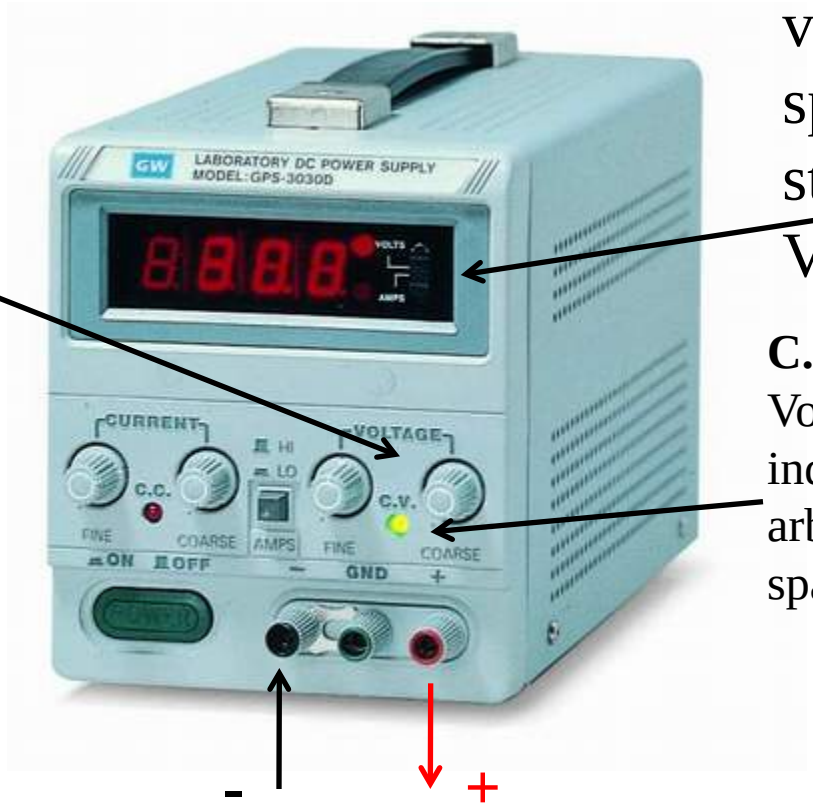
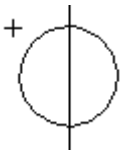
Spänningsaggregatet

VOLTAGE
ratt för att ställa in konstant spänning
Grov och fininställningsratt



Knappar för att välja visning av spänning eller ström
Voltage/Amps

C.V. Continuous Voltage. Lysdiod som indikerar att aggregatet arbetar som spänningsgenerator.



\+ och – pol

(GND är för att ansluta plåthöljet till +/- för att undertrycka störningar).

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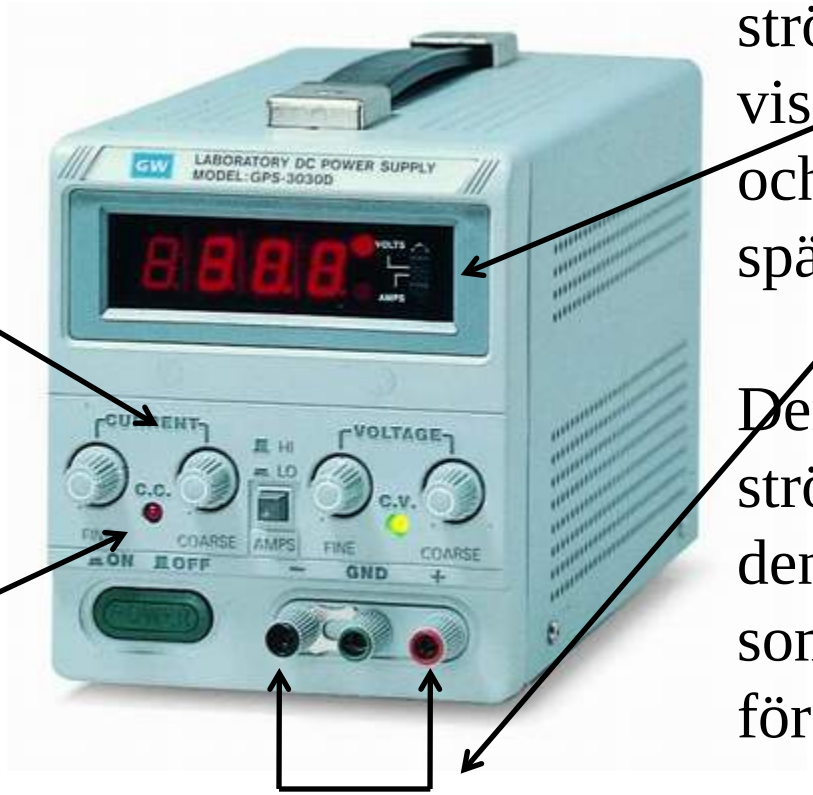
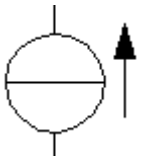
Spänningsaggregatet

CURRENT
ratt för att ställa in strömbegränsning
Grov och fininställningsratt



C.C. Continuous Current. Lysdiod som indikerar att aggregatet arbetar som strömgenerator.



För att ställa in strömbegränsningen visar man Amps och kortsluter spänningspolerna.

Den inställda strömmen blir då den högsta ström som kan förekomma.

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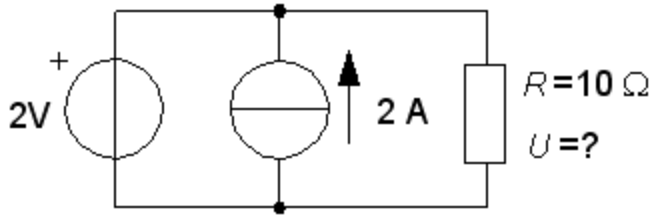
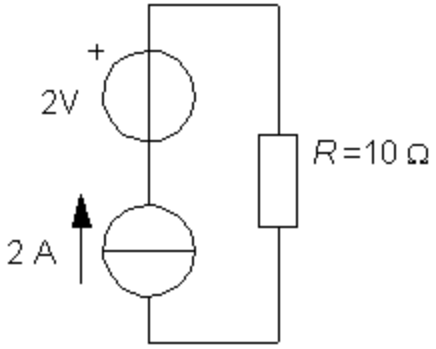
Emk och strömgenerator

Vilket värde får *U* i dessa idealiserade och vanligtvis verklighetsfrämmande kretsar.





