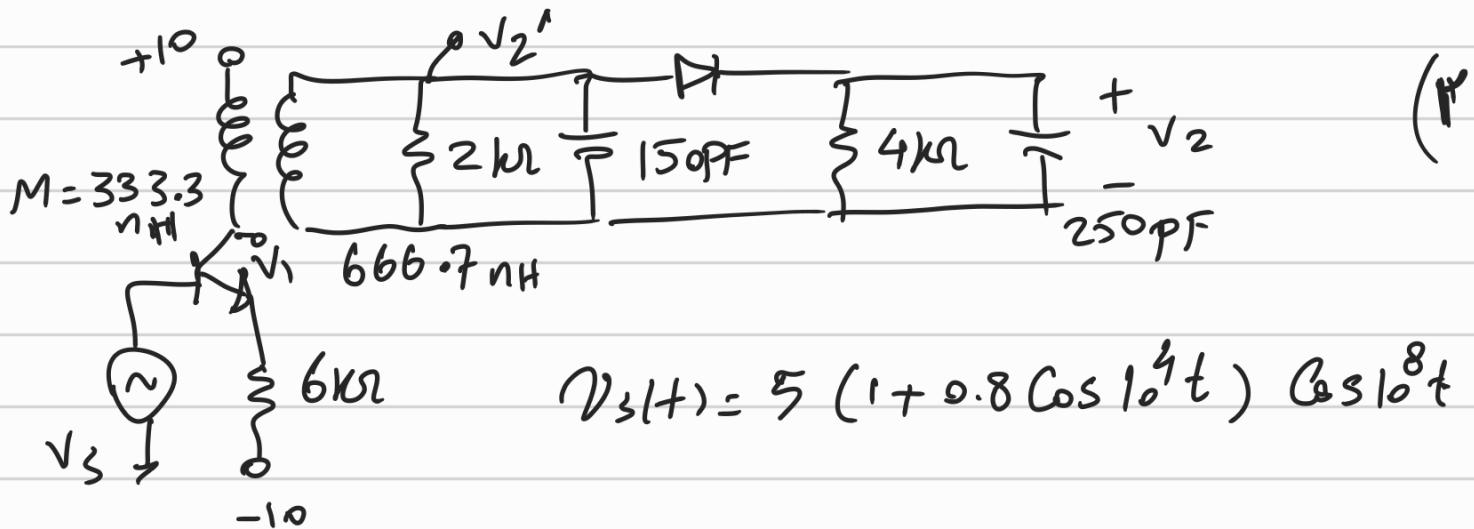
$j2\omega_0$ رفرمی

$$Z_T(j2\omega_0) = \frac{R || R_o/2}{\sqrt{1+Q^2(2-\frac{1}{2})^2}} \approx \frac{2R || R_o/2}{3Q}$$

$$Q = \omega_0 R C = 2\pi \times 2 \times 10^7 \times 10 \text{ k}\Omega \times 500 \text{ pF}$$

