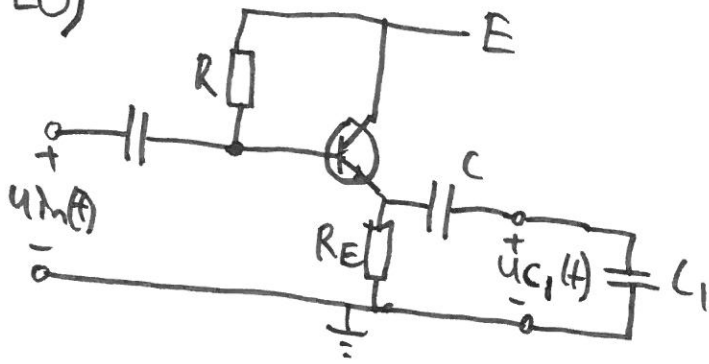


4-20)

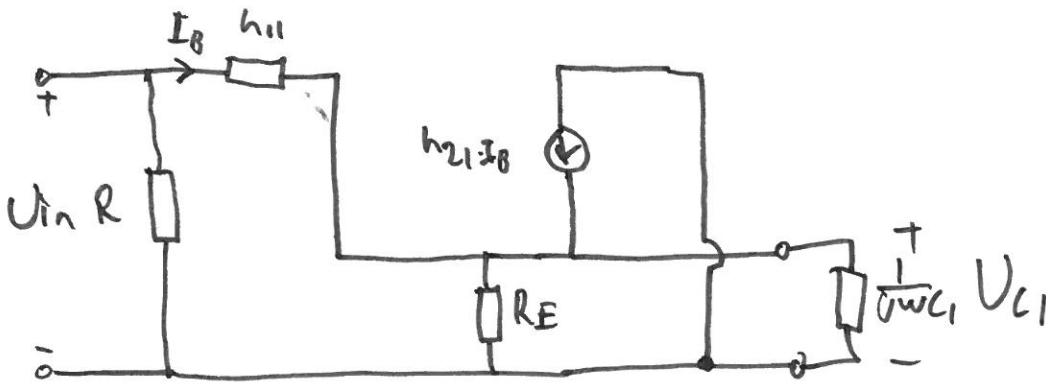


$E = 12\text{ V}$   
 $R = 500\text{ k}\Omega$   
 $R_E = 5\text{ k}\Omega$   
 $C$  stor

$h_{11} = 4\text{ k}\Omega$   
 $h_{21} = 50$   
 $h_{12} \approx 0$   
 $h_{22} \approx 0$

$C_1 = 10\text{ }\mu\text{F}$

ekvivalent småsignalschema:  $u_{in}(t) = 10 \sin(10^3 t)$  [V]



(1)  $U_{in} = h_{11} \cdot I_B + (I_B + h_{21} \cdot I_B) (R_E \parallel \frac{1}{j\omega C_1})$

(2)  $U_{C_1} = (R_E \parallel \frac{1}{j\omega C_1}) \cdot (I_B + h_{21} \cdot I_B)$

(1)  $\Rightarrow I_B = \frac{U_{in}}{h_{11} + (1+h_{21})(R_E \parallel \frac{1}{j\omega C_1})} = \frac{U_{in}}{h_{11} + (1+h_{21}) \cdot \frac{R_E}{1+j\omega R_E C_1}}$  (3)

(2) : (1)  $\Rightarrow$

$U_{C_1} = \frac{R_E}{(1+j\omega R_E C_1)} \cdot \frac{(1+h_{21}) \cdot U_{in}}{h_{11} + (1+h_{21}) \cdot \frac{R_E}{(1+j\omega R_E C_1)}}$ , förläng med  $(1+j\omega R_E C_1) \Rightarrow$

$U_{C_1} = \frac{R_E \cdot (1+h_{21}) \cdot U_{in}}{h_{11} \cdot (1+j\omega R_E C_1) + (1+h_{21}) \cdot R_E} = 7.8 e^{-0.65j}$

$u_{C_1}(t) \approx 7.8 \sin(10^3 t - 0.65) \text{ [V]}$