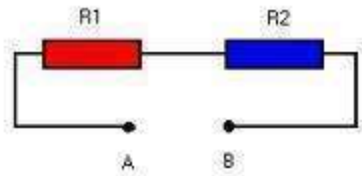


### 3. 01 Combinatie van componenten

N-03-01-001

Serie- parallelschakeling van weerstanden.

#### Weerstanden in serie.

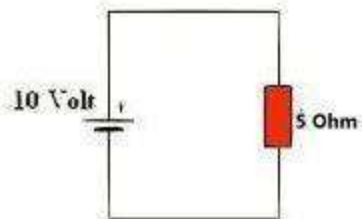


De weerstanden staan achter elkaar en hebben dezelfde stroom.

$$R_t = R_1 + R_2$$

De weerstanden worden hier opgeteld.

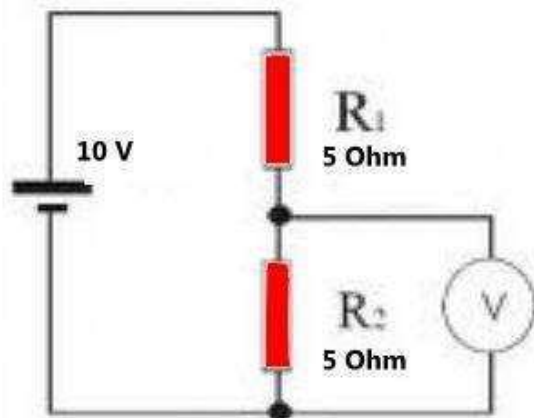
#### Wet van Ohm.



$$U = 10V \quad R = 5\Omega \quad I = ?$$

$$U = I \cdot R, \text{ dus } I = U/R \quad 10/5 = 2 \text{ A.}$$

$$UR = IR \cdot R \quad 2 \cdot 5 = 10V.$$



$$R_t = R_1 + R_2 \quad 5 + 5 = 10 \Omega$$

$$U = I \cdot R, \text{ dus } I = U/R \quad 10/10 = 1A.$$

De 1 Ampère loopt door R1 en R2 SERIE.

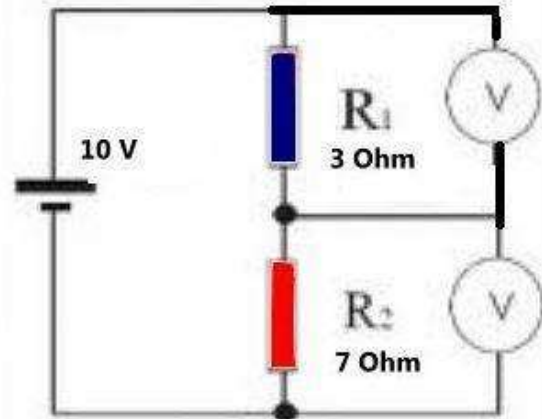
$$U_{r1} = I R_1 \cdot R_1 \quad 1 \cdot 5 = 5V$$

$$U_{r2} = I R_2 \cdot R_2 \quad 1 \cdot 5 = 5V$$

$$\text{Samen weer } 10V$$

#### Opm:

We zien dat de spanning verdeeld wordt in 2\*5V en samen weer 10V is!!!



