

$$13. U_{cc} = 12 V$$

$$P_k = 8 W$$

$$\eta = 86.5 \%$$

$U_{ce0} < 0$  znači da je tranzistor u zraku  
 $V$  znači da je davan izvor

1 jer nije zadan

$$\eta = \frac{1}{2} h_u h_i$$

$$h_i = 2\eta = 1.73 \Rightarrow \text{očitati } \varphi = 40^\circ$$

slika

$$P_k = \frac{U_{cm} I_{cm}}{2} = \frac{U_{cm} I_{ctm} f_1(\varphi)}{2}$$

$$I_{ctm} = \frac{2 P_k}{U_{cm} f_1(\varphi)} = 3.06 A$$

$$I_{ss} = I_{ctm} f_0(\varphi) = 3.06 \cdot 0.252$$

$$U_N = U_{cc} + U_{cm} = 2 U_{cc} = 24 < U_{ce0} = 30 V \rightarrow \text{uvijet zadovoljen}$$

$$U_M = U_{cc} - U_{cm} \cos(\varphi) = U_{cc} (1 - \cos 40^\circ) = 7.896 < U_{ce0(sus)} \uparrow$$

$$I_{ctm} < I_{cmax} \text{ uvijet zadovoljen}$$



14.

$$C_2 < C_1$$

$L$  veliki otpor za višu frekv.

$C$  veliki otpor za nižu frekv.

$$R = 10 \Omega \text{ (u području osciliranja)}$$

$$f_d = \frac{1}{2\pi RC_1}$$

$$C_1 = \frac{1}{2\pi R f_d} = \frac{1}{2\pi \cdot 10 \cdot 150 \cdot 10^3} = 9,944 \text{ nF}$$

