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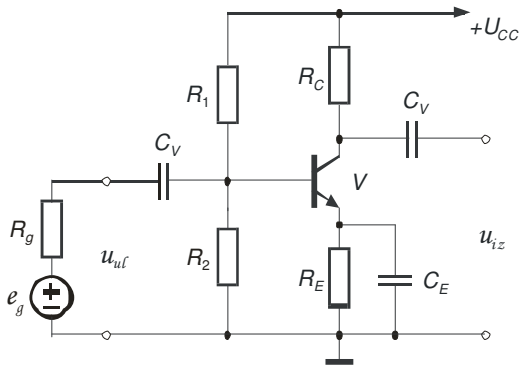
1. domaća zadaća iz Analognih sklopova i Elektroničkih sklopova

1. U krugu na slici napisati jednadžbe SRP-a i DRP-a te odrediti vrijednost otpornika R_2 da se postigne najveći maksimalni hod signala. Poznato je: U_{CC} = 24 V, R_1 = 1 MΩ, R_C = 6,2 kΩ, R_E = 1,1 kΩ, β = 130, U_{BEQ} = 0,7 V, $U_{CE\text{zas}}$ = 0.



Rješenje:

Uvjet za najveći maksimalni hod signala $R_C \cdot I_{CQ} = U_{CEQ} - U_{CE\text{zas}}$

Radna točka uvrštena u SRP $U_{CEQ} + (R_C + R_E) \cdot I_{CQ} = U_{CC}$

$$I_{CQ} = \frac{U_{CC}}{2R_C + R_E} = 1{,}77\dot{7}\ \text{mA}, \qquad U_{CEQ} = 11{,}02\dot{2}\ \text{V} = U_{izmm}$$

$$I_{BQ} = \frac{I_{CQ}}{\beta} = 13{,}68\ \mu\text{A}$$

$$U_B = U_{BEQ} + R_E \cdot I_{CQ} = 2{,}65\dot{5}\ \text{V}$$

$$I_1 = \frac{U_{CC} - U_B}{R_1} = 21{,}34\ \mu\text{A}, \qquad I_2 = I_1 - I_{BQ} = 7{,}669\ \mu\text{A}, \qquad \boxed{R_2 = \frac{U_B}{I_2} = 346{,}3\ \text{k}\Omega}$$

SRP ... $\boxed{I_C = -\frac{1}{R_C + R_E} \cdot U_{CE} + \frac{U_{CC}}{R_C + R_E} = -137{,}0 \cdot U_{CE} + 3288\ \mu\text{A}}$

DRP ... $\boxed{i_C = -\frac{1}{R_C} \cdot u_{CE} + \frac{U_{CEQ}}{R_C} + I_{CQ} = -161{,}3 \cdot u_{CE} + 3556\ \mu\text{A}}$