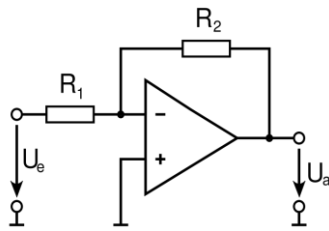


# Referat Operationsverstärker

von Dengke Ye

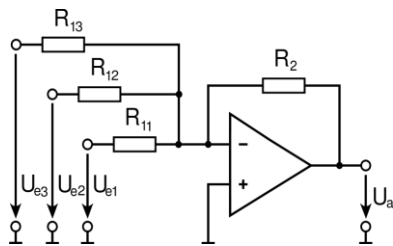
## Invertierender Verstärker



Übertragungsfunktion:

$$U_a = v \cdot U_e = -\frac{R_2}{R_1} \cdot U_e$$

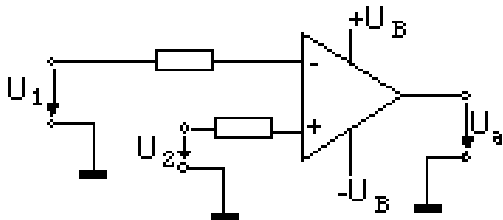
## Addierer



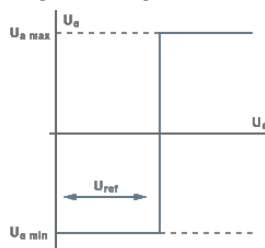
Übertragungsfunktion:

$$U_a = -R_2 \cdot \left( \frac{U_{E1}}{R_{11}} + \frac{U_{E2}}{R_{12}} + \frac{U_{E3}}{R_{13}} \right)$$

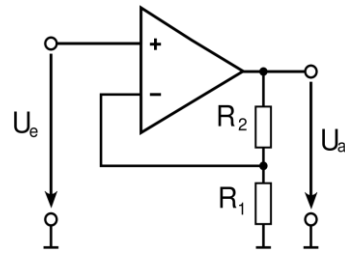
## Komparator ohne Hysterese



Kennlinie:



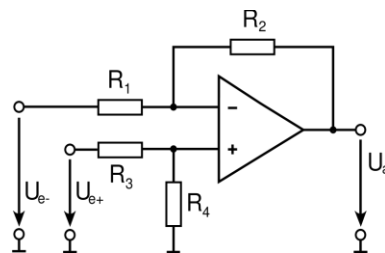
## Nicht invertierender Verstärker



Übertragungsfunktion:

$$U_a = v \cdot U_e = \left[ 1 + \frac{R_2}{R_1} \right] \cdot U_e$$

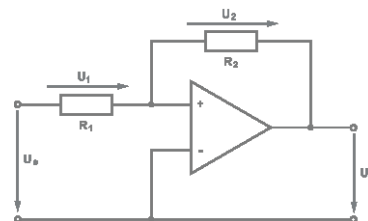
## Subtrahierer



Übertragungsfunktion:

$$U_a = U_{e+} \cdot \left( \frac{(R_1 + R_2) R_4}{(R_3 + R_4) R_1} \right) - U_{e-} \cdot \left( \frac{R_2}{R_1} \right)$$

## Komparator mit Hysterese



Kennlinie:

