

Wat is de Lading, de spanning en de polariteit van de in serie geschakelde condensatoren?

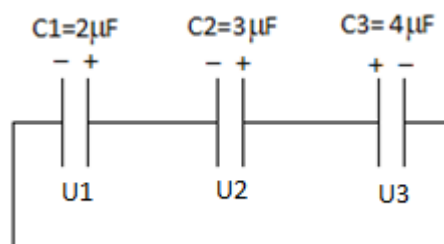
$$Q = CU$$

**2<sup>e</sup> wet van Kirchoff.**

$$U_1 + U_2 - U_3 = 0$$

$$U_1 + U_2 = U_3$$

$$\frac{q_1}{C_1} + \frac{q_2}{C_2} = \frac{q_3}{C_3}$$



Q (lading in de beginsituatie (condensatoren links))

q (lading in de eindsituatie (serieschakeling rechts))

$$q_3 = Q_2 - q_2 = 80\mu C - q_2$$

$$q_2 = Q_2 - (Q_1 - q_1)$$

$$q_2 = q_1 + Q_2 - Q_1$$

$$q_2 = q_1 + 40\mu C$$

$$q_3 = Q_2 - q_2$$

$$q_3 = Q_2 - (q_1 + 40\mu C) = 80\mu C - 40\mu C - q_1$$

$$q_3 = 40\mu C - q_1$$

$$q_1 = 40\mu C - q_3$$

$$\frac{40\mu C - (40\mu C - q_1)}{C_1} + \frac{q_1 + 40\mu C}{C_2} = \frac{40\mu C - q_1}{C_3}$$

$$\frac{q_1}{2} + \frac{q_1 + 40}{3} = \frac{40 - q_1}{4}$$

$$12\left(\frac{q_1}{2} + \frac{q_1 + 40}{3} = \frac{40 - q_1}{4}\right)$$

$$6q_1 + 4(q_1 + 40) = 3(40 - q_1)$$

$$6q_1 + 4q_1 + 160 = 120 - 3q_1$$

$$13q_1 = -40$$

### Eindsituatie

$$q_1 = \frac{-40}{13} = -3,0769\mu C \text{ (omgepoold)}$$

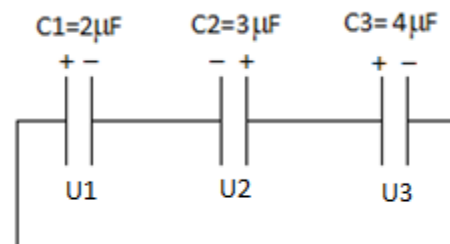
$$q_2 = q_1 + 40\mu C = 36,923\mu C$$

$$q_3 = 40\mu C - q_1 = 43,0769\mu C$$

$$U_1 = \frac{q_1}{C_1} = -1,53845V$$

$$U_2 = \frac{q_2}{C_2} = 12,307V$$

$$U_3 = \frac{q_3}{C_3} = 10,769V$$



### Eindsituatie

$$q_1 = -3,0769\mu C$$

$$q_2 = 36,923\mu C$$

$$q_3 = 43,0769\mu C$$

$$U_1 = -1,53845V$$

$$U_2 = 12,307V$$

$$U_3 = 10,769V$$