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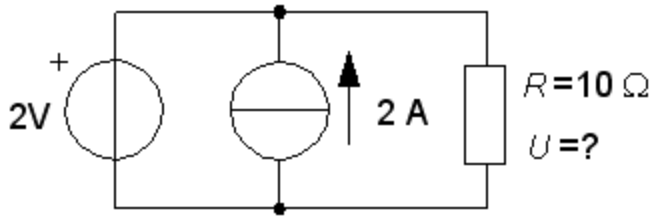
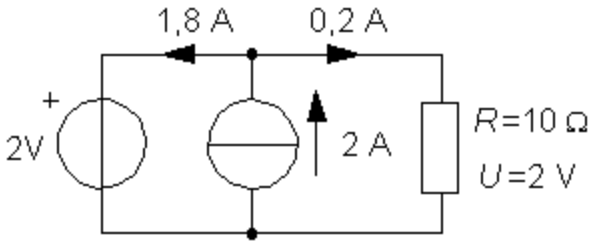
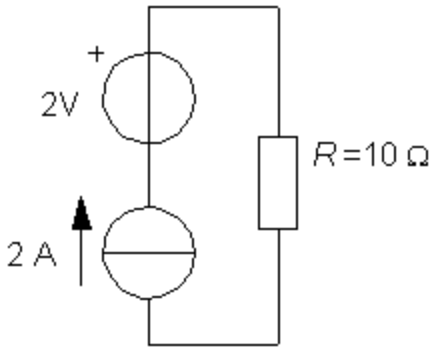
Emk och strömgenerator

Vilket värde får *U* i dessa idealiserade och vanligtvis verklighetsfrämmande kretsar.







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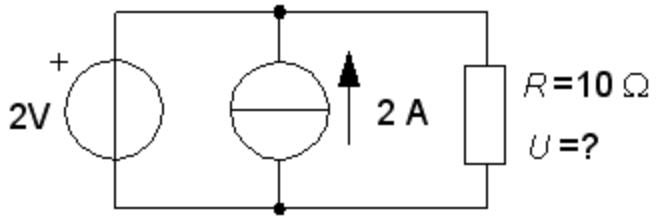
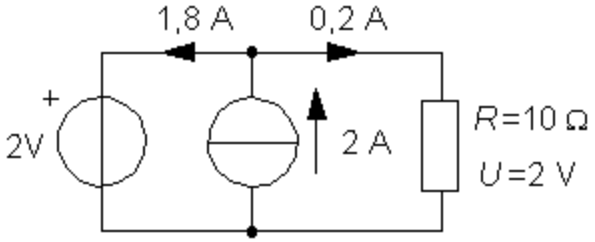
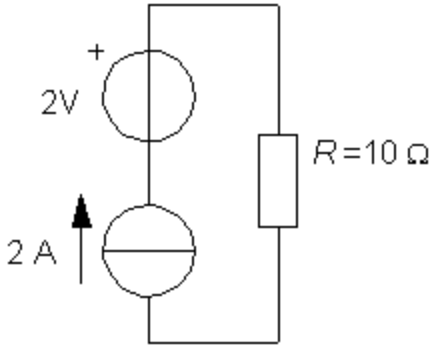
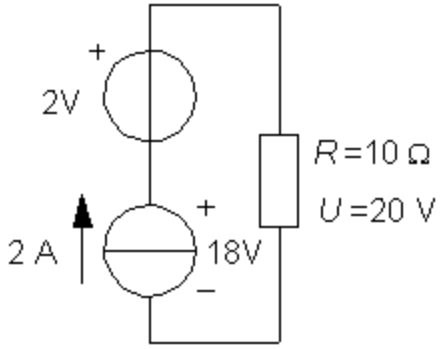
Emk och strömgenerator

Vilket värde får *U* i dessa idealiserade och vanligtvis verklighetsfrämmande kretsar.









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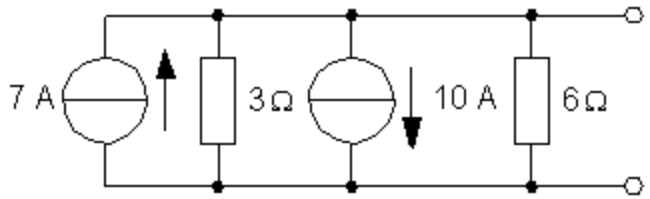
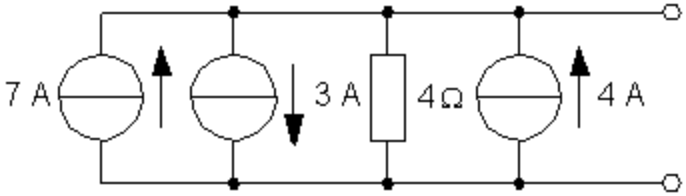
Förenkla …





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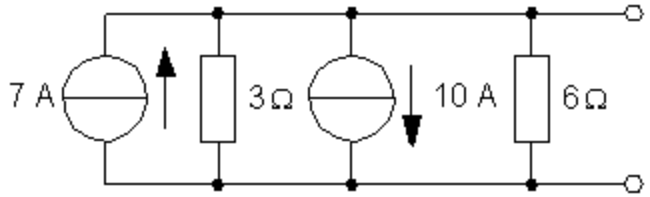
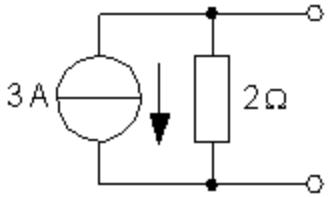
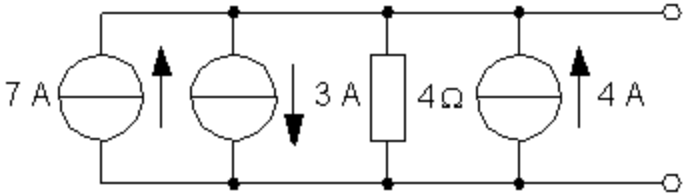
Förenkla …



$$7 - 10 = -3$$

$$\frac{3 \cdot 6}{3 + 6} = 2$$





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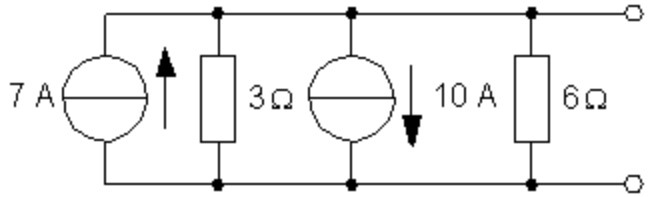
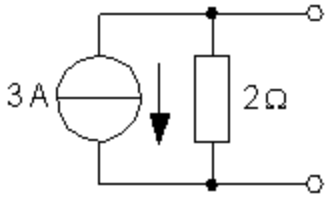
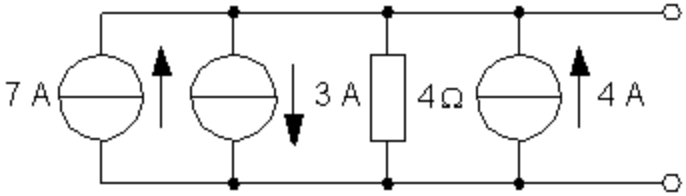
Förenkla …

