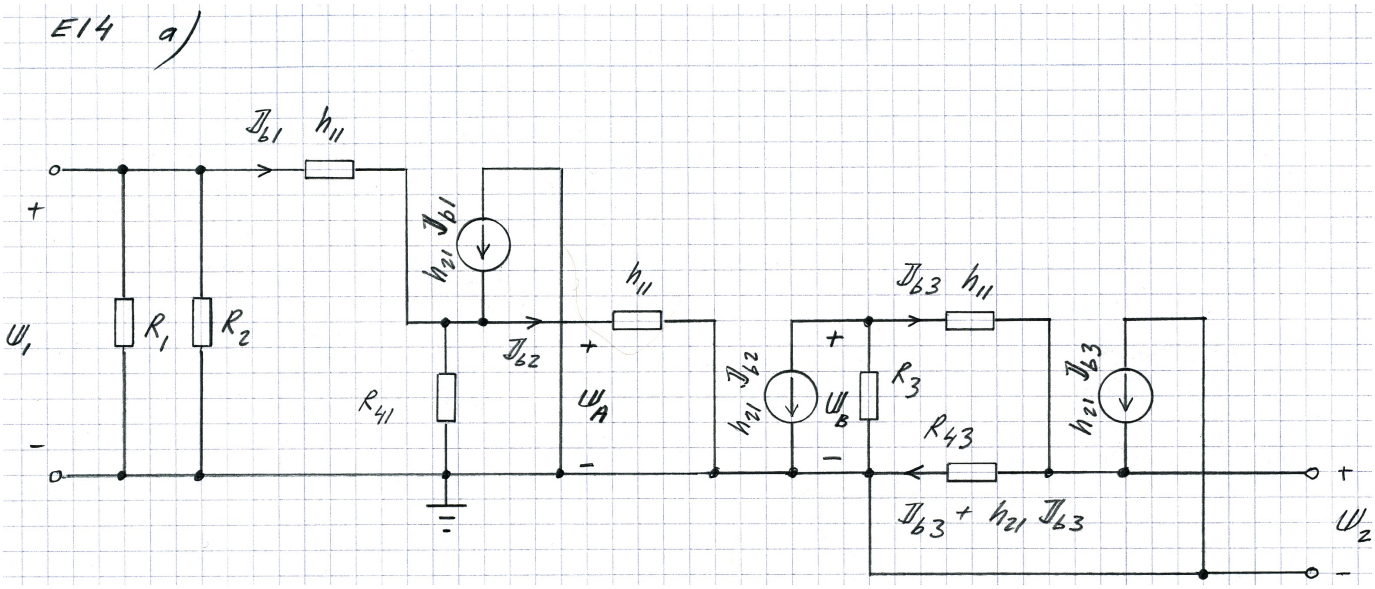
E14 a)



b) $$Z_{in} = R_1 \parallel R_2 \parallel \left(h_{11} + (1 + h_{21})(R_{41} \parallel h_{11}) \right)$$

$$\rightarrow Z_{in} \approx 53\ k\Omega \parallel 20{,}8\ k\Omega \parallel 52{,}5\ k\Omega \approx$$

$$\approx 12\ k\Omega \ (11{,}6\ k\Omega)$$

c) $$Z_{ut} = R_{43} \parallel \frac{h_{11} + R_3}{1 + h_{21}}$$

$$\rightarrow Z_{ut} = 2{,}5\ k\Omega \parallel 29{,}1\ \Omega \approx$$

$$\approx 29\ \Omega \ (28{,}8\ \Omega)$$

d) $$F = \frac{U_2}{U_1} = \frac{U_2}{U_B} \cdot \frac{U_B}{U_A} \cdot \frac{U_A}{U_1} \quad \ldots (1)$$

$$U_2 = R_{43}\left(I_{b3} + h_{21} I_{b3}\right) \Rightarrow U_2 = 377500\, I_{b3}$$

$$U_B = h_{11} I_{b3} + R_{43}\left(I_{b3} + h_{21} I_{b3}\right)$$

$$\Rightarrow \quad U_B = 377900\, I_{b3}$$

$$U_B = -h_{21} I_{b2}\left(R_3 \,/\!/\, \left(h_{11} + R_{43}(1 + h_{21})\right)\right)$$

$$\Rightarrow \quad U_B = -593716\, I_{b2}$$

$$U_A = h_{11} I_{b2} \Rightarrow U_A = 400\, I_{b2}$$

$$U_A = \left(R_{41} \,/\!/\, h_{11}\right) \cdot \left(I_{b1} + h_{21} I_{b1}\right)$$

$$\Rightarrow U_A = 54909\, I_{b1}$$

$$U_1 = h_{11} I_{b1} + U_A \Rightarrow U_1 = 55309\, I_{b1}$$

INSÄTTNING (1) $\rightarrow$

$$F = \frac{377500\, I_{b3}}{377900\, I_{b3}} \cdot \frac{-593716\, I_{b2}}{400\, I_{b2}} \cdot \frac{54909\, I_{b1}}{55309\, I_{b1}}$$

$$\rightarrow F \approx -1472$$

$$|F| \approx 1{,}5 \cdot 10^3 \quad \text{GGR}$$