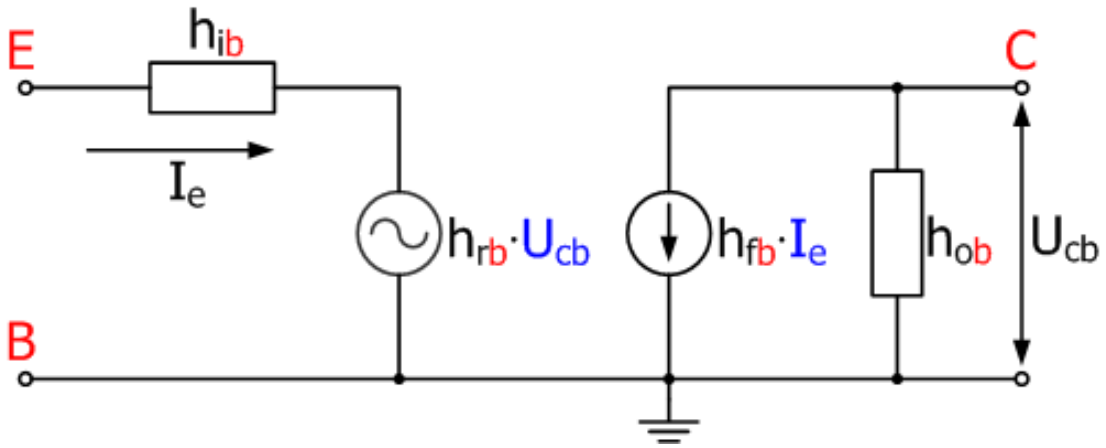
Elektronika

Auditorne vježbe 11

Pojačalo u spoju ZB

- Ulaz: emiter
- Izlaz: kolektor



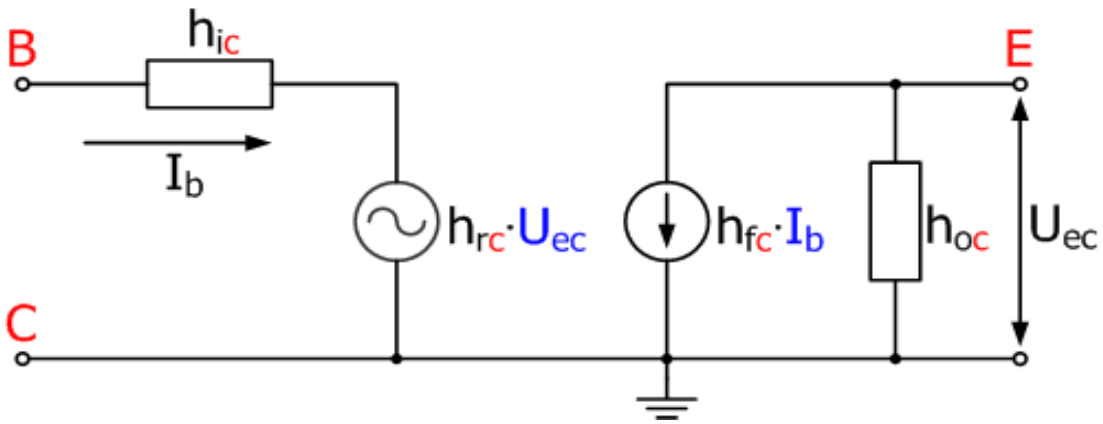
- Transformacija hibridnih parametara ZE < - > ZB:

$$h_{ib} \approx \frac{h_{ie}}{1+h_{fe}} \qquad h_{fb} \approx -\frac{h_{fe}}{1+h_{fe}}$$

$$h_{rb} \approx \frac{h_{ie} \cdot h_{oe}}{1+h_{fe}} - h_{re} \qquad h_{ob} \approx \frac{h_{oe}}{1+h_{fe}}$$