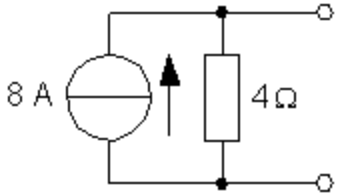


$$7-10=-3$$

$$\frac{3\cdot 6}{3+6}=2$$







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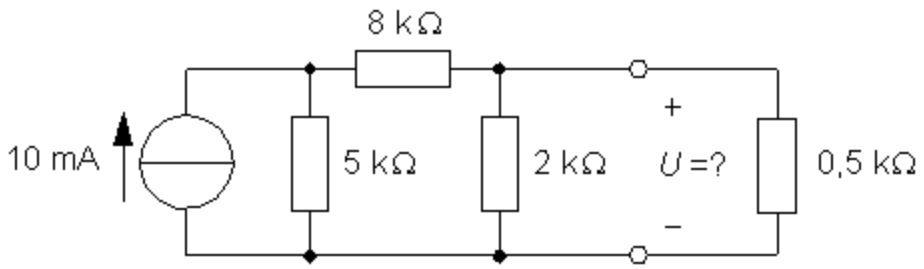
Tvåpolssatsen steg för steg …

(9.3) Elektronikprefix [V] [kΩ] [mA]



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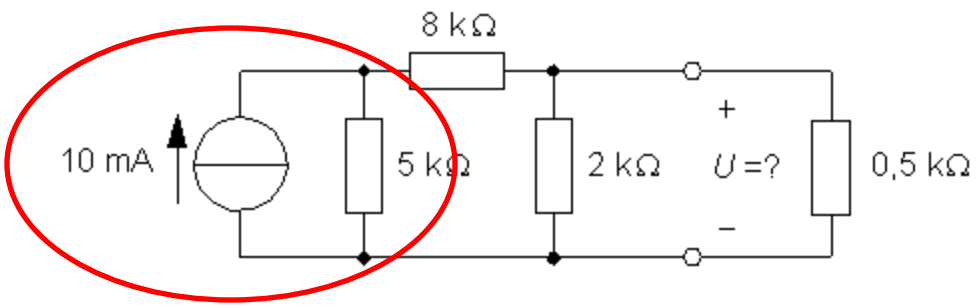
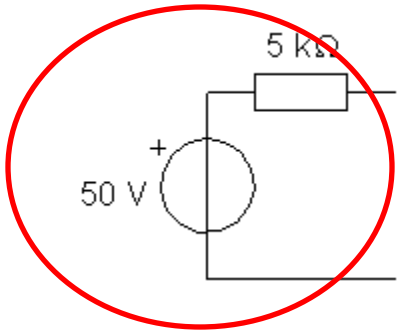
Tvåpolssatsen steg för steg …

(9.3) Elektronikprefix [V] [kΩ] [mA]



10·5=50



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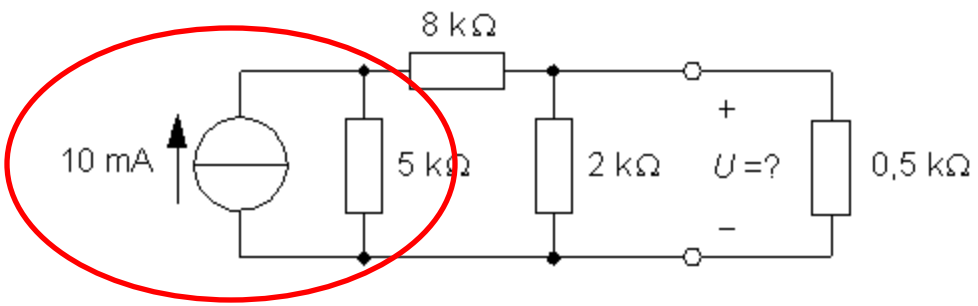
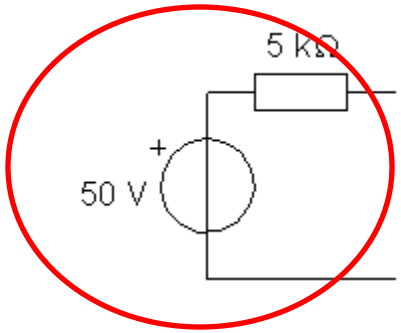
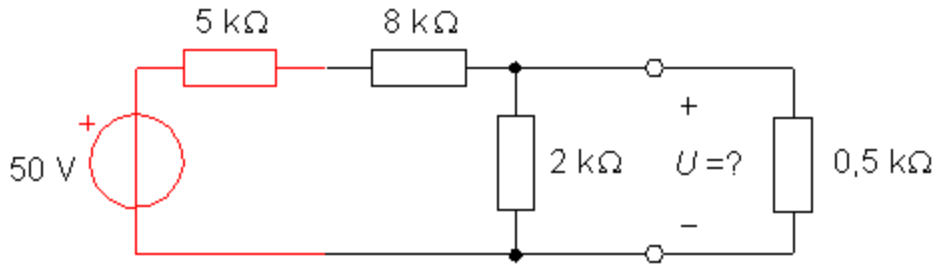
Tvåpolssatsen steg för steg …

(9.3) Elektronikprefix [V] [kΩ] [mA]



10·5=50





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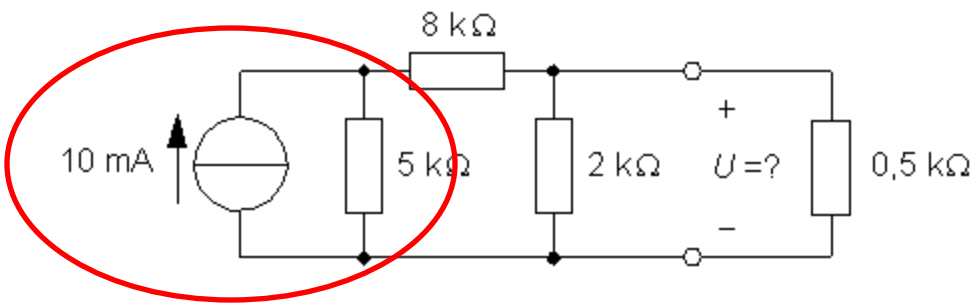
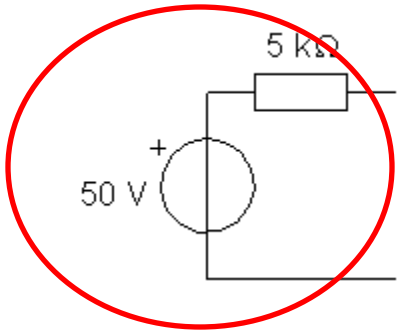
Tvåpolssatsen steg för steg …

