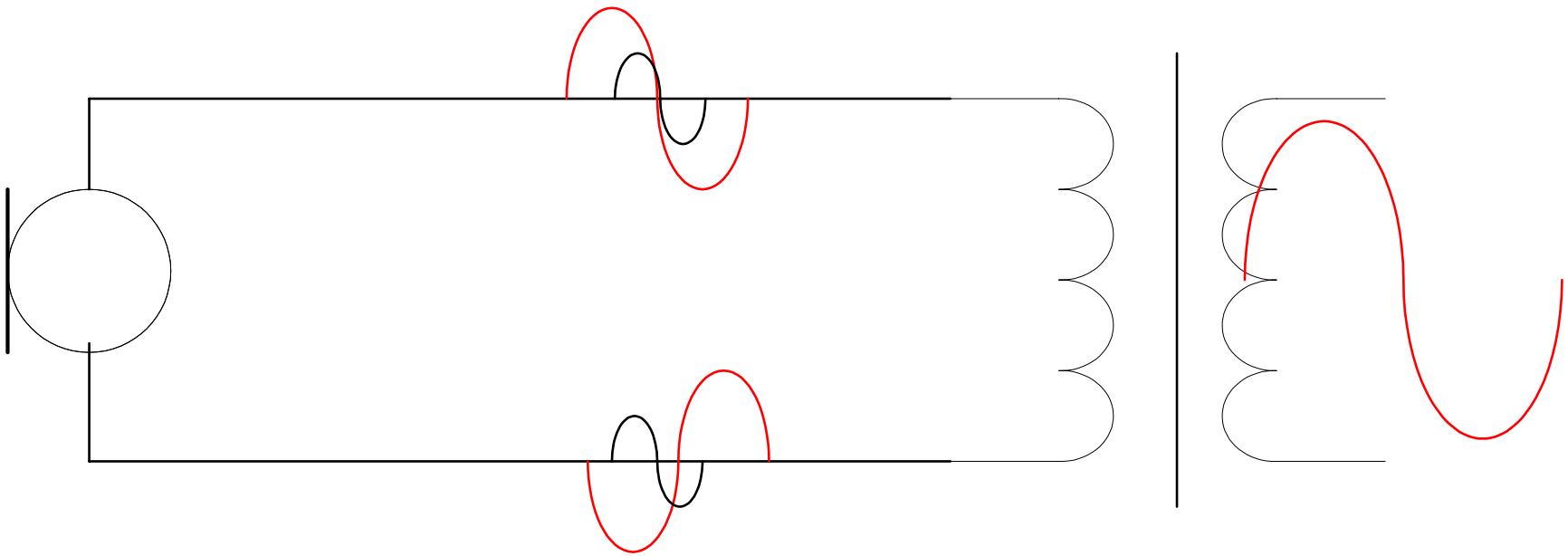
Differential forstærkeren

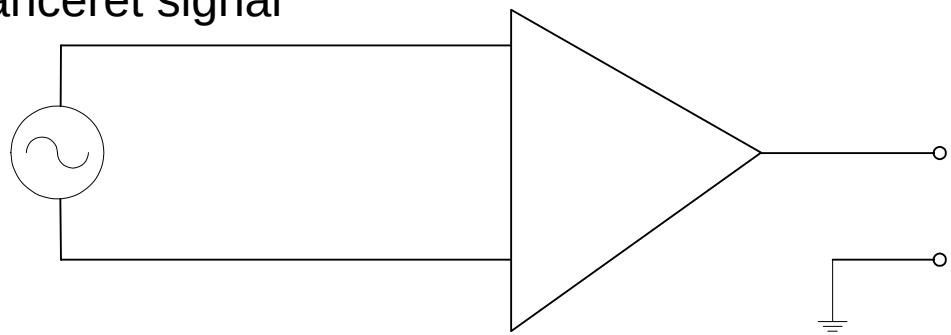
Lkaa
S.331 Bind 2 analog teknik Udg. 1
S.407 Analog teknik Udg.3