$$v_o(t) = i_s(t) \cdot Z_T(j\omega_0)$$

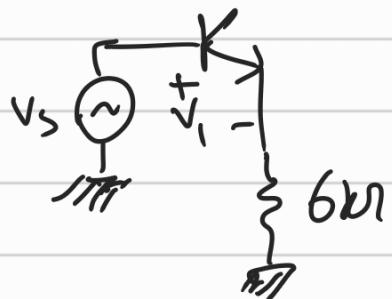
حารونی بوچ



$$I_C = \frac{10 - 0.7}{6 \text{ k}\Omega} = 1.55 \text{ mA}$$

جودانی و لذت گیری از مفهوم

با مفهوم تغیریاتی



$$-V_S + V_I + 6 I_e = 0$$

$$V_I + 6 \frac{G_m}{\alpha} V_I = V_S$$

$$\chi = \frac{V_I}{V_T}$$

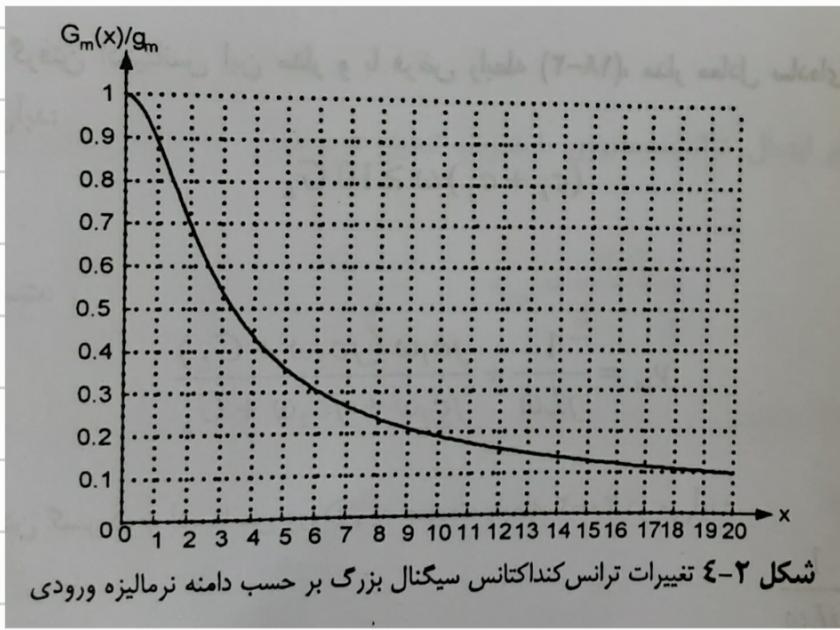
$$\chi \times V_T \left(1 + \frac{6}{\alpha} G_m \right) = V_S$$

$$\chi \times 25 \text{ mV} \left(1 + \frac{6}{0.99} G_m \right) = 5$$

$$\chi \left(1 + 6.06 \times \frac{G_m \times 62}{g_m} \right) = 200$$

$$\chi \left(1 + 6.06 G_m \right) = 200$$

$$g_m = \frac{I_C}{V_T} = \frac{1.55}{25 \text{ mV}} = 62 \text{ mV}$$



$$\Rightarrow x \approx 0.92$$

$$\frac{G_m}{g_m} \approx 0.99$$

$$G_m = 58.2$$

m⁻²

V_T

$$i_C = G_m \cdot V_i = 58.2 m^{-2} \cdot (0.92 \times 0.025)$$

$$\approx 1.34 \text{ mA}$$

$$n = \frac{M_{r2}}{L_2} \approx 0.5$$

$$Z_T(j10^4) = \frac{R_{11}R_{20}/2}{1+j(R_{11}R_{20}/2)(2C+2C_0)\omega} = \frac{211^{4/2}}{1+j10^3 \times 800 \mu_F \times 10^4}$$

