Elektronik Aufgabe 11

a) n-MOS: Source an Masse

$$U_{DS,n} \geq U_{GS,n} - U_{Th,n}$$

$$U_{out} \geq U_{in} - U_{Th,n}$$

$$U_{out,min} = U_{in} - U_{Th,n}$$

p-MOS: Source an U_{DD}

$$|U_{DS,p}| \geq |U_{GS,p}| - |U_{Th,p}| \Rightarrow \text{Beträge vereinfachen alles}$$

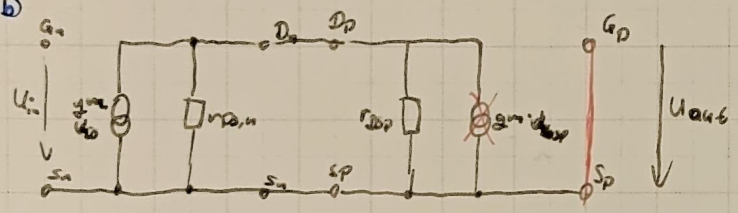
$$U_{DD} - U_{out} \geq U_{DD} - U_{ref} - |U_{Thp}|$$

$$-U_{out} \geq -U_{ref} - |U_{in}|$$

$$U_{out} \leq U_{ref} + |U_{Thp}|$$

$$U_{out,max} = U_{ref} + |U_{Thp}|$$

b)



c)

$$\frac{u_{out}}{u_{in}} = -g_{m,n} \cdot (r_{DS,n} \| r_{DS,p})$$

d)

$g_{m,n} = 600 \frac{\mu A}{V}$ $\quad g_{m,p} = -600 \frac{\mu A}{V}$

$r_{DS,n} = 3{,}3\,M\Omega$

$r_{DS,p} = 3{,}3\,M\Omega$

U_{ref} aus $I_{Dn} = |I_{D,p}| = 3V$