CMRR
Common Mode Rejection Ratio

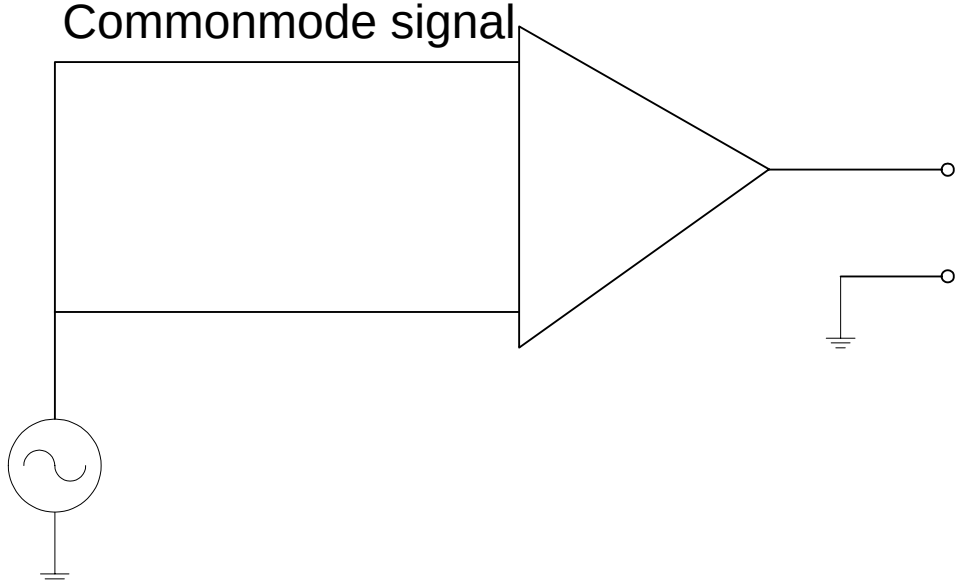


CMRR

Balanceret signal



Commonmode signal



CMRR

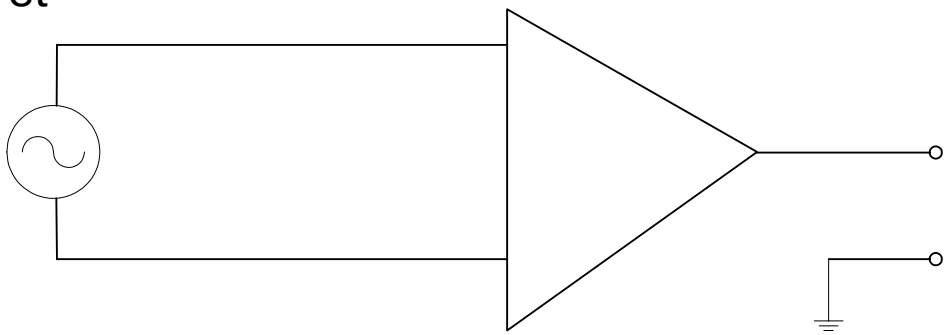
- U_{DM} : AC signalet der ønskes forstærket!
- U_{CM} : CM= common mode, uønskede signal
- A_{DM} : Forstærkningen af AC signalet (endelig værdi)
- A_{CM} : Er altid større end 0

CMRR

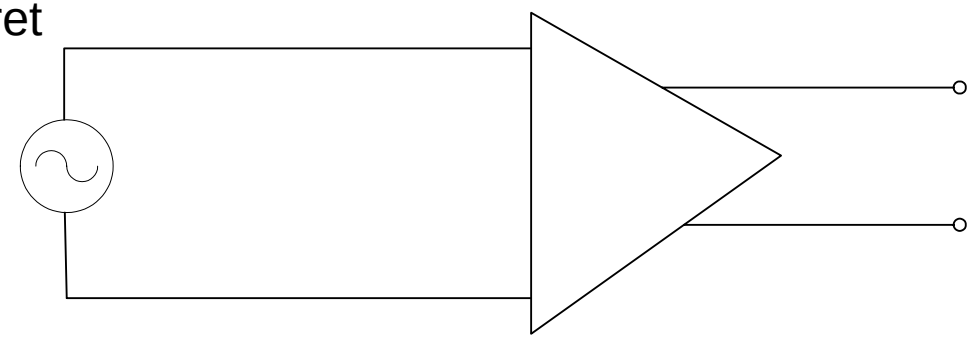
- CMRR= A_{DM}/A_{CM}
- $CMRR_{dB}$= 20*log(A_{DM}/A_{CM})’
- EKS:
- A_{DM}=2000gg
- A_{CM}=0,2
- $CMRR_{dB}$=20*log(2000/0,2)=80 dB

