

Föreläsning 2

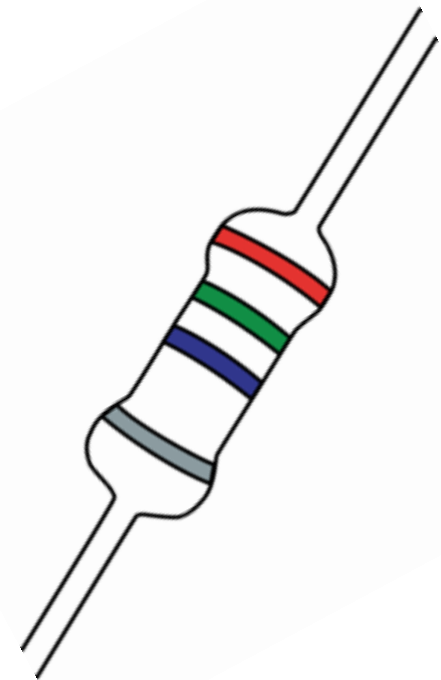
Effekt

Serie och parallellkopplingar

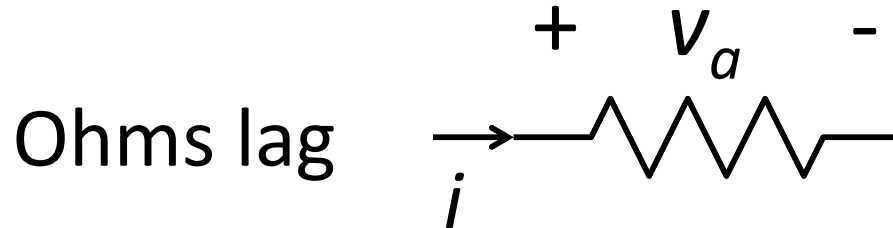
Ström/Spänningsgrening

Jordfelsbrytare

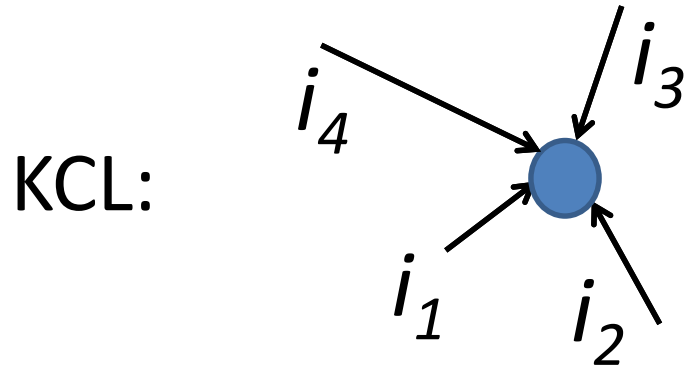
Hambely: 65-78



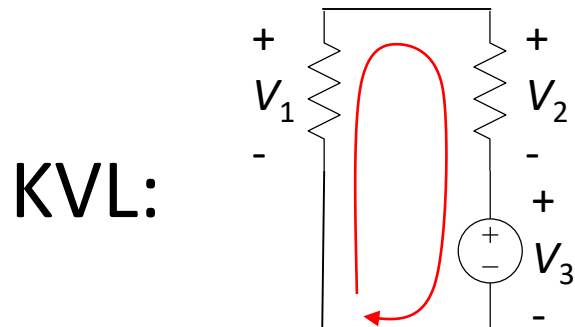
Måndagens föreläsning



$$v_a = iR$$

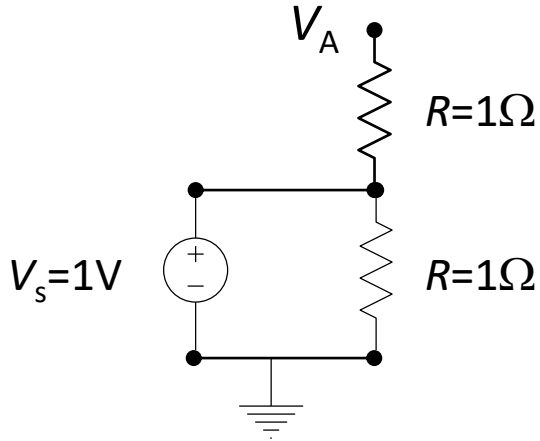


$$\sum_{k=1}^n i_k = 0$$



$$\sum_{k=1}^n v_k = 0$$

KCL & Ohms lag



Vad är potentialen i nod V_A ?

