

+ ) Zählwert  $A_0, A_1$

$$I_b = \frac{U_1 - U_2}{h_{11e}} \Rightarrow U_2 = (R_3 \parallel R_L) \cdot h_{21e} I_b = (R_3 \parallel R_L) h_{21e} \frac{U_1 - U_2}{h_{11e}}$$

$$U_2 \left( 1 + \frac{R_3 \parallel R_L}{h_{11e}} h_{21e} \right) = \frac{R_3 \parallel R_L}{h_{11e}} h_{21e} U_1$$

$$\left[ \frac{U_2}{U_1} = \frac{\frac{R_3 \parallel R_L}{h_{11e}} h_{21e}}{1 + \frac{R_3 \parallel R_L}{h_{11e}} h_{21e}} = \left| \frac{h_{21e} (R_3 \parallel R_L)}{h_{11e}} \right| \gg 1 \right]$$

$$I_1 = \frac{U_1}{\frac{1}{h_{11e}} + \frac{1}{R_1} + \frac{1}{R_2}} \Rightarrow I_b = I_1 \frac{1}{1 + \frac{1}{h_{11e} R_1} + \frac{1}{h_{11e} R_2}}$$

$$I_2 = h_{21e} I_b \frac{\frac{1}{R_L}}{\frac{1}{R_L} + \frac{1}{R_3}} = h_{21e} \frac{\frac{1}{h_{11e}} \cdot I_1 \cdot \frac{1}{R_L}}{\frac{1}{h_{11e}} + \frac{1}{R_1} + \frac{1}{R_2}} \cdot \frac{1}{\frac{1}{R_L} + \frac{1}{R_3}}$$

Ab  $R_1, R_2 > h_{11e}$  ;  $R_3 > R_L$

$$\frac{I_2}{I_1} = h_{21e}$$

5.1 R<sub>ust</sub> ;

$$R_{ust} = \frac{U_1}{I_1} \Rightarrow U_1 = h_{11e} I_b + (h_{21e} + 1) (R_4 \parallel R_L) I_b = \frac{h_{11e} U_1}{1 + \frac{1}{R_1} + \frac{1}{R_2}} + \frac{U_1}{h_{11e}}$$

$$R_{ust} = R_1 \parallel R_2 \parallel \left( (R_4 \parallel R_L) (h_{21e} + 1) + h_{11e} \right) = R_4 \cdot h_{21e} + h_{11e}$$

relativ  
velke