Output

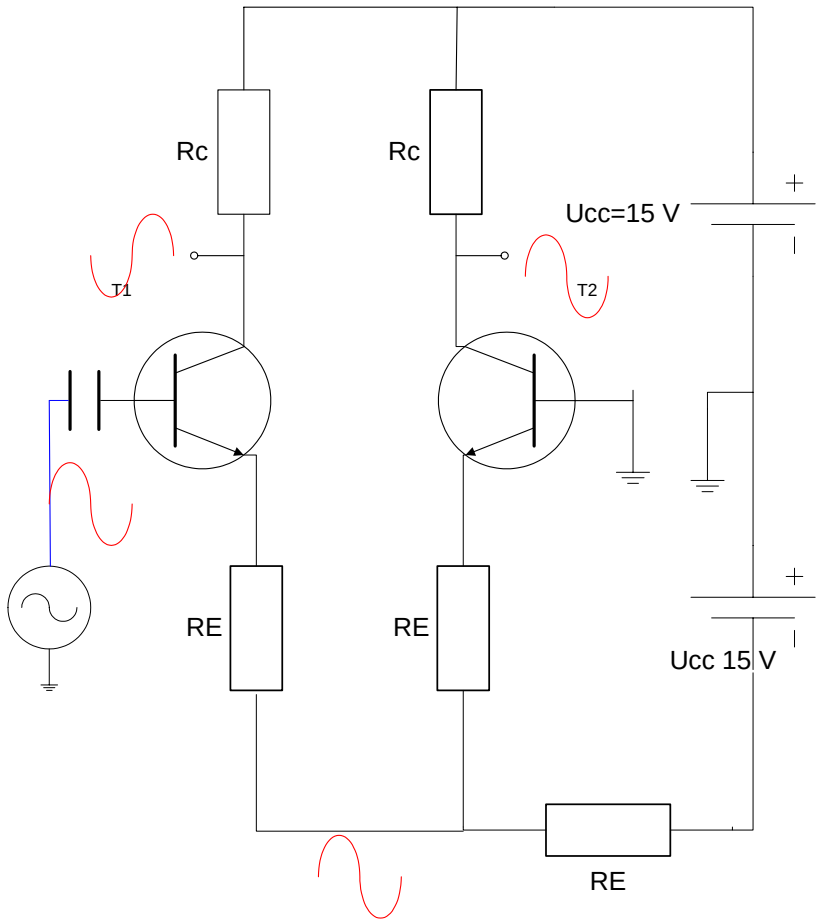
Ubalanceret



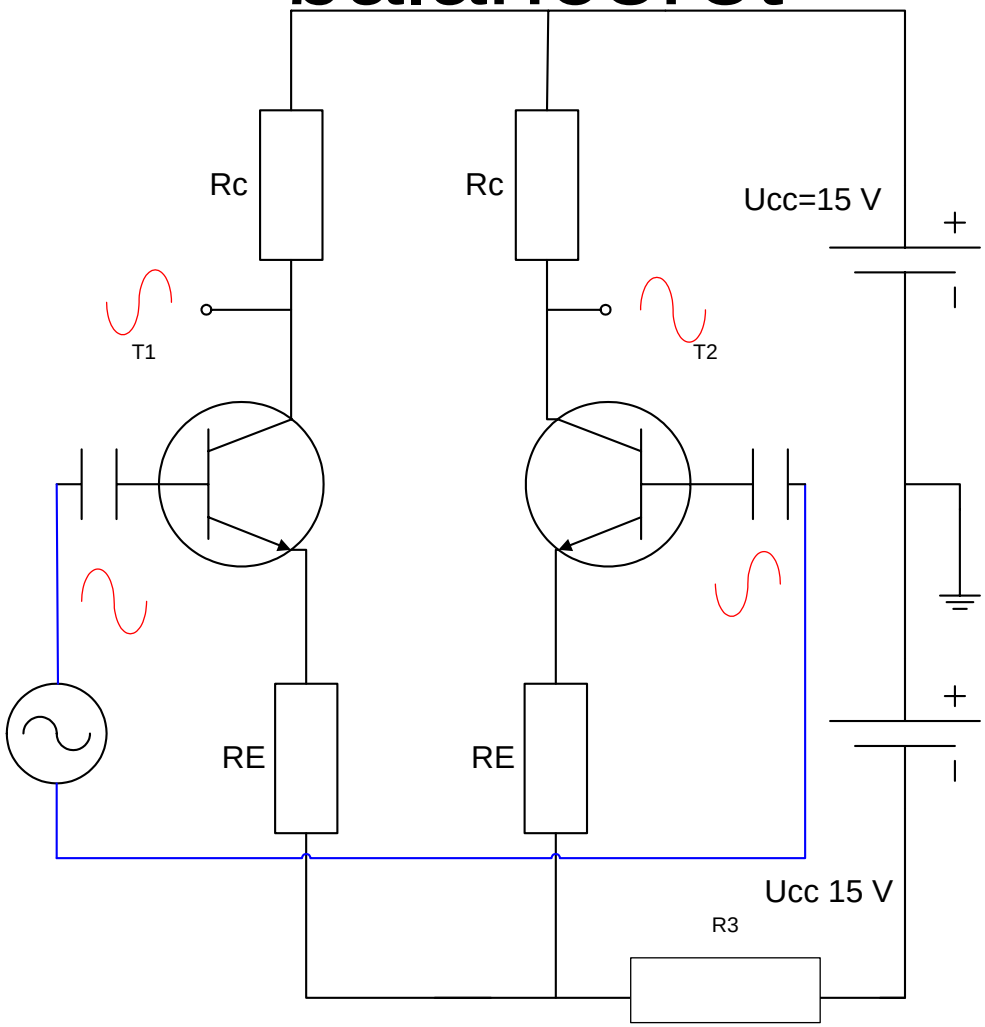
Balanceret



Differential forstærkeren
Ubalanceret



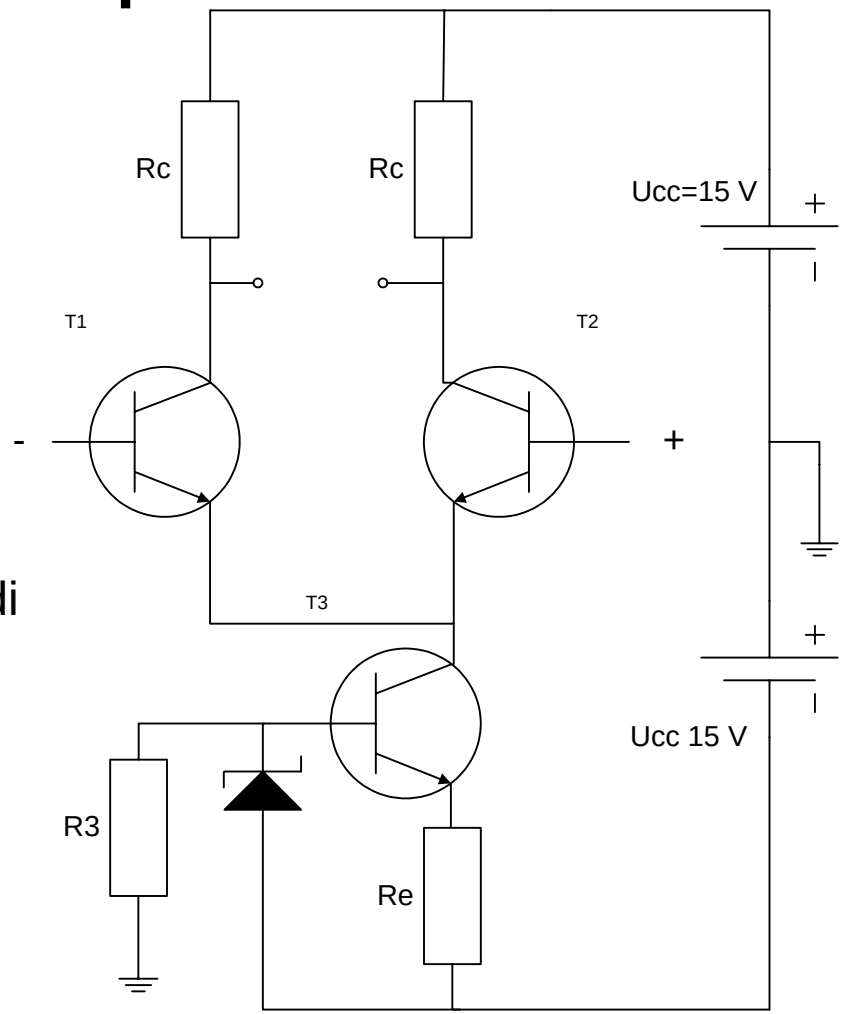
Differentialforstærkeren balanceret



CMRR beregning