$$10^4 = \frac{1}{1+j0.008} \\ = 1.0034 - j0.008$$

$$\approx 1$$

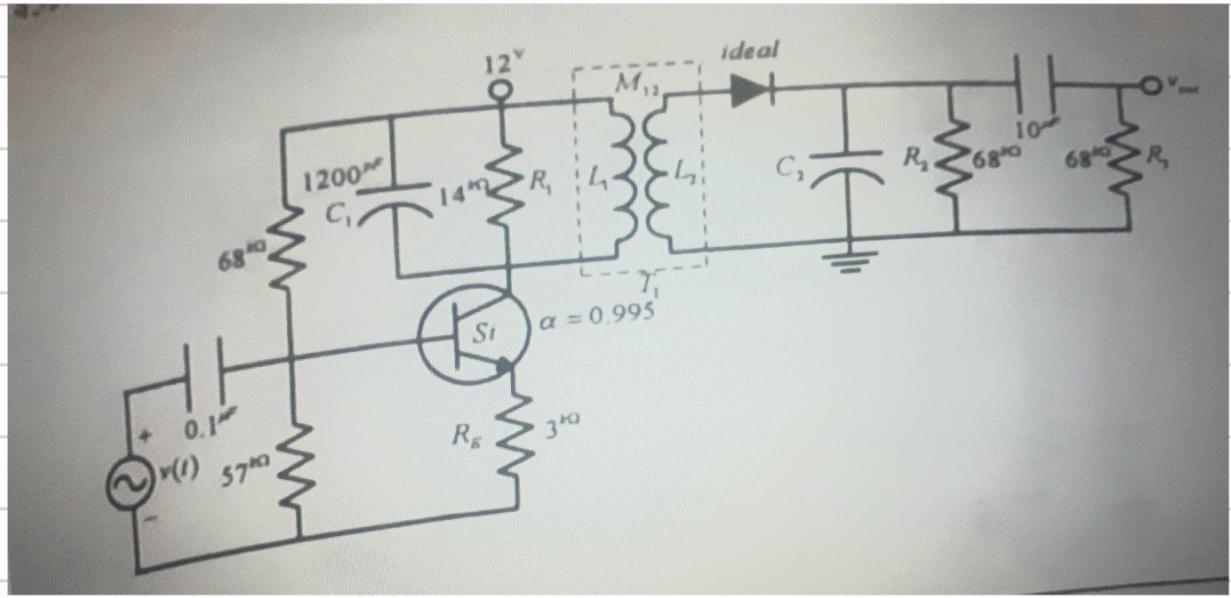
$$V_2(t) = I_S Z_T(0) + I_1 Z_T(j10^4) \cos(10^4 t)$$

