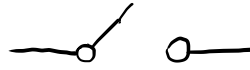




Condensatore



Batteria



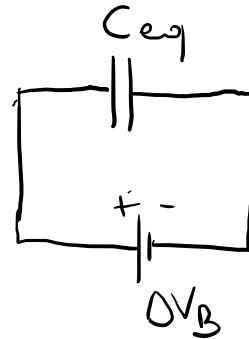
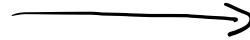
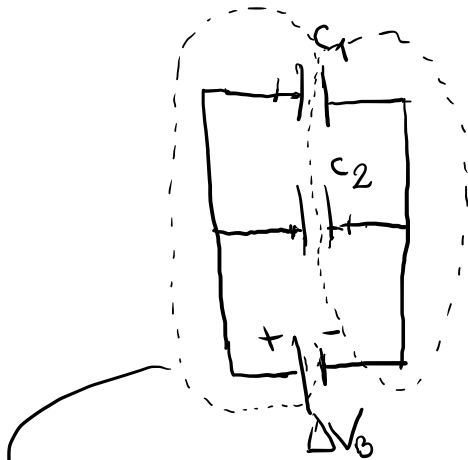
Interruttore  
aperto



Interruttore  
chiuso



# COMBINAZIONE DI CONDENSATORI IN PARALLELO



$$\Delta V_1 = \Delta V_2 = \Delta V_{\text{BATTERIA}}$$

$$Q_1 = C_1 \cdot \Delta V_1 = C_1 \cdot \Delta V$$

$$Q_2 = C_2 \cdot \Delta V_2 = C_2 \cdot \Delta V$$

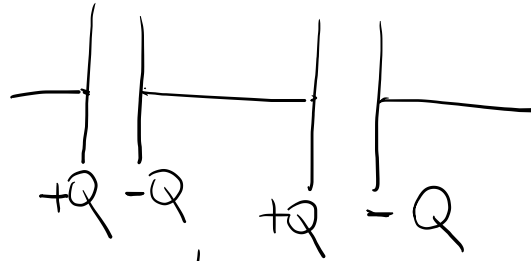
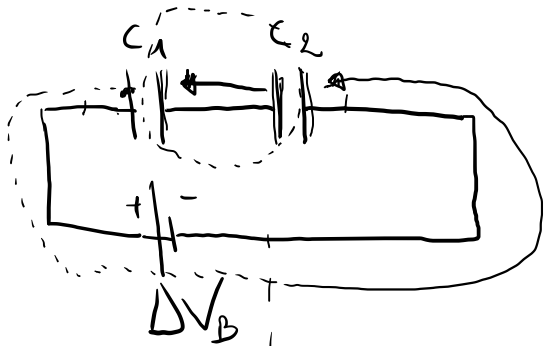
$$Q_{\text{TOT}} = C_{\text{TOT}} \cdot \Delta V$$

$$Q_{\text{TOT}} = Q_1 + Q_2 = (C_1 + C_2) \cdot \Delta V$$

$$C_{\text{eq}} = C_1 + C_2$$

$$C_{\text{eq}} = C_1 + C_2 + C_3 + \dots + C_n$$

# COMBINAZIONE DI CONDENSATORI IN SERIE



$$Q_1 = Q_2 = Q$$



$$\frac{Q}{C_{eq}} = Q \cdot \left( \frac{1}{C_1} + \frac{1}{C_2} \right)$$

$$\begin{cases} \Delta V_B = \Delta V_1 + \Delta V_2 \\ \Delta V_B = \frac{Q_1}{C_1} + \frac{Q_2}{C_2} = Q \left( \frac{1}{C_1} + \frac{1}{C_2} \right) \\ \Delta V_B = \frac{Q}{C_{eq}} \end{cases}$$

$$\frac{1}{C_{eq}} = \left( \frac{1}{C_1} + \frac{1}{C_2} \right)$$

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} + \dots + \frac{1}{C_m}$$

↓ X 1 conclusione in serie  
il reciproco delle capacità equivalente  
è la somma dei reciproci delle capacità

parallel:

$$C_{eq} = C_1 + C_2 + \dots + C_n$$

serie

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} + \dots + \frac{1}{C_n}$$

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$$C_1 = 5 \mu\text{F} \quad C_2 = 12 \mu\text{F} \quad \Delta V = 9\text{V}$$

$$\cdot C_{\text{eq}} = ? \quad \Delta V_1 \text{ e } \Delta V_2 = ? \quad Q_1 \text{ e } Q_2 = ? \quad \left. \begin{array}{l} / \text{ parallelo} \\ \backslash \text{ serie} \end{array} \right\}$$

• CASO PARALLELO

$$- C_{\text{eq}} = C_1 + C_2 = 5 \mu\text{F} + 12 \mu\text{F} = 17 \mu\text{F}$$

$$- \Delta V_1 = \Delta V_2 = \Delta V = 9\text{V}$$

$$- Q_1 = C_1 \cdot \Delta V = 5 \mu\text{F} \cdot 9\text{V} = 45 \mu\text{C}$$

$$Q_2 = C_2 \cdot \Delta V = 12 \cdot 10^{-6} \cdot 9\text{V} = 108 \cdot 10^{-6} \text{C} \Rightarrow 108 \mu\text{C}$$