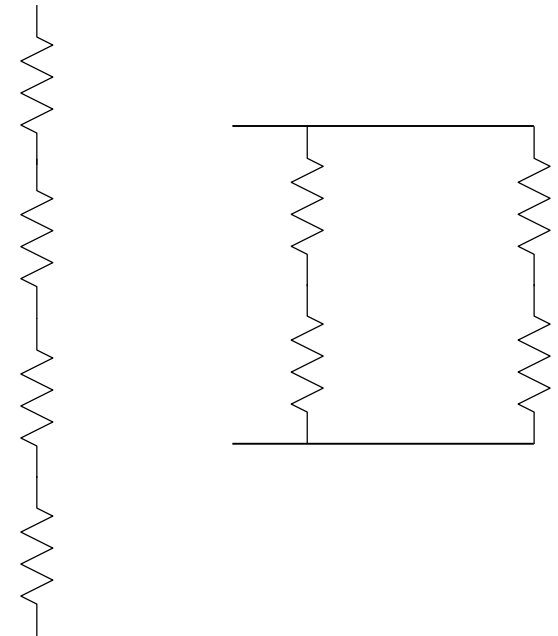
- A) 0V
- B) 1V
- C) 0.5 V
- D) Obestämd
- E) ???

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Dagens föreläsning

- Styrda källor
- Effekt
- Seriekoppling av resistanser
- Parallellkoppling av resistanser
- Spänningsdelning. Strömgrening

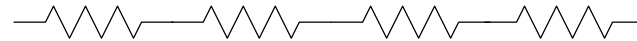
Resistornätverk



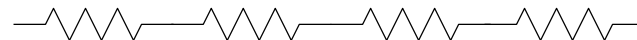
Motstånd : $p > 0$: Bara Resistorer?



Omvandlar elektrisk energi till termisk energi (Värme)



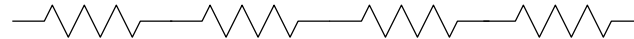
Omvandlar elektrisk energi till termisk energi och ljus
(Värme/ljus)



Motstånd – Bara Resistorer?



Omvandlar elektrisk energi till rörelseenergi (Ljudvågor)

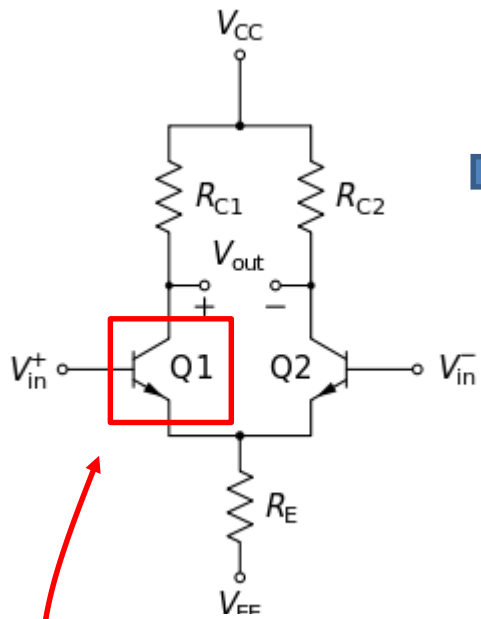


Omvandlar elektrisk energi till rörelseenergi (mekanisk kraft)