$$V_2(t) = 1.34 \times 1k\Omega + 1.34 \times 0.8 \cos(10^4 t)$$

$$V_2'(t) = I_s Z_T(j\omega_0) (1 + 0.8 \cos 10^4 t) \cos 10^8 t$$

$$V_1(t) = n V_2'(t)$$

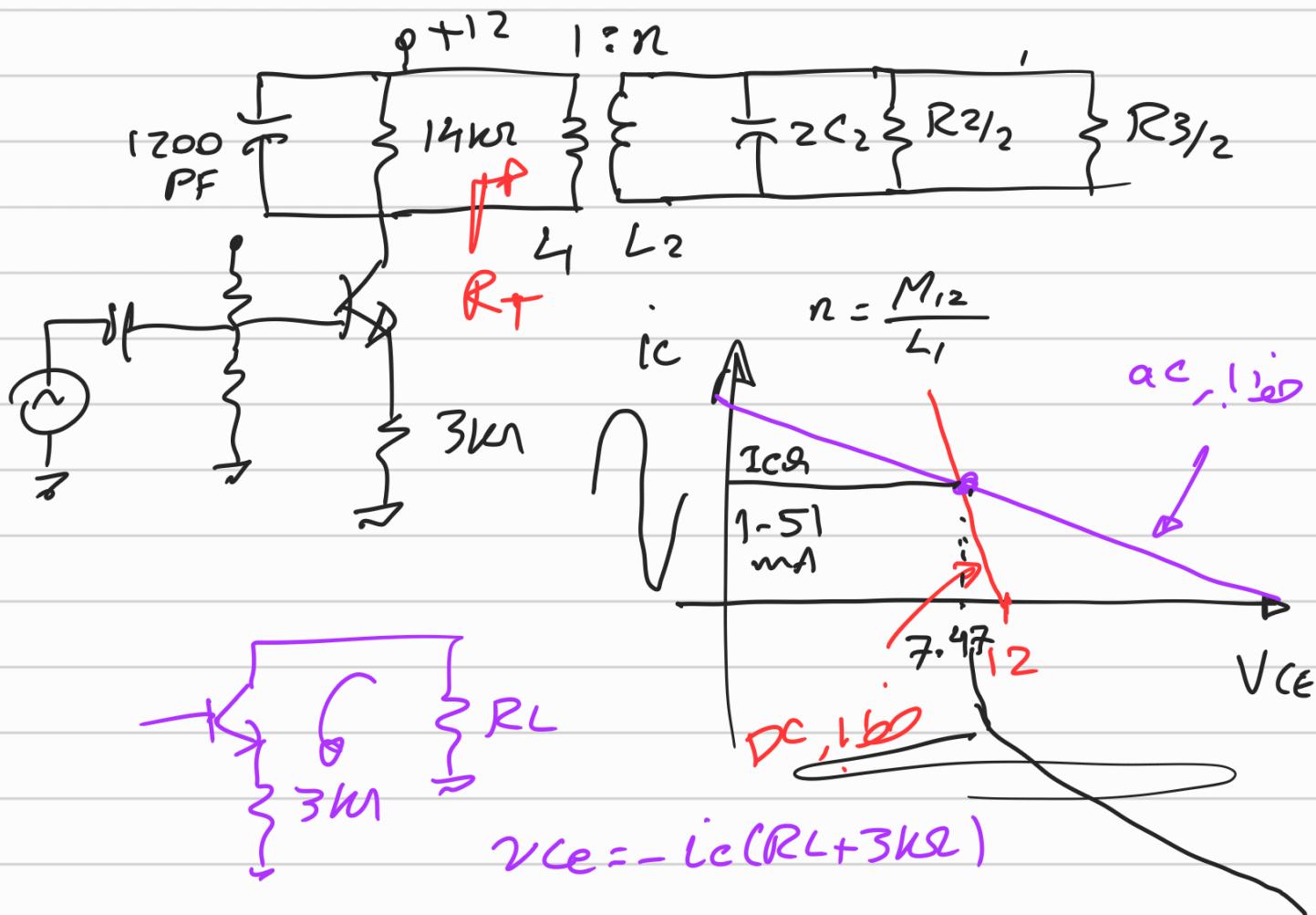
$$= 0.5 \times 1.34 \times 1k\Omega \times (1 + 0.8 \times \cos 10^4 t) \cos 10^8 t$$



(.1)

$$f_0 = \frac{1}{2\pi\sqrt{L_1 C_1}} = 455 \text{ kHz}$$

$$\frac{1}{2\pi\sqrt{L_1 \times 1200 \text{ PF}}} = 455 \text{ kHz} \rightarrow L_1 = 102 \text{ } \mu\text{H}$$



$$I_{CQ} = \alpha \frac{V_{ph} - V_{BE}}{\frac{R_{Th}}{\beta + 1} + 3k\Omega} = \frac{5.47 - 0.7}{\frac{31}{\beta + 1} + 3k\Omega} \approx 1.51 \text{ mA}$$

مقدار جریان

$$\alpha = 0.995$$

$$\beta = 199$$

مقدار راهن توسان متوسط

$$R_L = \frac{7.47 \text{ Volt}}{1.5 \text{ mA}} = 11.28 \text{ k}\Omega$$

ابعاد

$$R_L = 14 \text{ k}\Omega \parallel R_T \Leftrightarrow R_T = 58 \text{ k}\Omega$$

$$R_T = \frac{1}{n^2} \left(\frac{R_2}{2} \parallel \frac{R_3}{2} \right) \Leftrightarrow n = 0.54$$