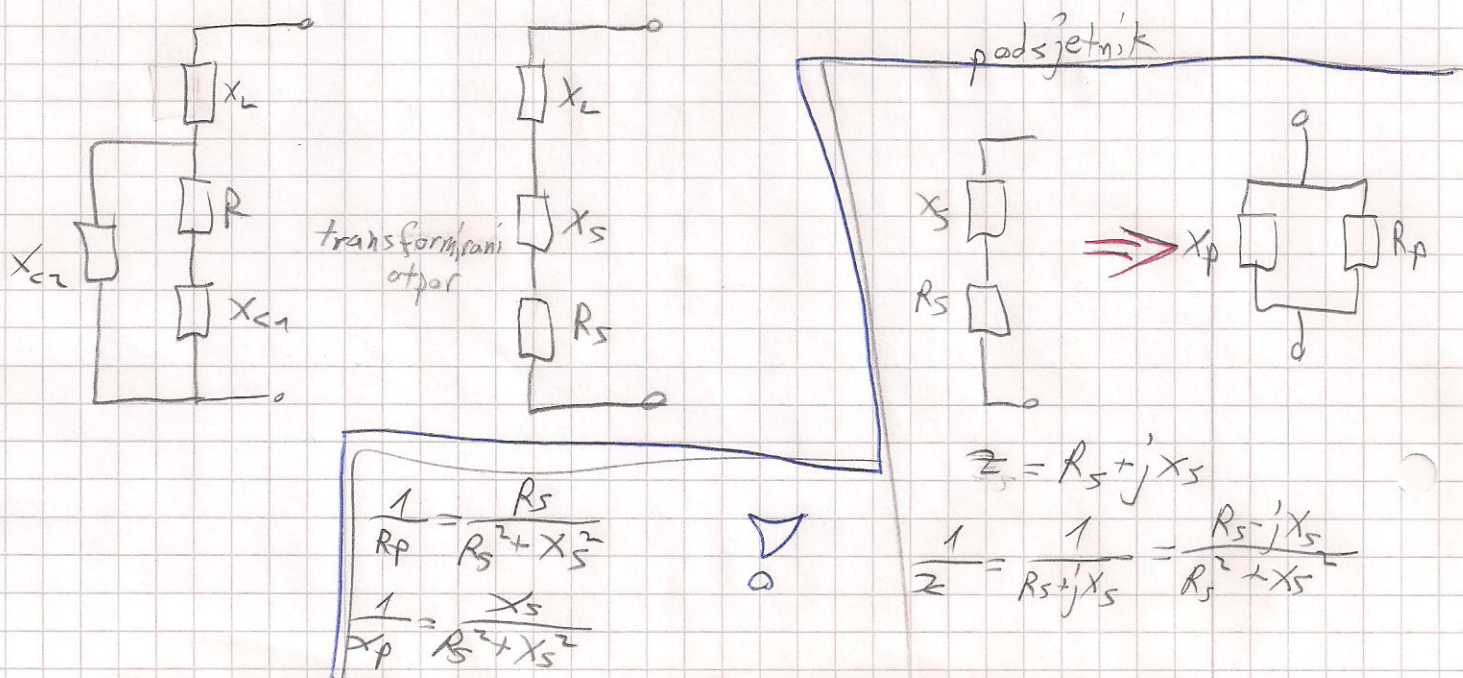
$$f_g = \frac{R}{2\pi L}$$

$$L = \frac{R}{2\pi f_g} = 44,2 \text{ mH}$$

	$f_d$	$f_g$
$X_{C2}$	3074	13,4
$X_L$	0,04	10

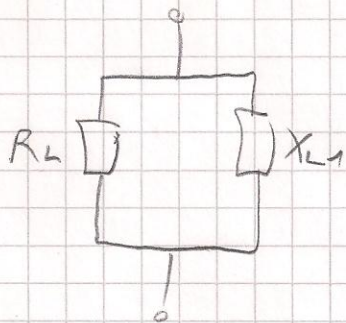
$C_1$  služi za povezivanje opterećenog otpora u željenom području rada

Opterećeni otpor, treba biti što veći, da se što manje opterećuje stvarna mreža napajanja tj da što veći signal ide prema strelici.





$$f_1 = 132 \text{ MHz}$$



$$X_{C1} = 0.072 \Omega \approx 0$$

$$X_{C2} = \frac{1}{2\pi f_1 C_2} = 3.65 \Omega$$

$$X_L = 2\pi f_1 L = 36.66 \Omega$$

$$R_S = \frac{R X_{C2}^2}{R^2 + X_{C2}^2} = 1.14 \Omega$$

$$X_S = \frac{R^2 X_{C2}}{R^2 + X_{C2}^2} = 3.22 \Omega$$

$$X_{S1} = X_S + X_L = 36.66 - 3.22 = 33.44 \Omega$$

$$R_L = \frac{R_S^2 + X_{S1}^2}{R_S} = 950.84 \Omega$$

$$X_{L1} = \frac{R_S^2 + X_{S1}^2}{X_{S1}} = 33.48 \Omega$$

bez  $C_2$

$$R_L = \frac{R^2 + X_L^2}{R} = 144.44 \Omega$$

$$X_{L1} = 39.99 \Omega$$



$$f_2 =$$

$$X_{C2} = 2,47 \Omega$$

$$X_L = 48,33 \Omega$$

$$R_5 = \frac{R X_{C2}^2}{R^2 + X_{C2}^2} = 0,257 \Omega$$

$$X_5 = \frac{R^2 X_{C2}}{R^2 + X_{C2}^2} = 2,57 \Omega$$

$$X_{S1} = X_L - X_5 = 45,75 \Omega$$

$$R_L = \frac{R_5 + X_{S1}}{R_5} = 2135 \Omega$$

Što veća frekv. veći otpor na  $C_2$

može doći pojačalo, i,

pojačalo - sa spreženom mrežom



15.

 $\pi$ -četverop.

$$X_L = \frac{R}{1+Q^2} \left( Q + \sqrt{\frac{r_a}{R} (1+Q^2)} - 1 \right)$$

$$\frac{r_a}{R} = \frac{0}{50} = \frac{4}{25}$$

$Q \approx 5, 10, 15$  kod LC krugova

$$X_L \approx \frac{R}{Q^2} \left( Q + \sqrt{\frac{r_a}{R} Q^2} \right)$$

$$Q \approx \frac{R}{X_L} \left( 1 + \sqrt{\frac{r_a}{R}} \right) = \frac{40}{X_L}$$