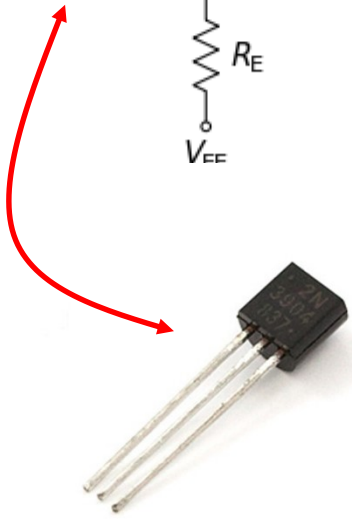
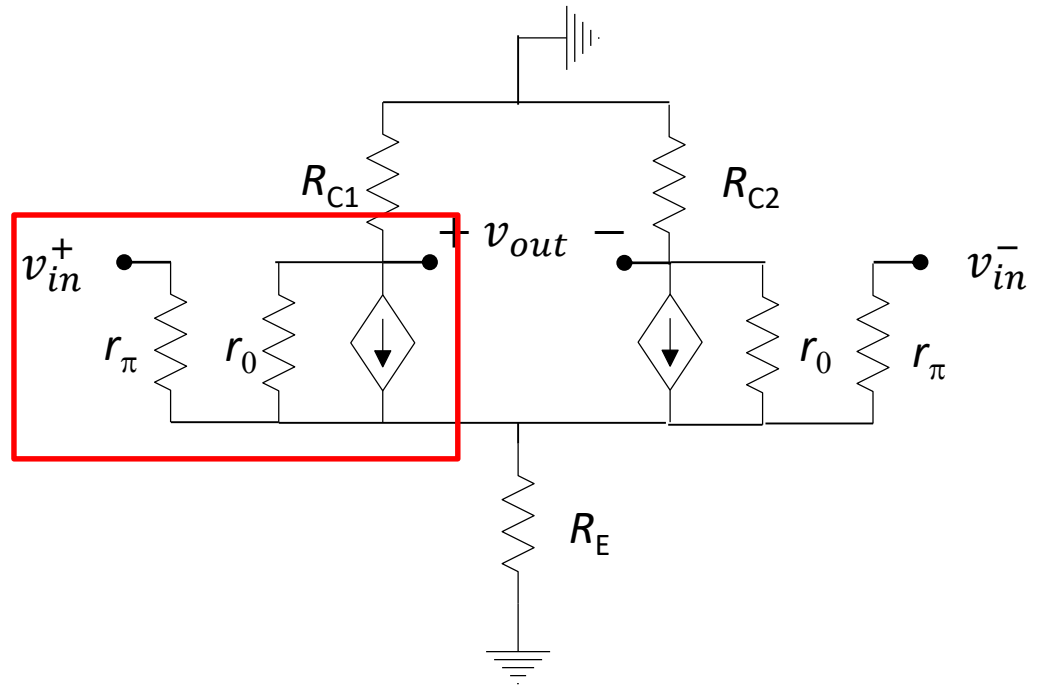


**I princip allt som konsumerar/omvandlar elektrisk effekt kan elektriskt modeleras som ett resistornätverk!
(Med varierande noggrannhet...)**

Motstånd – Bara Resistorer?



Modell



Sammanfattning

Seriekoppling

$$R = R_1 + R_2 + R_3 + \dots$$

Parallellkoppling

$$R = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots \right)^{-1} \quad G = G_1 + G_2 + G_3 + \dots$$