(9.3) Elektronikprefix [V] [kΩ] [mA]

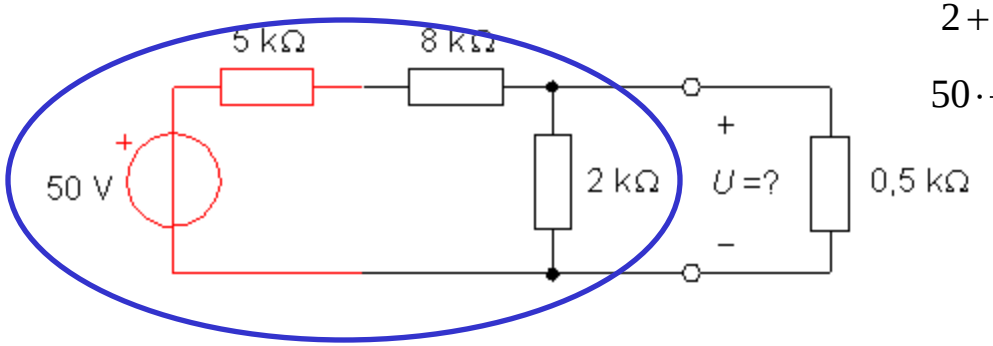


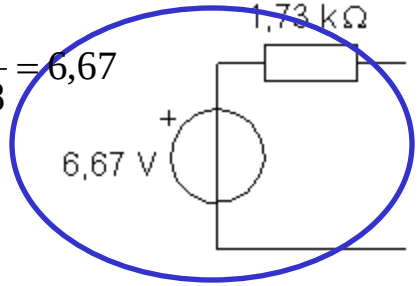
$10 \cdot 5 = 50$



$$\frac{2 \cdot (5+8)}{2+5+8} = 1{,}73$$

$$50 \cdot \frac{2}{2+5+8} = 6{,}67$$





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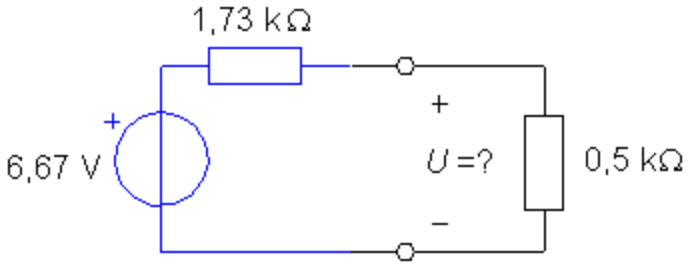
Till sist …



Spänningsdelningslagen:

$$U = 6{,}67 \cdot \frac{0{,}5}{0{,}5 + 1{,}73} = 1{,}49 \text{ V}$$

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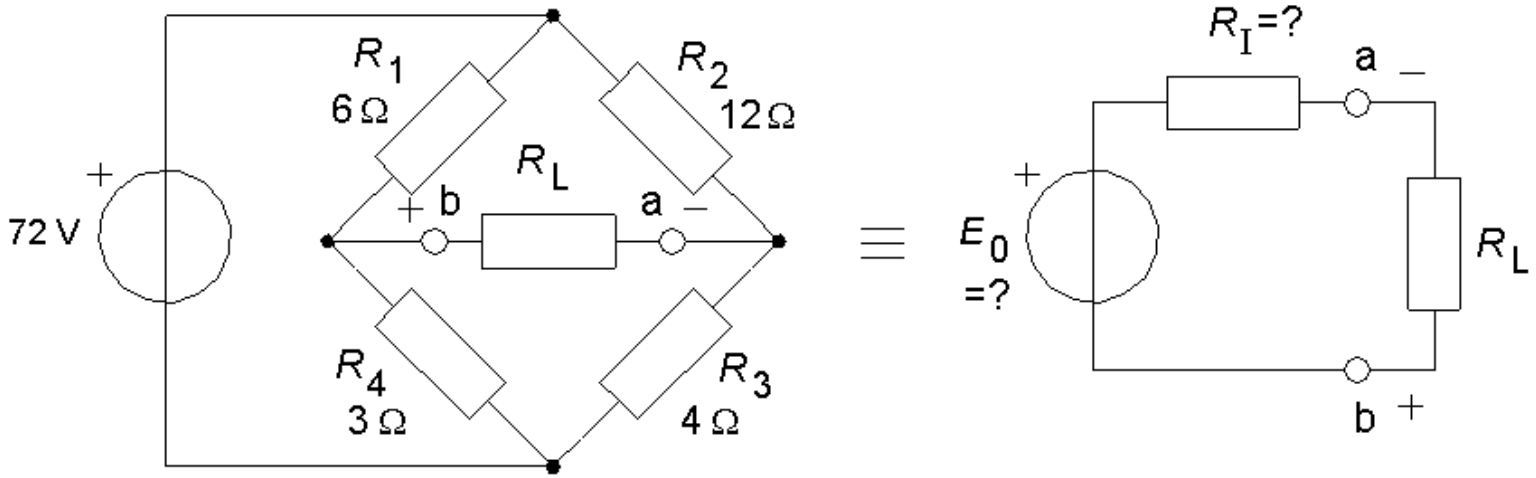
(Wheatstonebryggans tvåpolsekvivalent)



Bestäm Wheatstonebryggans tvåpolsekvivalent.

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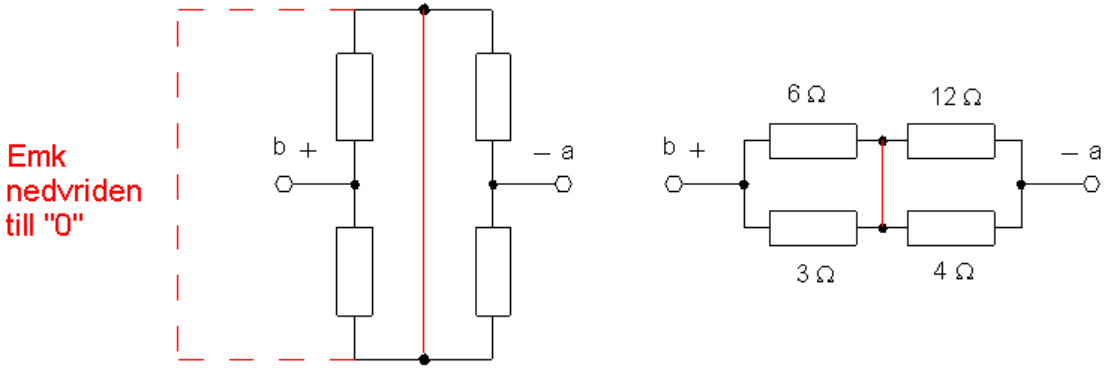
(Bestäm R_I)