Pojačalo u spoju ZC

- Ulaz: baza
- Izlaz: emiter



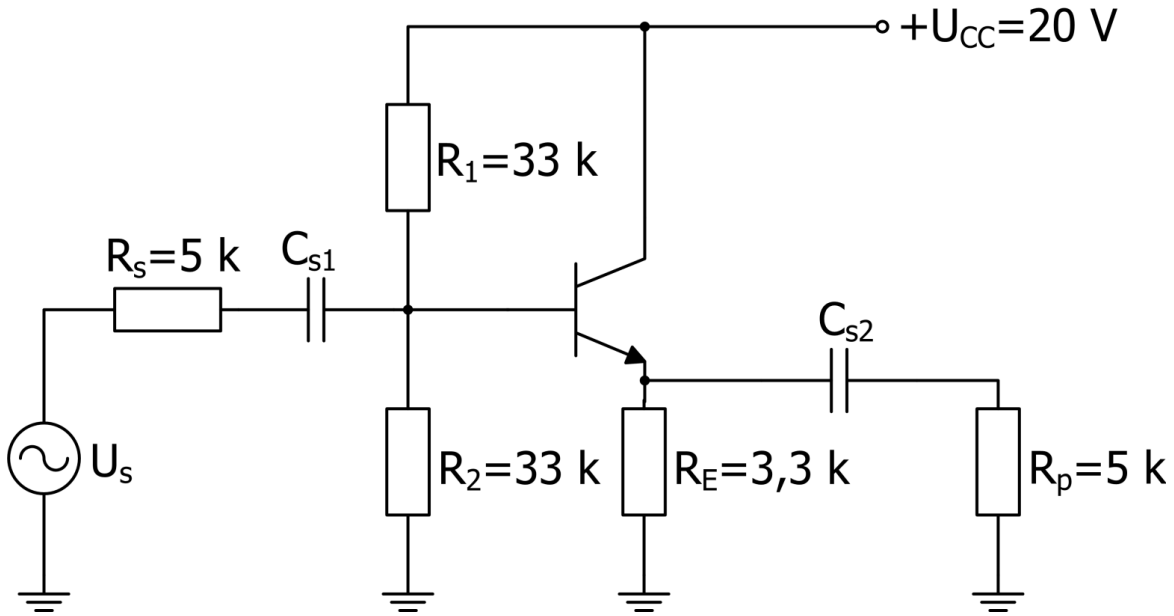
- Transformacija hibridnih parametara ZE < - > ZC:

$$h_{ic} = h_{ie} \qquad h_{fc} = -\left(1 + h_{fe}\right)$$

$$h_{rc} = 1 - h_{re} \qquad h_{oc} = h_{oe}$$

Zadatak 42.

- Odrediti strujno i naponsko pojačanje te ulazne i izlazne otpore tranzistora i sklopa za pojačalo prikazano na slici. Poznato je: h_{ie}=4 kΩ, h_{fe}=250, h_{oe}=40·10^{-6} S, h_{re}= 2·10^{-6}.