$$R = \frac{R_1 R_2}{R_1 + R_2} \quad \text{Två motstånd}$$

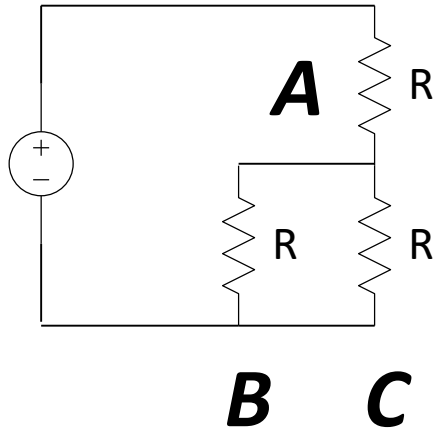
Spänningsdelning

$$v_1 = \frac{R_1}{R_1 + R_2} v_s$$

Strömgrening

$$i_1 = \frac{R_2}{R_1 + R_2} i_s$$

Spänning/Ström/Effekt

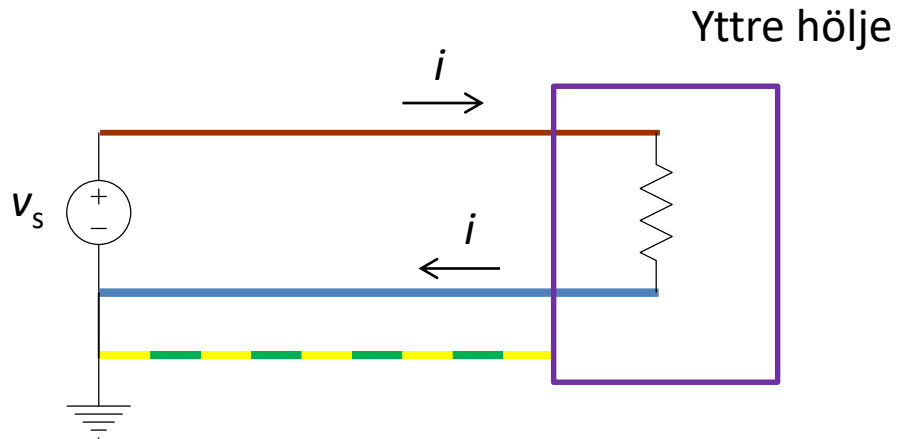
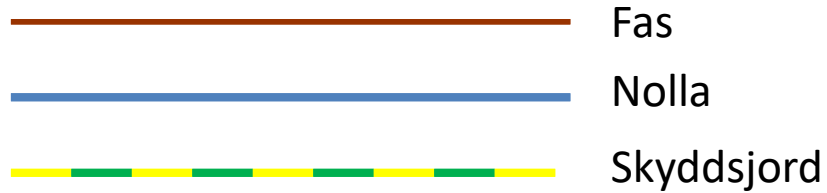


Varje resistans motsvarar en identisk lampa.

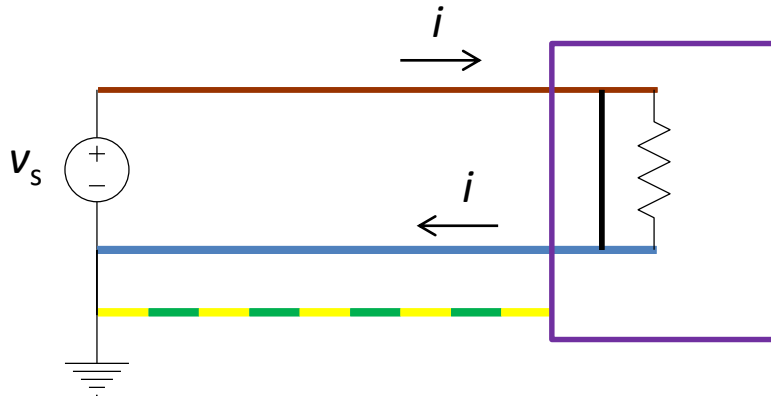
Vilken lyser starkast?

- A) A
- B) B
- C) C
- D) ????