$$R_I = \frac{6 \cdot 3}{6+3} + \frac{12 \cdot 4}{12+4} = 5\,\Omega$$

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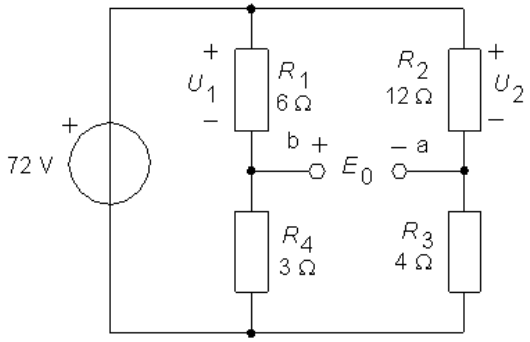
(Bestäm E_0)



$$U_1 = 72 \cdot \frac{6}{6+3} = 48$$

$$U_2 = 72 \cdot \frac{12}{12+4} = 54$$

$$E_0 = 54 - 48 = 6 \text{ V}$$

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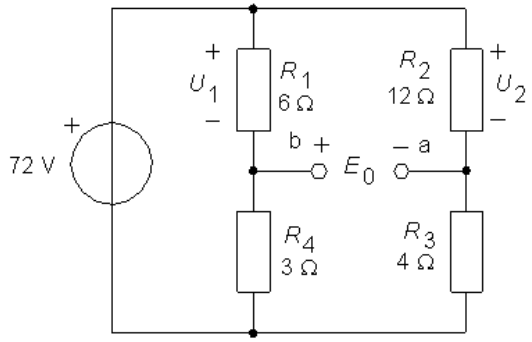
(Bestäm E_0)

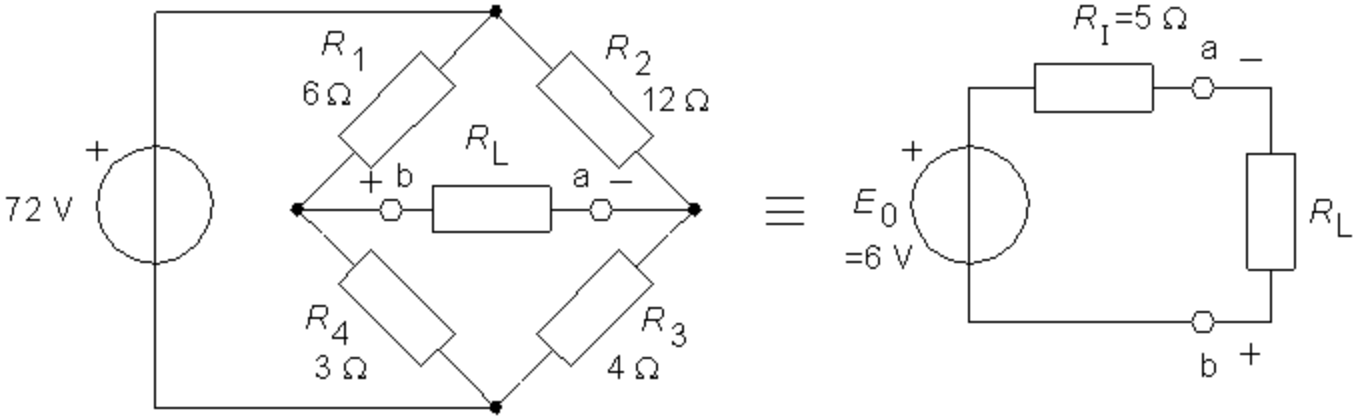


$$U_1 = 72 \cdot \frac{6}{6+3} = 48$$

$$U_2 = 72 \cdot \frac{12}{12+4} = 54$$

$$E_0 = 54 - 48 = 6 \text{ V}$$

Klart!



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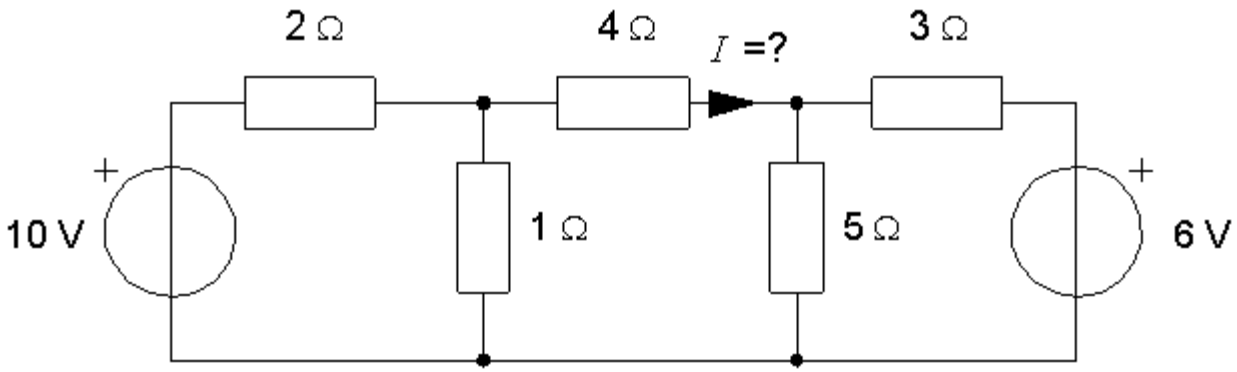
Tvåpolssatsen (i stället för maskanalys)!



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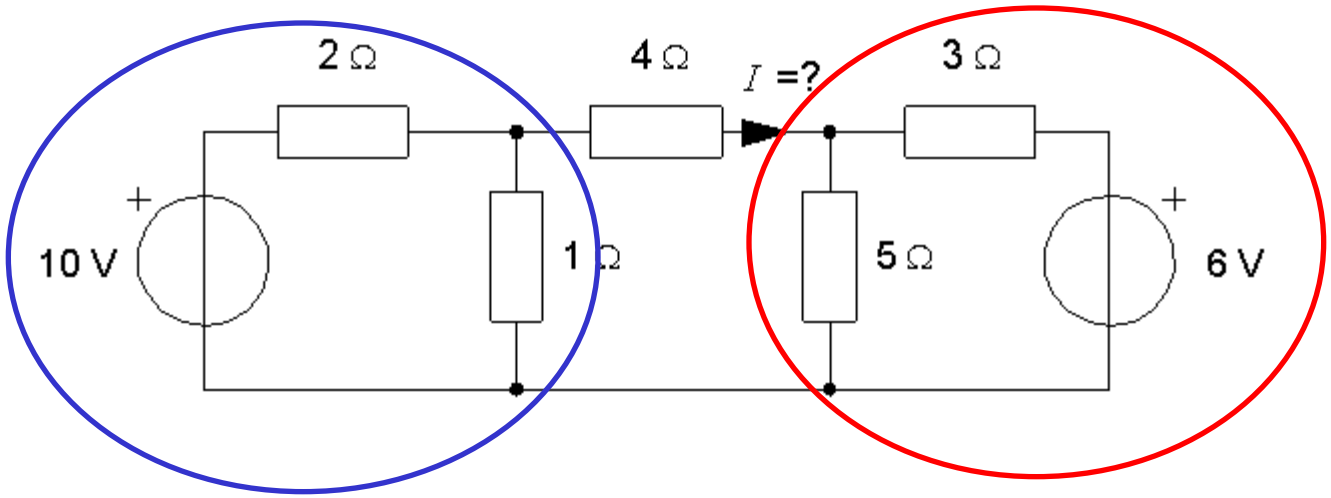
Tvåpolssatsen (i stället för maskanalys)!