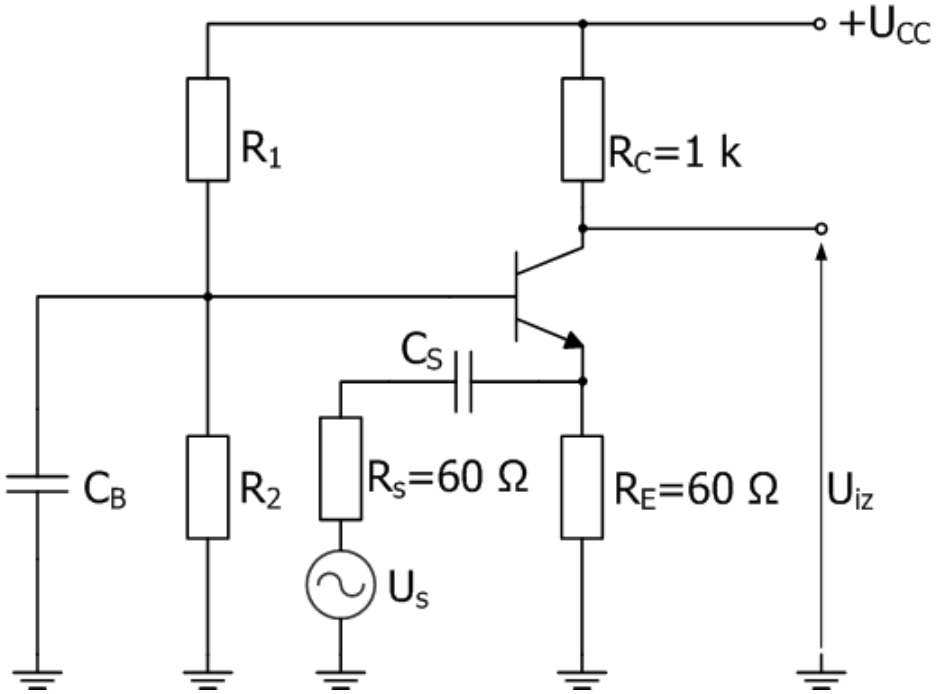
Zadatak 42.

☑ Rješenje:

- R_B=16,5 kΩ; R_p'=2 kΩ; R_s'=R_s||R_B=3,84 kΩ
- A_I=232,5
- R_{ul}=466 kΩ; R_{ul}'=15,9 kΩ;
- A_V=0,986
- R_{iz}=31,2 Ω; R_{iz}'=30,9 Ω.

Zadatak 43.

- Odrediti strujno i naponsko pojačanje te ulazne i izlazne otpore tranzistora i sklopa za pojačalo prikazano na slici. Poznato je: h_{ie}=1 kΩ, h_{fe}=100, h_{oe}=25·10^{-6} S, h_{re}= 1·10^{-4}.



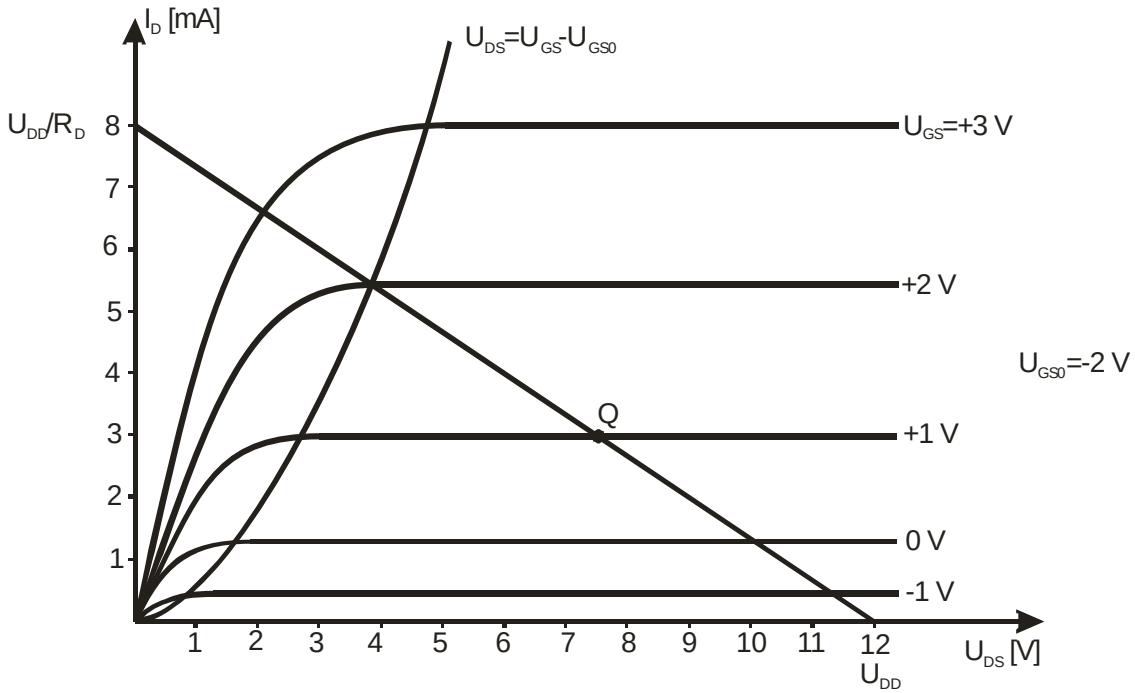
Zadatak 43.