Vardagselektronik – fas, nolla & jord

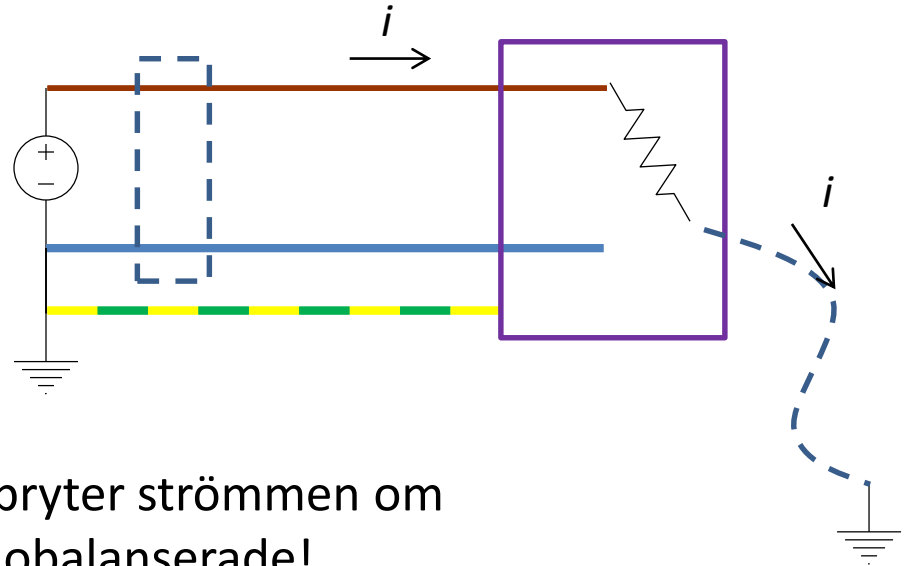
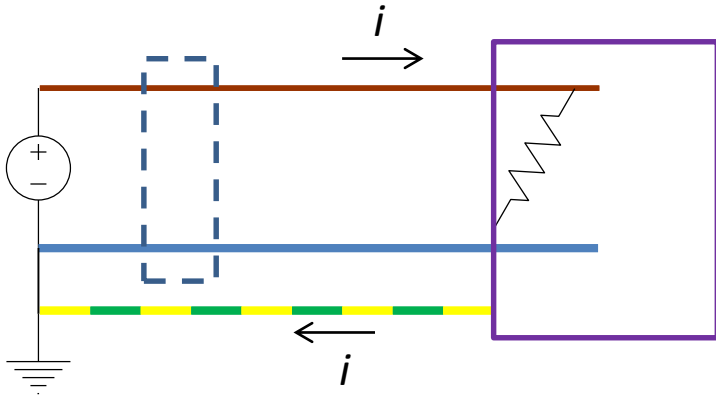


Vardagselektronik – fas, nolla & jord



$$i \rightarrow \infty$$

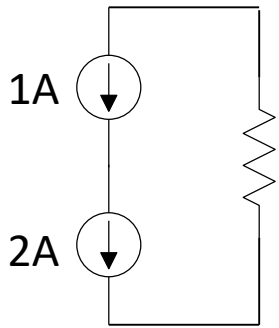
Säkringen går!



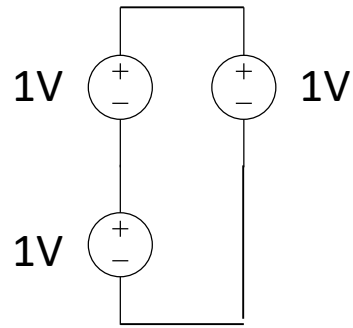
Jordfelsbrytare – bryter strömmen om fas/nolla är obalanserade!

Källor

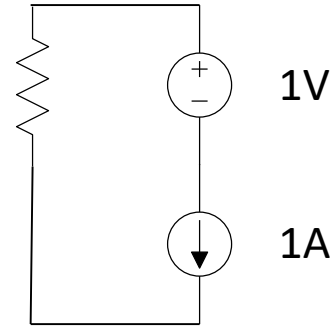
Antag ideala källor – vilken koppling leder **INTE** till en motsägelse?



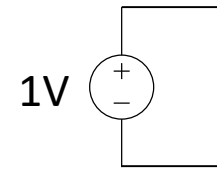
A



B



C



D

????

E

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