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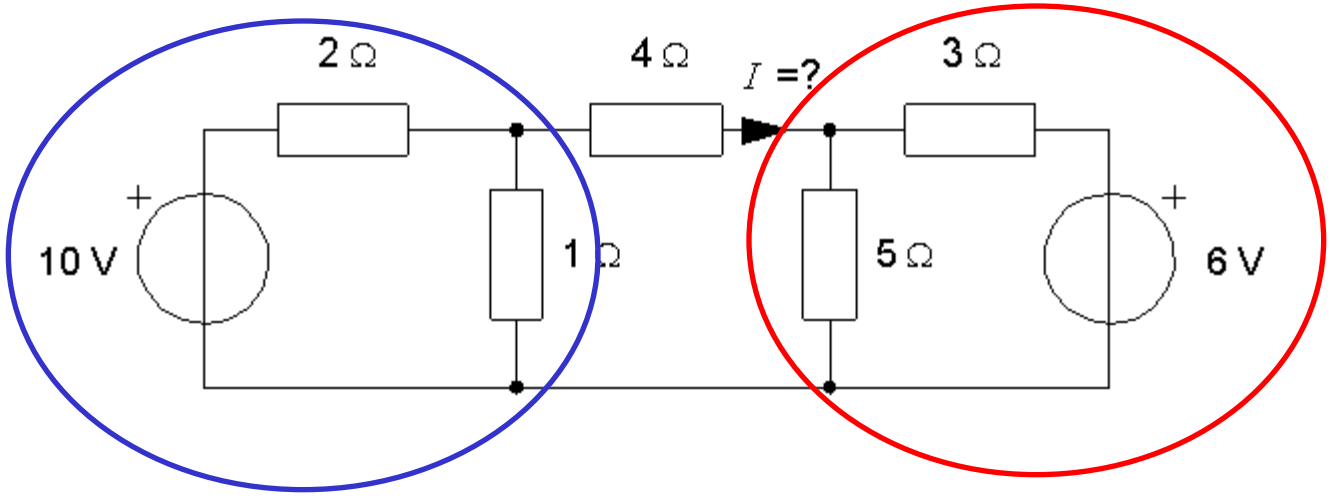
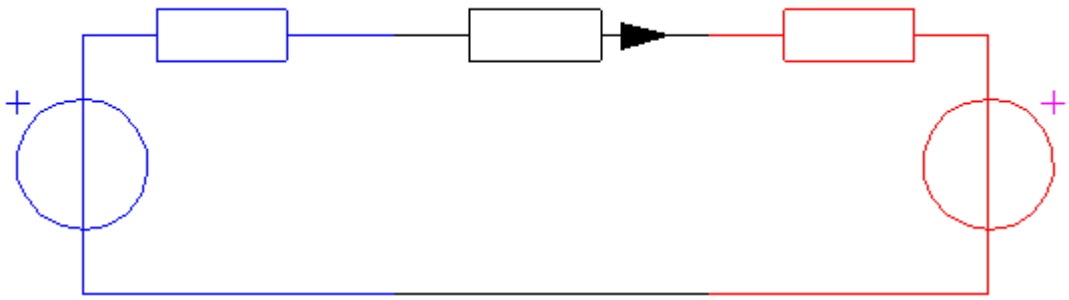
Tvåpolssatsen (i stället för maskanalys)!



$$\frac{1\cdot 2}{2+1}=0{,}67$$

$$\frac{3\cdot 5}{3+5}=1{,}88$$



$$10\frac{1}{1+2}=3{,}33$$

$$6\frac{5}{5+3}=3{,}75$$

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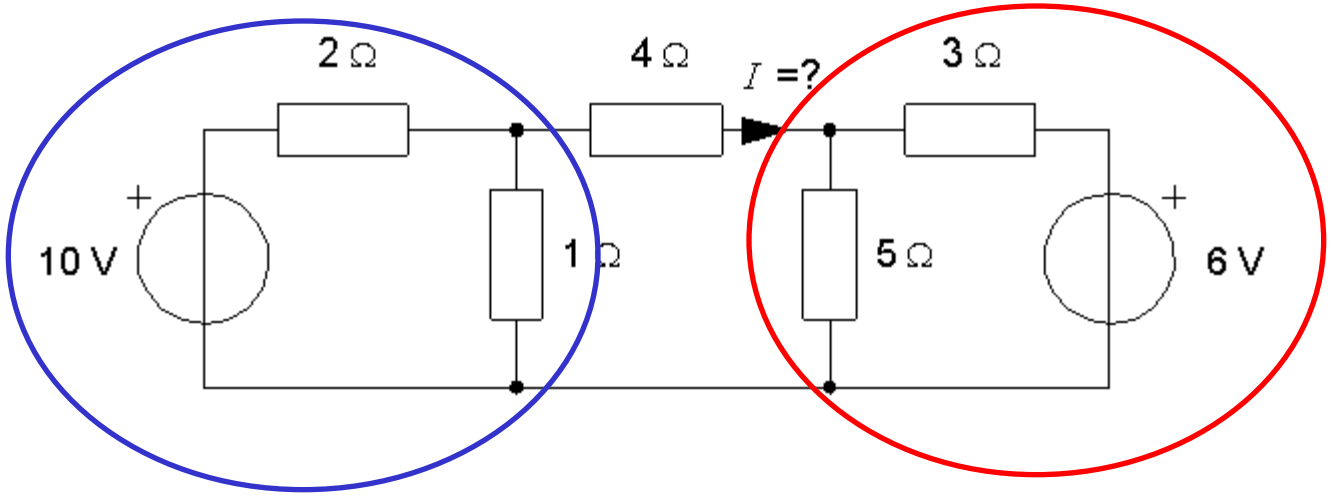
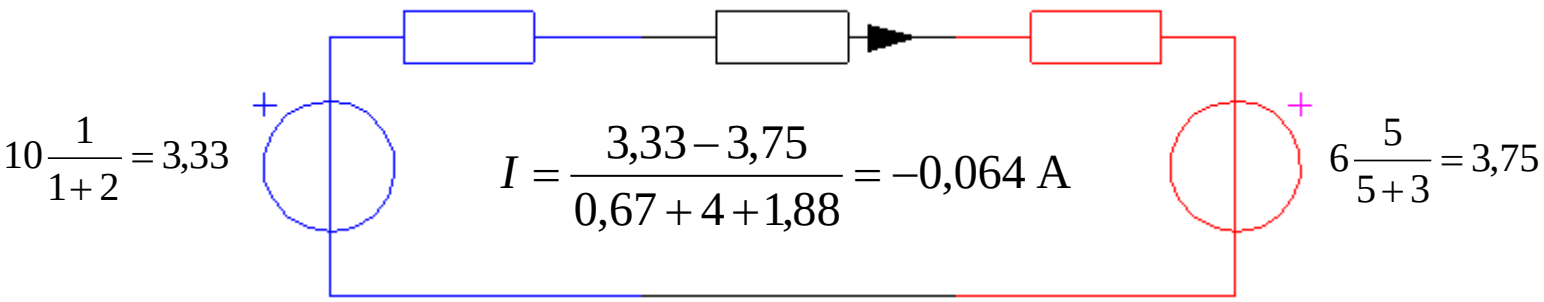
Tvåpolssatsen (i stället för maskanalys)!