☑ Rješenje:

- $R_p=R_C=1\ k\Omega$; $R_s'=R_s||R_E=30\ \Omega$
- $A_I=0,99$
- $R_{ul}=10,1\ \Omega$; $R_{ul}'=8,6\ \Omega$
- $A_V=98,5$
- $R_{iz}=255,9\ k\Omega$; $R_{iz}'=1\ k\Omega$

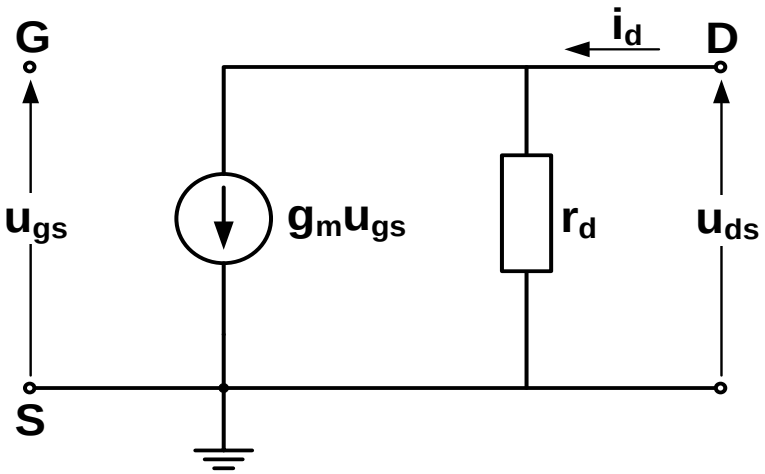
Pojačala s unipolarnim tranzistorom

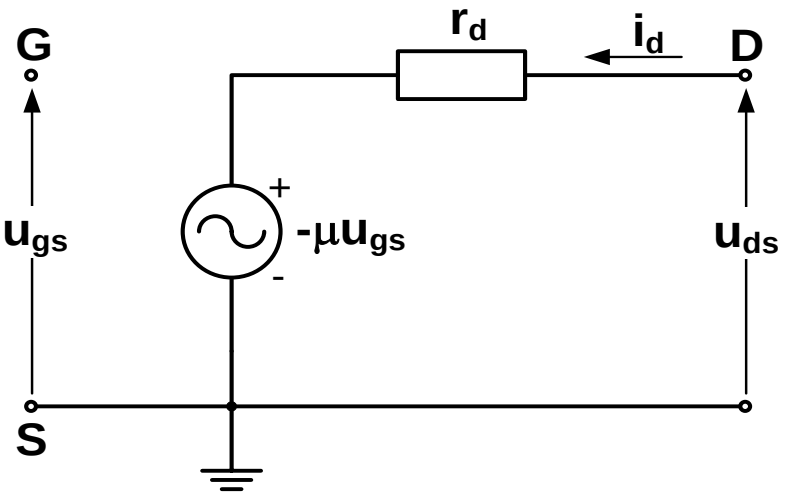
- Zajedničko svojstvo: vrlo veliki ulazni otpor (G-S) => upravljani naponskim signalom
- Radna točka u području zasićenja => idealni strujni izvor



Nadomjesni model FET-a u dinamičkim uvjetima

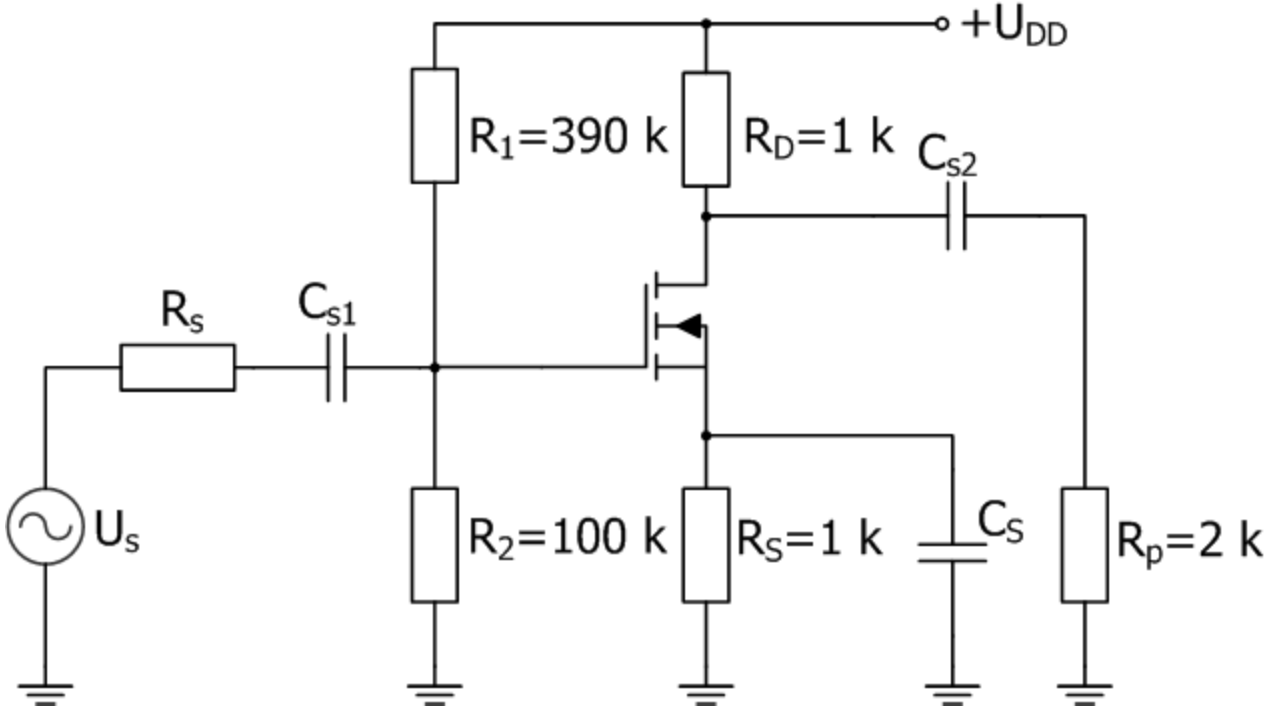
- Mali signali i srednje frekvencije:





Zadatak 44.

- Odrediti naponsko pojačanje te ulazne i izlazne otpore tranzistora i sklopa za pojačalo prikazano na slici. Poznato je: g_m=3,5 mA/V, g_d=20·10^{-6} S. Zadatak riješiti i za slučaj kad je kondenzator C_S isključen.



Zadatak 44.

☑ Rješenje:

a) S priključenim kondenzatorom C_S

1) A_V=-2,31
2) $R_{ul} \rightarrow \infty$; $R_{ul}'=R_G$=79,6 kΩ
3) $R_{iz}=r_d$=50 kΩ; $R_{iz}' \approx R_D$=1 kΩ

b) Bez kondenzatora C_S

1) A_V=-0,52
2) $R_{ul} \rightarrow \infty$; $R_{ul}'=R_G$=79,6 kΩ
3) $R_{iz}=r_d+(1+\mu)R_S$=226 kΩ; $R_{iz}' \approx R_D$=1 kΩ