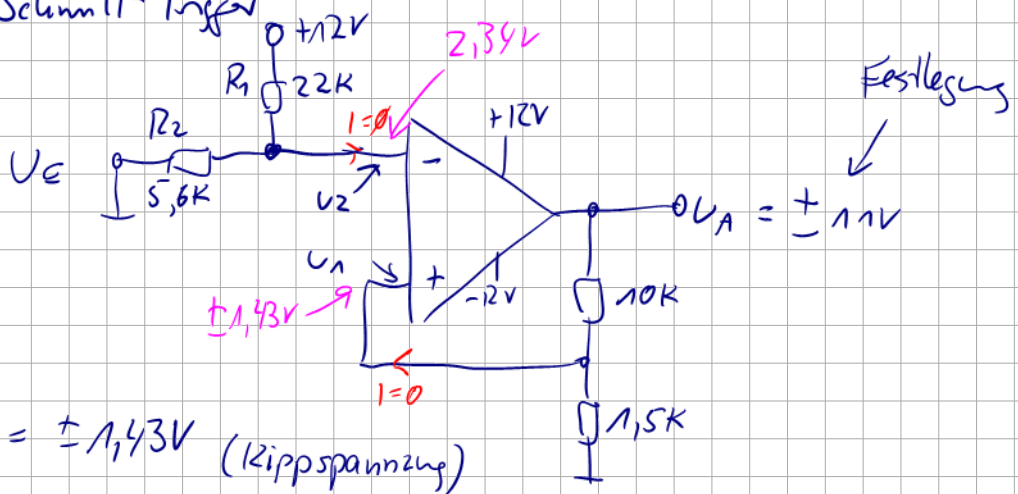
AE-T1

23.06.2020
BRe

Invertierender Schmitt-Trigger

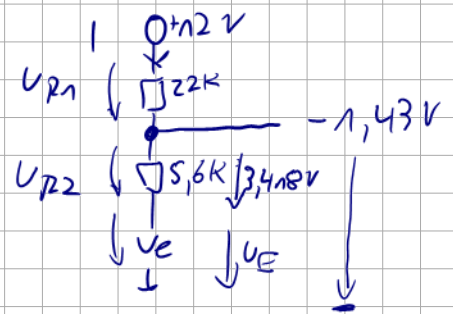


Annahme:
$U_E = 0V$

$U_1 = \pm 11V \cdot \frac{1,5}{11,5} = \pm 1,43V$ (Kippspannung)