$$\frac{1\cdot 2}{2+1}=0{,}67 \qquad \frac{3\cdot 5}{3+5}=1{,}88$$



$$10\frac{1}{1+2}=3{,}33 \qquad I=\frac{3{,}33-3{,}75}{0{,}67+4+1{,}88}=-0{,}064\ \text{A} \qquad 6\frac{5}{5+3}=3{,}75$$

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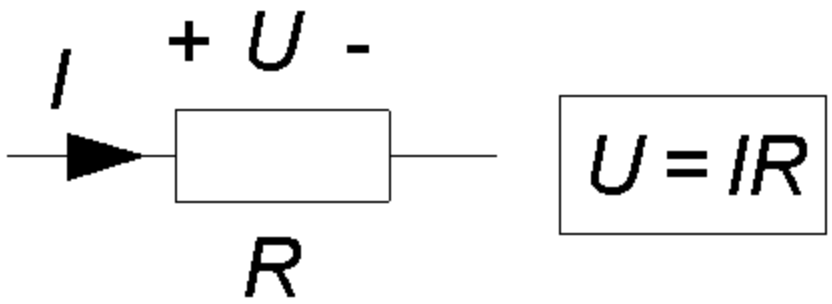
Nodanalys



OHM’s lag

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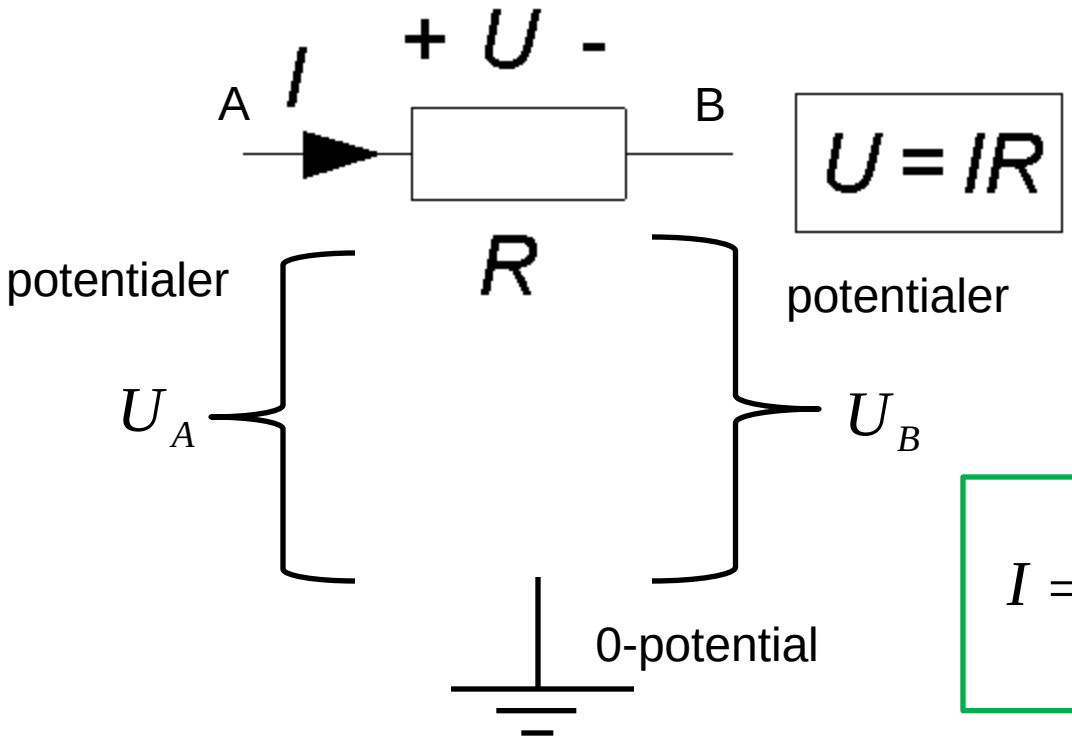
Nodanalys

$$U_{AB} = U_A - U_B$$



$$U = IR$$

$$I = \frac{U_{AB}}{R} = \frac{U_A - U_B}{R}$$

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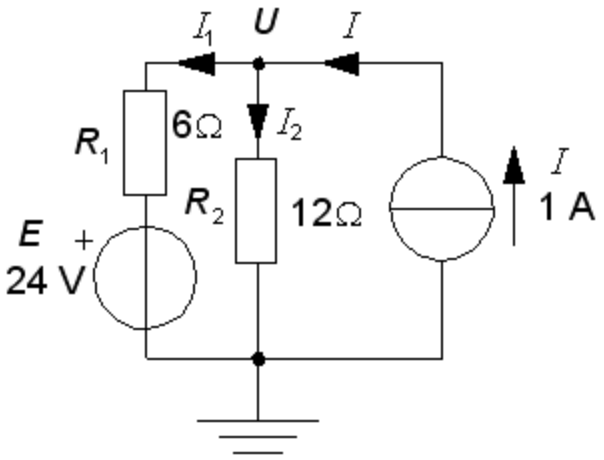
Ex. strömgenerator vid nodanalys