$$R_t = R_1 + R_2 \quad 3 + 7 = 10 \Omega$$

$$U = I \cdot R, \text{ dus } I = U/R \quad 10/10 = 1A.$$

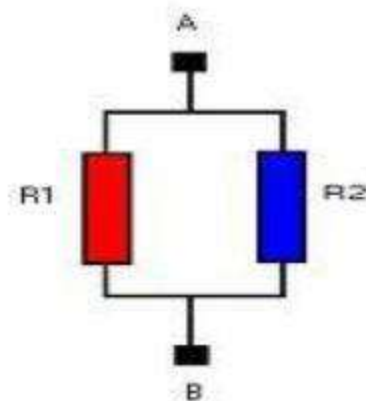
De 1 Ampère loopt door R1 en R2 SERIE

$$U_{r1} = I R_1 \cdot R_1 \quad 1 \cdot 3 = 3V$$

$$U_{r2} = I R_2 \cdot R_2 \quad 1 \cdot 7 = 7V$$

$$\text{Samen weer } 10V$$

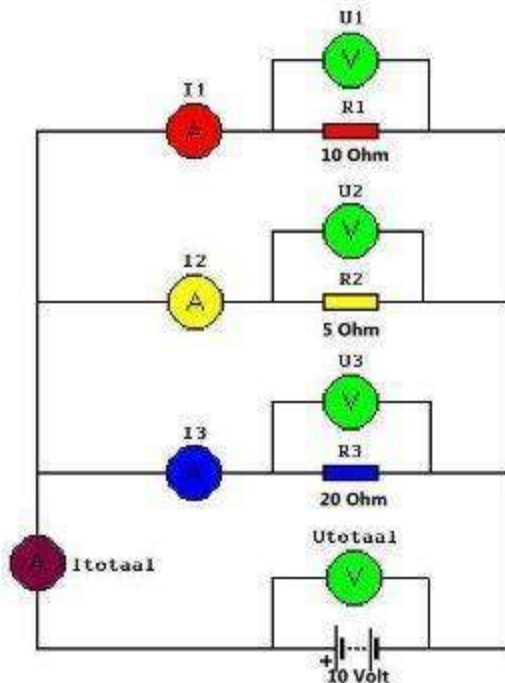
#### Weerstanden Paralleel



De weerstanden staan naast elkaar en hebben dezelfde spanning.

### 3. 01 Combinatie van componenten

$$R_v = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}$$



De spanning U is hetzelfde, maar de stromen anders.

$$I_1 = U_1/R_1 = 10/10 = 1 \text{ A}$$

$$I_2 = U_2/R_2 = 10/5 = 2 \text{ A}$$

$$I_3 = U_3/R_3 = 10/20 = 0.5 \text{ A}$$

$$I_t = I_1 + I_2 + I_3 = 1 + 2 + 0.5 = 3.5 \text{ A}$$

$$R_v = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

$$R_v = \frac{1}{\frac{1}{10} + \frac{1}{5} + \frac{1}{20}} = 2.857 \Omega$$

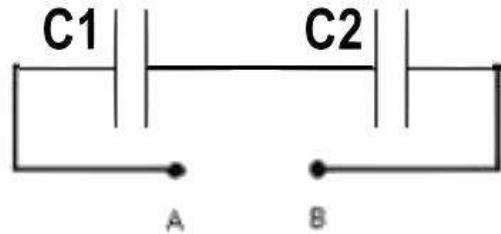
$$R_v = 1/350 \text{ exp-3} = 2.857 \Omega$$

$$I_t = U_t/R_t = 10/2.857 = 3.5 \text{ A}$$

$$I_t = I_1 + I_2 + I_3 = 1 + 2 + 0.5 = 3.5 \text{ A}$$

N-03-01-002  
Serie- parallelschakeling van condensatoren.

#### Condensatoren in serie:



$$C_v = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}}$$

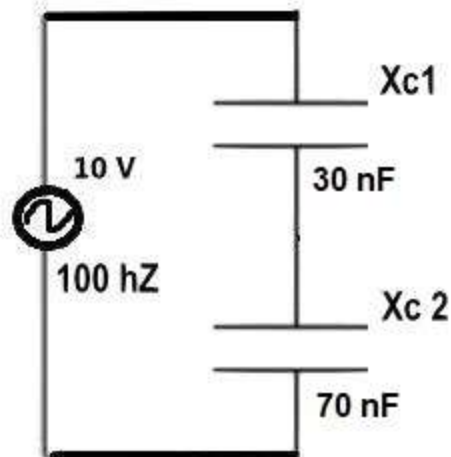
De Condensatoren staan achter elkaar en hebben dezelfde stroom

De condensatoren worden hier **niet** opgeteld.

#### **BELANGRIJK:**

Maar behandelt als een weerstand of spoel die parallel staan.

#### Voorbeeld:



$$C_v = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2}} = \frac{1}{\frac{1}{30 \text{ nF}} + \frac{1}{70 \text{ nF}}} = 21 \text{ nF}$$

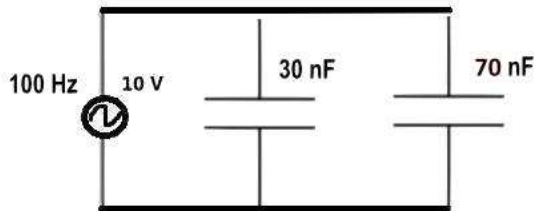
### 3. 01 Combinatie van componenten

$$X_C = \frac{1}{2 \pi \times f \times C}$$

$$1 / (2 \times 3.14 \times 100 \times 21 \times 10^{-9}) = 75 \text{ Ohm}$$

$$I = U / X_C = 10 / 75 = 133 \text{ mA}$$

#### Condensatoren Parallel:



$$C_t = C_1 + C_2 \quad 30 + 70 = 100 \text{ nF.}$$

$$X_C = \frac{1}{2 \pi \times f \times C} = 16 \Omega.$$

$$X_C = 1 / (2 \times 3.14 \times 100 \times 100 \times 10^{-9}) = 16 \Omega$$

$$I = U / X_C = 10 / 16 = 625 \text{ mA.}$$

**Heel anders als bij  
weerstand en spoelen !!!**