$U_2 = 12V \cdot \frac{5,6}{27,6} = 2,34V$ ⇒ U_A wird negativ, d.h. $-11V$

Frage: Wann kippt U_A ins Positive? ⇒ $U_2 < -1,43V$

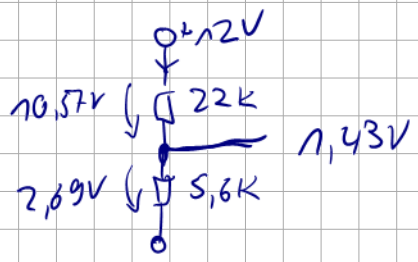


$U_{R1} = 12V - (-1,43V) = 13,43V$

$I_{R1} = I_{R2} = \frac{13,43V}{22k\Omega} = 610,45\mu A$

$U_{R2} = 610,45\mu A \cdot 5,6k\Omega = 3,418V$

$U_E = -4,85V$ ↘ kippt ins Positive

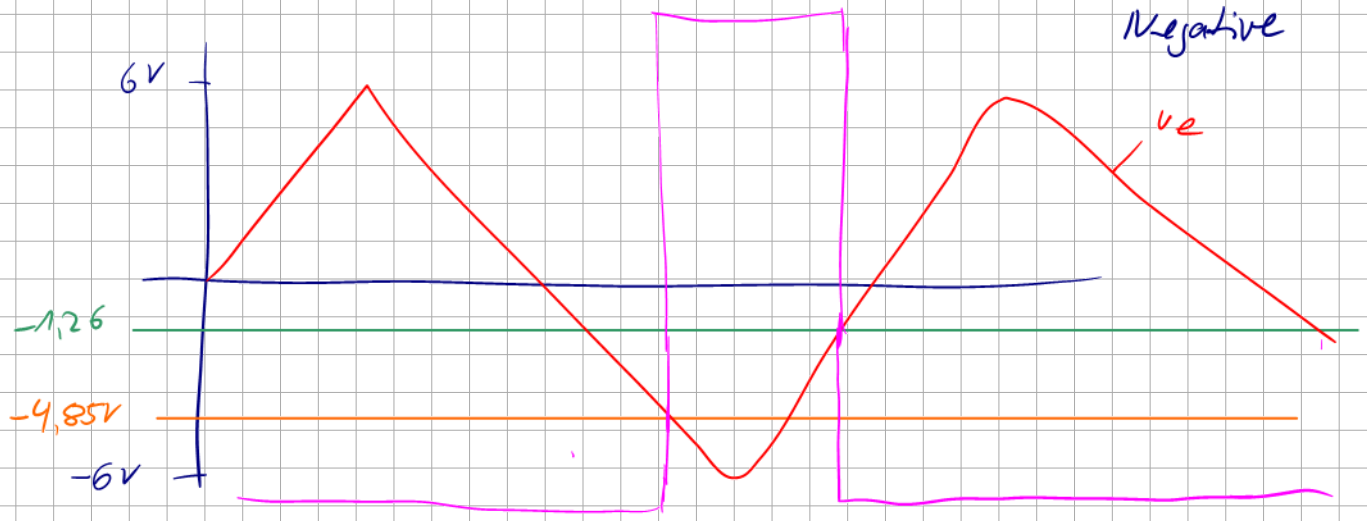


$U_{R1} = 12V - 1,43V = 10,57V$

$I_{R1} = I_{R2} = \frac{10,57V}{22k} = 480,4\mu A$

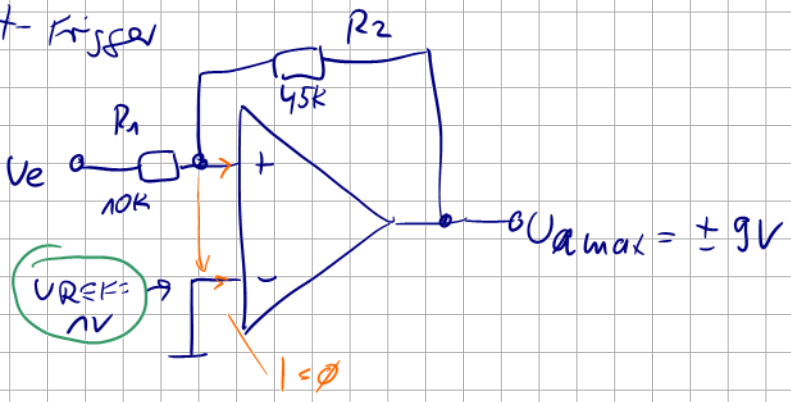
$U_{R2} = 480\mu A \cdot 5,6k\Omega = 2,69V$