مقدار نسبت تغذیه

$$n = \frac{M_{12}}{L_1} \Leftrightarrow M_{12} = 55.08 \mu\text{H}$$

$$k = \frac{M_{12}}{\sqrt{L_1 L_2}} = 1 \Leftrightarrow L_2 = 29.79 \mu\text{H}$$

$$\therefore f_m = 5 \text{ kHz}$$

$$\frac{1}{(R_2 || R_3) C_2} = 2 \omega_m$$

$$\frac{1}{(68 || 68) k\Omega \times C_2} = 2 \times 2 \pi f_m$$

$$C_2 = \frac{1}{34 \times 2 \times 2 \pi \times 5 \text{ kHz}} = 500 \text{ pF}$$

$$V_s(t) = 500 \text{ mV} [1 + 0.7 \cos(10^4 t)] \text{ cos}(2\pi \times 555 \frac{t}{\text{kHz}})$$

$$-V_s + V_i + R_E I_e = 0$$

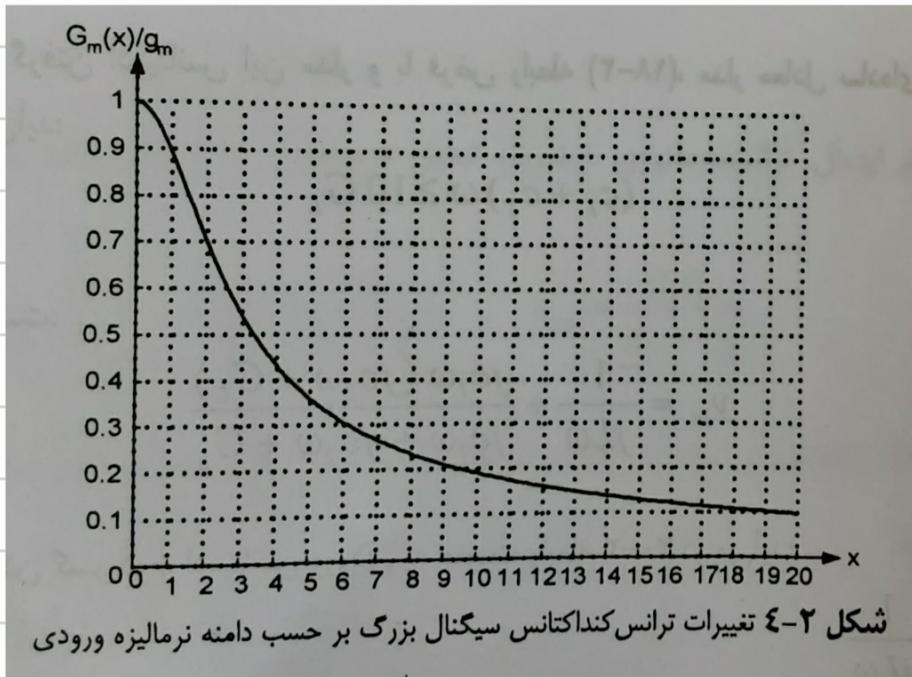


$$-V_s + V_i + \frac{R_E}{\alpha} (G_m V_i) = 0$$

$$-0.5 + (2 \times 0.025) + \frac{3}{0.995} G_m (2 \times 0.025) = 0$$

$$g_m = \frac{I_c}{V_T} = \frac{1.51}{25 \text{ mV}} = 60.4 \text{ mS}$$





$$x \approx 0.1$$

$\frac{G_m}{g_m} \approx 0.97$
نیز توصیه شد

$$i_C = g_m V_i = g_m \cdot x \cdot V_T$$

$$= 60.4 \times 0.1 \times 0.025 = 0.15 \text{ mA}$$

$$i_C(t) = 0.15 \text{ mA} (1 + 0.7 \cos(10^4 t)) \cos(2\pi \times 455 \text{ kHz} t)$$

$$Z_T(j\omega) = \frac{R_L}{1 + j R_L (2 \times 1200 \text{ pF} + 2 C_2) \omega}$$

$$Z_T(j10^4) = \frac{11.28 \text{ k}\Omega}{1 + j 11.28 \text{ k}\Omega (3400 \text{ pF}) \times 10^4}$$

$$V_o = 2 \times 0.15 \times 0.7 |Z_T(j10^4)| \cos(10^4 t - \tan^{-1} 0.383)$$