(8.2)



$$-I_1 - I_2 + 1 = 0 \quad I_1 + I_2 = 1$$

$$I_2 = \frac{U}{R_2} = \frac{U}{12}$$

$$I_1 = \frac{U - E}{R_1} = \frac{U - 24}{6}$$

$$1 = \frac{U}{12} + \frac{U - 24}{6} = \frac{2 \cdot U - 48 + U}{12} \quad \Leftrightarrow \quad 12 = 3 \cdot U - 48$$

$$\boxed{U = 20 \text{ V}}$$

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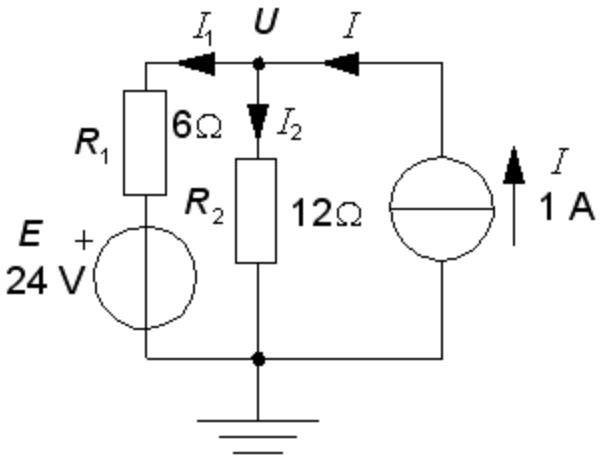
Ex. nodanalys - strömmarna

$$I_2 = \frac{20}{12} = 1{,}67$$

$$I_1 = \frac{20 - 24}{6} = -0{,}67$$

$$I_1 + I_2 = 1 \quad \Rightarrow \quad -0{,}67 + 1{,}67 = 1$$



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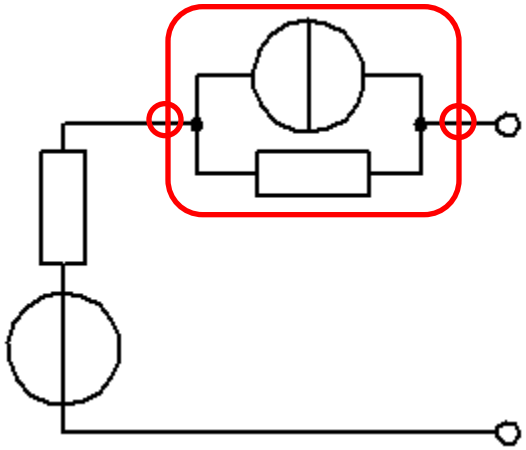
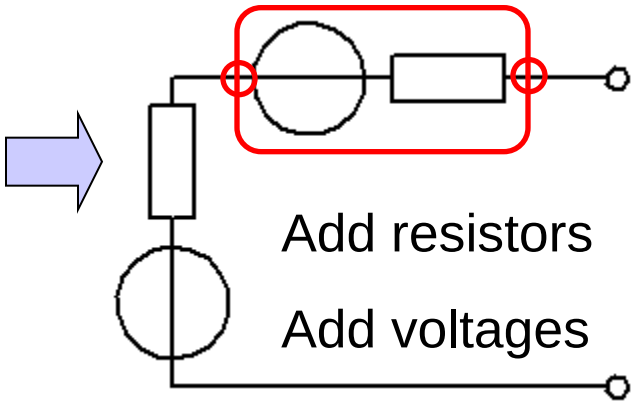
Tips & Tricks

- *U*, *I* Series connected

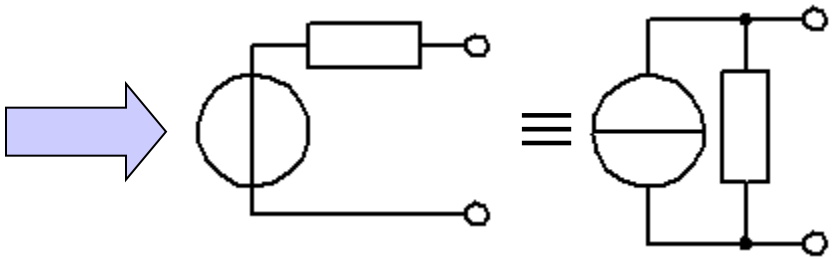


Transform to voltage source!



Add resistors

Add voltages



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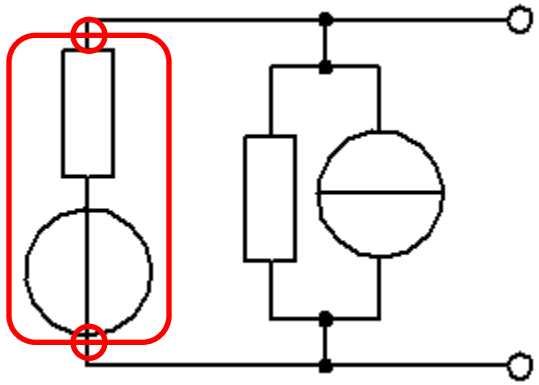
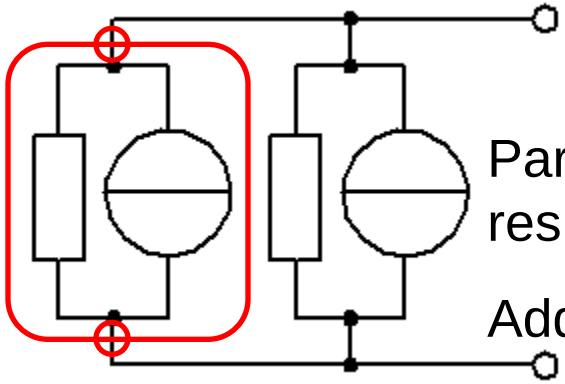
Tips & Tricks

- *U*, *I* Parallel connected

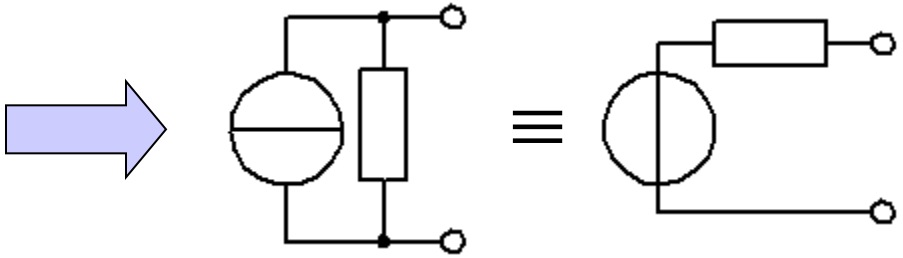


Transform to current source!



Parallel resistors

Add currents



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