a)  $f_d = 980 \text{ kHz}$

$$X_L' = 2\pi f_d L = 4 \Omega$$

$$Q' = \frac{40}{4} = 10$$

$$X_L' = \frac{r_a}{\sqrt{\frac{r_a}{R} (1+Q'^2)} - 1} = 2.05 \Omega$$

$$X_C' = \frac{R}{Q'} = 5 \Omega$$

$$C_2' = \frac{1}{2\pi f_d X_L'} = 49 \text{ nF}$$

$$C_1' = \frac{1}{2\pi f_d X_C'} = 32.48 \text{ nF}$$

b)  $f_g = 1400 \text{ kHz}$

$$X_L'' = 2\pi f_g L = 10 \Omega$$

$$Q'' = \frac{40}{10} = 4$$

$$X_L'' = \frac{r_a}{\sqrt{\frac{r_a}{R} (1+Q''^2)} - 1} = 3.02 \Omega$$

$$X_C'' = \frac{R}{Q''} = 10 \Omega$$

$$C_2'' = \frac{1}{2\pi f_g X_L''} = 37.6 \text{ nF}$$

$$C_1'' = \frac{1}{2\pi f_g X_C''} = 15.91 \text{ nF}$$

$$15.91 \text{ nF} \leq C_1 \leq 32.48 \text{ nF}$$

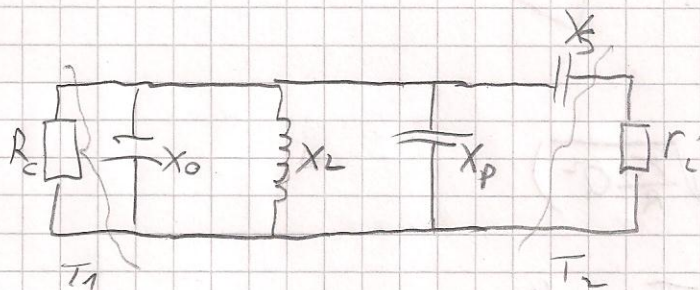
$$37.6 \text{ nF} \leq C_2 \leq 49 \text{ nF}$$



16.

"tipični"  
zadatak

$$\left. \begin{array}{l} X_{ce} = 0.53 \, \Omega \\ X_{L1} = 471.23 \, \Omega \end{array} \right\} \text{zanemariti}$$

opteretni otpor  $T_1$ ,  $C_p$ ,  $C_s$ ,  $L_1$ treba napraviti  
transformaciju $X_s \rightarrow u \, X_s'$  (paralelno)

$$X_s = 70 \, \Omega$$

leva strana mreže vidi

$$X_s = 13.26 \, \Omega$$

$$R_i' = \frac{r_i^2 + X_s^2}{r_i} = 47.97$$

$$X_s' = \frac{R_i^2 + X_s^2}{X_s} = 74.47 \, \Omega$$

$$C_s' = \frac{1}{2\pi f X_s'} = 3.66 \, \text{nF}$$

$$X_0 + X_p + X_s' = X_L$$

$$X_{Lck} = X_{Cuk} = \frac{1}{\omega C_{uk}}$$

nema izvora

$$C_{uk} = \frac{1}{2\pi f \cdot 10} = 5.3 \, \text{nF}$$

$$C_p = C_{uk} - C_0 - C_s' = 1.6 \, \text{nF}$$

$$\text{kut} \Rightarrow \cos \theta = \frac{U_k - U_{BB}}{U_{Bem, \min}}$$

$$P_{z62} = \frac{U_{em}^2}{2r_i} = 2.02 \, \text{W}$$

$$\cos \theta = 0.294$$

$$\theta = 72.72^\circ$$

Snaga na  $T_1$  jednako je onom na  $T_2$  jer smo  
prilagodili mrežu.

$$P_{z62} = P_{K1} = \frac{(U_{cc} - U_s)^2}{2R_c}$$

$$R_c = R_i' \Rightarrow P_{z62} = \frac{(U_{cc} - U_s)^2}{2R_i'} = 0.51 \, \text{W}$$



"tipičan zadatak"

17.

snaga na trašilu treba biti 8W, ja  $T_2$  treba dobiti 1W  
a  $T_1$  daje 4W pa sprežna mreža ne treba biti  
prilagođena tj. treba malo gušiti snagu (prilagoditi  
impedancije)

nadomjesna shema

$$R_{c1} = \frac{U_{cc}^2}{2P_{K1}} = 91,12 \Omega$$

$$X_{o1} = \frac{1}{B_L} = 38,46 \Omega$$

klazna admitancija

$$X_L' = 2,6$$

$$C_{o1} = \frac{1}{2\pi f X_{o1}} = 23,46 \text{ nF}$$

$$r_L' = 2,6$$

$$R_{c1}' = \frac{R_{c1} X_{o1}^2}{R_{c1}^2 + X_{o1}^2} = 13,95 \Omega$$

$$X_{o1}' = \frac{R_{c1}^2 X_{o1}}{R_{c1}^2 + X_{o1}^2} = 32,82 \Omega$$

$$X_{L1} = Q_1 r_L' = 18,2 \Omega$$

$$X_{L1} = X_{L2} + X_L'$$

$$X_{L2} = X_{L1} - X_L' = 15,6 \Omega$$

$$L_2 = \frac{1}{2\pi f X_{L2}} = 14,19 \text{ mH}$$

$$X_{S1} = R_{c1}' \sqrt{\frac{r_L'}{R_{c1}'}} (1 + Q_1^2) - 1 = 40,25 \Omega$$

$$X_S = X_{S1} - X_{o1}' = 4,43 \Omega$$

$$C_S = \frac{1}{2\pi f X_S} = 122,4 \text{ pF}$$

$$X_P = \frac{r_L' (1 + Q_1^2)}{Q_1 - \sqrt{\frac{r_L'}{R_{c1}'}} (1 + Q_1^2) - 1} = 37,58$$

$$C_P = \frac{1}{2\pi f X_P} = 28,8 \text{ pF}$$