# 3.0 KOPLINGER MED RESISTANSER OG ELEMENTER
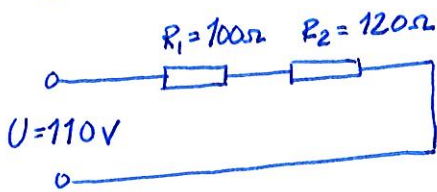
## 3.1 SERIEKOPLING

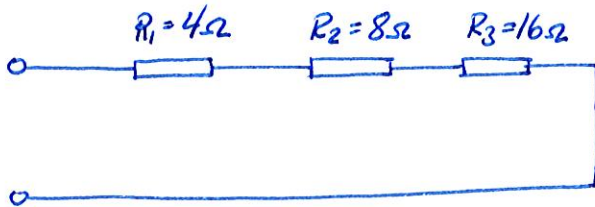### 3.1.1



$R_T = R_1 + R_2 = 100\,\Omega + 120\,\Omega = \underline{\underline{220\,\Omega}}$

$I = \dfrac{U}{R_T} = \dfrac{110\,V}{220\,\Omega} = \underline{\underline{0,5\,A}}$

$\triangle U_1 = I \cdot R_1 = 0,5A \cdot 100\,\Omega = \underline{50\,V}$

$\triangle U_2 = I \cdot R_2 = 0,5A \cdot 120\,\Omega = \underline{60\,V}$

### 3.1.2



$R_T = R_1 + R_2 + R_3 = 4\,\Omega + 8\,\Omega + 16\,\Omega = \underline{\underline{28\,\Omega}}$
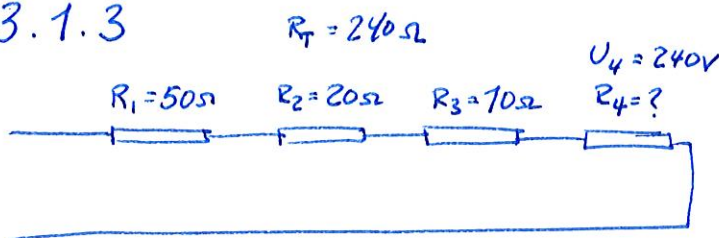
$I = \dfrac{U}{R_T} = \dfrac{100\,V}{28\,\Omega} = \underline{\underline{3,57A}}$

$\triangle U_1 = I \cdot R_1 = 3,57A \cdot 4\,\Omega = \underline{14,3\,V}$

$\triangle U_2 = I \cdot R_2 = 3,57A \cdot 8\,\Omega = \underline{28,6\,V}$

$\triangle U_3 = I \cdot R_3 = 3,57A \cdot 16\,\Omega = \underline{57,1\,V}$

### 3.1.3

$R_T = 240\,\Omega$



a) $R_T = R_1 + R_2 + R_3 + R_4$

$R_4 = R_T - (R_1 + R_2 + R_3)$

$R_4 = 240\,\Omega - (50\,\Omega + 20\,\Omega + 10\,\Omega) = \underline{\underline{160\,\Omega}}$

b) $I = \dfrac{U_4}{R_4} = \dfrac{240\,V}{160\,\Omega} = \underline{\underline{1,5A}}$

c) $U = I \cdot R_T = 1,5A \cdot 240\,\Omega = \underline{\underline{360\,V}}$

$\triangle U_1 = I \cdot R_1 = 1,5A \cdot 50\,\Omega = \underline{75\,V}$

$\triangle U_2 = I \cdot R_3 = 1,5A \cdot 20\,\Omega = \underline{30\,V}$

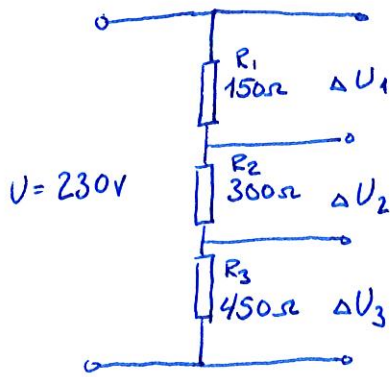$\triangle U_3 = I \cdot R_3 = 1,5A \cdot 10\,\Omega = \underline{15\,V}$

d) $P = U \cdot I = 360\,V \cdot 1,5A = \underline{\underline{540\,W}}$

$P_1 = \triangle U_1 \cdot I = 75\,V \cdot 1,5A = \underline{112,5\,W}$

$P_2 = \triangle U_2 \cdot I = 30\,V \cdot 1,5A = \underline{45\,W}$

$P_3 = \triangle U_3 \cdot I = 15\,V \cdot 1,5A = \underline{22,5\,W}$

## 3.1.4

$$R_T = R_1 + R_2 + R_3 = 150\,\Omega + 300\,\Omega + 450\,\Omega = \underline{900\,\Omega}$$

$$I = \frac{U}{R_T} = \frac{230V}{900\,\Omega} = \underline{0,256A}$$

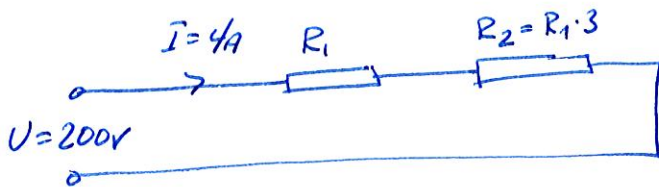$$\Delta U_1 = I \cdot R_1 = 0,256A \cdot 150\,\Omega = \underline{38,3V}$$

$$\Delta U_2 = I \cdot R_2 = 0,256A \cdot 300\,\Omega = \underline{76,7V}$$

$$\Delta U_3 = I \cdot R_3 = 0,256A \cdot 450\,\Omega = \underline{115V}$$

$$\Delta U_{12} = \Delta U_1 + \Delta U_2 = 38,3V + 76,7V = \underline{115V}$$

$$\Delta U_{23} = \Delta U_2 + \Delta U_3 = 76,7V + 115V = \underline{191,7V}$$

U = 230V, R_1 = 150Ω ΔU_1, R_2 = 300Ω ΔU_2, R_3 = 450Ω ΔU_3

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## 3...5

$I = 4A$   $R_1$   $R_2 = R_1 \cdot 3$   $U = 200V$

$$R_T = \frac{U}{I} = \frac{200V}{4A} = \underline{50\,\Omega}$$

### a)

$$R_T = R_1 + R_2 = R_1 + R_1 \cdot 3$$

$$50\,\Omega = R_1 + R_1 \cdot 3$$

$$50\,\Omega = R_1(1+3)$$

$$\frac{50\,\Omega}{4} = R_1$$

$$R_1 = \underline{12,5\,\Omega}$$

$$R_T = R_1 + R_2$$

$$50\,\Omega = 12,5\,\Omega + R_2$$

$$R_2 = 50\,\Omega - 12,5\,\Omega = \underline{37,5\,\Omega}$$

### b)

$$I = \frac{U}{R_T} = \frac{150V}{50\,\Omega} = \underline{3A}$$

$$\Delta U_1 = I \cdot R_1 = 3A \cdot 12,5\,\Omega = \underline{37,5V}$$

$$\Delta U_2 = I \cdot R_2 = 3A \cdot 37,5\,\Omega = \underline{112,5V}$$

KOMPENDIE I LIKESTRØM - FASIT