$U_E = 1,43V - 2,69V = -1,26V$ ↘ kippt ins Negative



AE - T1

Nichtinvertierender Schmitt-Trigger



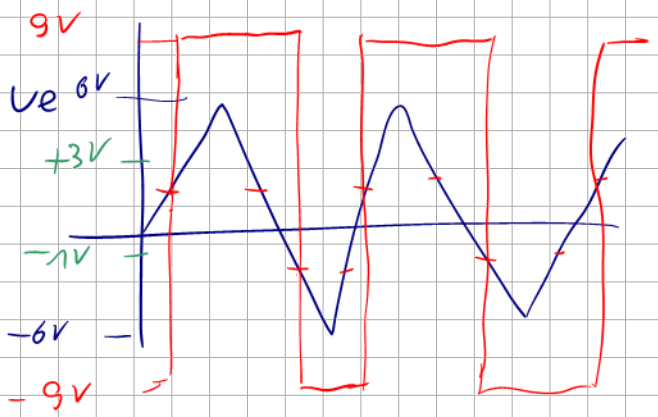
$9V \triangleq 45k\Omega$

$U_e \triangleq 10k\Omega \triangleq U_{kipp}$

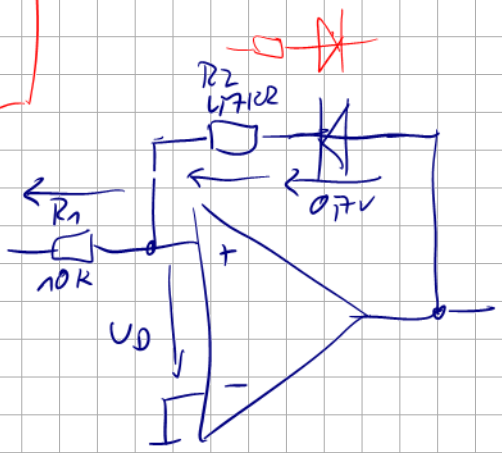
$U_{kipp} = \pm 9V \cdot \frac{10}{45}$

allg. $\boxed{U_{kipp} = \pm U_{A\,max} \cdot \frac{R_1}{R_2}}$

$U_{kipp} = \pm 9V \cdot \frac{10}{45} = \pm 2V$



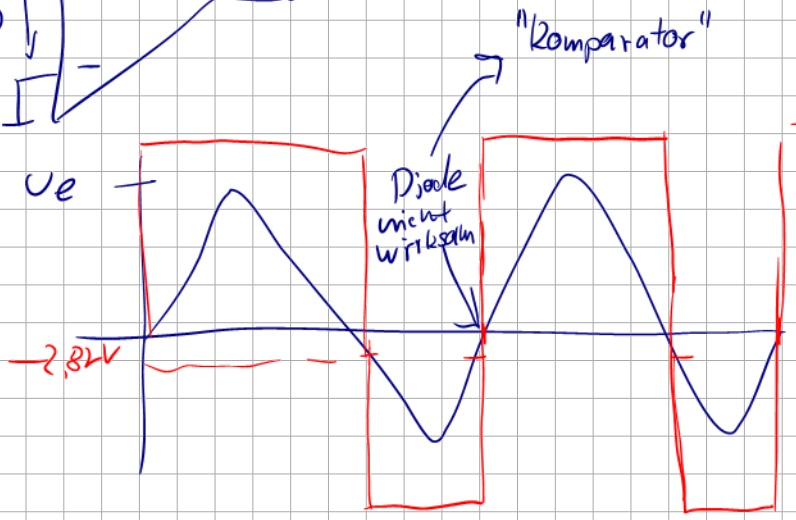
Beispiel



a) Kippunkt bei $U_D = Ø V$

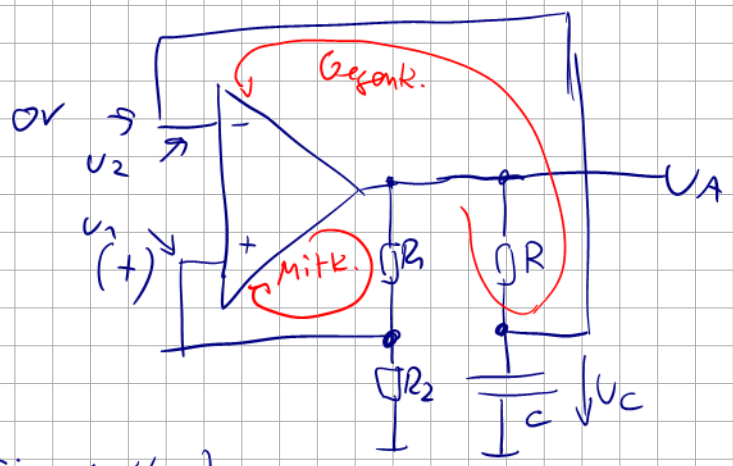
b) $\rightsquigarrow U_{R2} = 14V - 0,7V = 13,3V$

c) $\rightsquigarrow U_{R1} = -2,82V$



AE-T1

Astabile Kippstufe
Oszillator
Schwingkreis



a) $t = 0$ (Beim Einschalten)

$U_C = 0V$

b) U_2 ↑ auf $\sim U_A \cdot \frac{R_2}{R_1 + R_2}$