- $CMRR=A_{DM}/A_{CM}$
- $CMRR_{dB}=A_{DM}[dB]-A_{CM}[dB]$
- CMRR[balanceret]= komponent spredning
- $CMRR_{singleout}=I_C*R_E/25m$

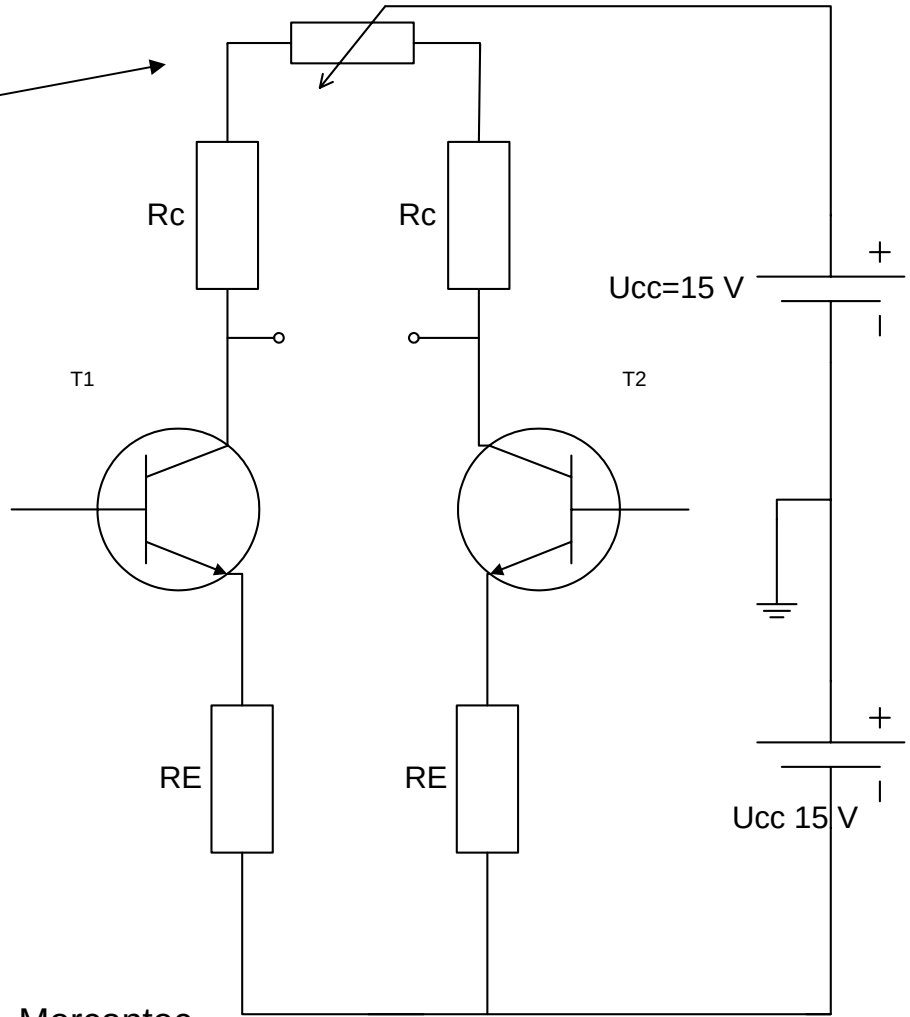
Differentialforstærkeren balanceret praktisk



- CMRR>100dB
- Re så stor så mulig =>Stor CMRR værdi
- Strømgenerator som Re

Differentialforstærkeren balanceret praktisk

- Offset justering!!



Impedancer

- Indgang
  - $Z_{inDM}=2*h_{ie}$
  - $Z_{inCM=}R_{E*}h_{fe}$
- Udgang
  - Single out: $Z_{out}=R_C//1/h_{oe}=R_C$
  - Balanceret: $Z_{out}=2*R_C$