• CASO SERIE

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} = \frac{1}{C_{eq}} = \frac{C_2 + C_1}{C_1 \cdot C_2}$$

$$= C_{eq} = \frac{C_1 \cdot C_2}{C_1 + C_2} = \frac{60 \cdot 10^{-12}}{17 \cdot 10^{-6}} = 3,53 \cdot 10^{-6} \text{ F}$$

↓  
3,53  $\mu\text{F}$

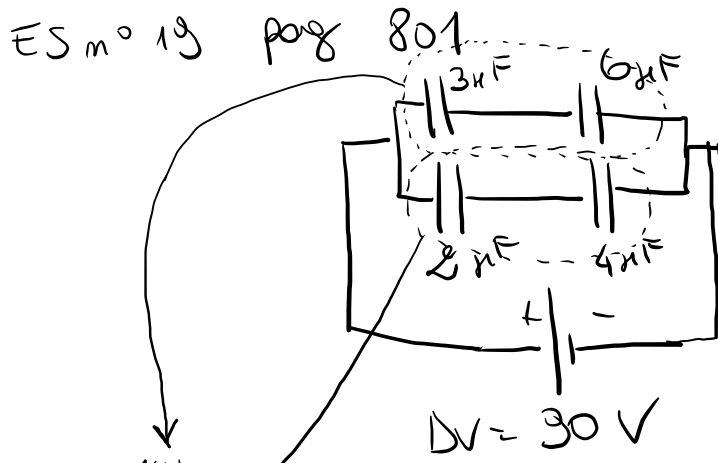
$$Q_1 = Q_2 = Q_{eq}$$

$$Q_{eq} = C_{eq} \cdot \Delta V$$

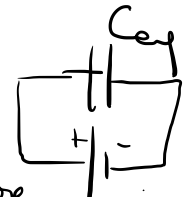
$$Q_{eq} = 3,53 \cdot 10^{-6} \cdot 9 = 31,8 \cdot 10^{-6} \text{ C} = Q_1 = Q_2$$

$$C = \frac{Q}{\Delta V}$$

$$\Delta V_1 = \frac{Q}{C_1}$$



$C_{eq} = ?$

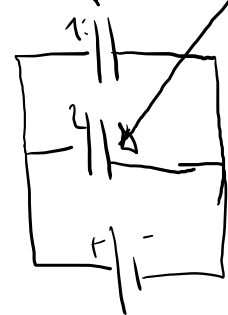


Q seu valor em coulombs  
 $\Delta V$  su valor condicional = ?

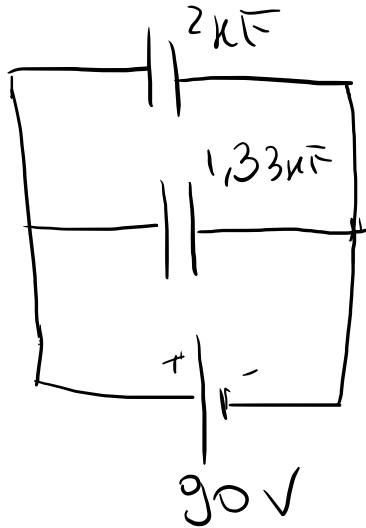
$$\frac{1}{C_{eq1}} = \frac{1}{3 \cdot \mu F} + \frac{1}{6 \cdot \mu F}$$

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

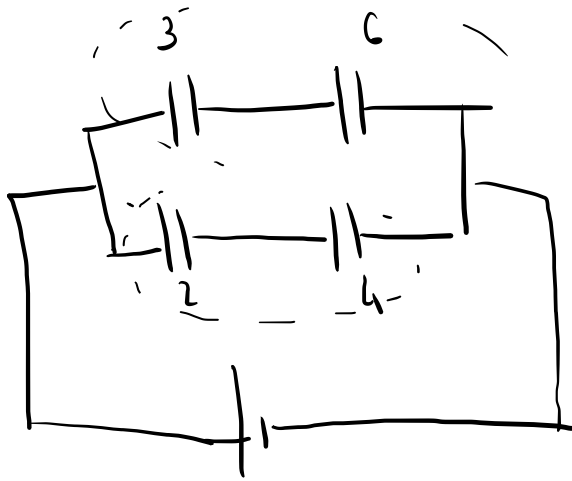
$$\frac{1}{C_{eq2}} = \frac{1}{4} + \frac{1}{2} \Rightarrow C_{eq2} = \frac{4 \cdot 2}{(4+2)} = 1,33 \mu F$$







$$\begin{aligned}C_{eq_{TOT}} &= C_{eq_1} + C_{eq_2} \\ &= 2\mu\text{F} + 1,33\mu\text{F} \\ &= 3,33\mu\text{F}\end{aligned}$$



$$\begin{aligned}
 Q_3 = Q_6 = Q_{eq1} &= C_{eq1} \cdot \Delta V = 2 \cdot 10^{-6} \cdot 90V = 180 \cdot 10^{-6} C \\
 &= 180 \mu C \\
 Q_2 = Q_4 = Q_{eq2} &= C_{eq2} \cdot \Delta V = 1,33 \cdot 10^{-6} \cdot 90 \\
 &= 120 \mu C
 \end{aligned}$$

$$\Delta V_3 = \frac{Q_3}{C_3} = \frac{180 \cdot 10^{-6}}{3 \cdot 10^{-6}} = 60V$$
$$\Delta V_6 = \frac{Q_6}{C_6} = \frac{180 \cdot 10^{-6}}{6 \cdot 10^{-6}} = 30V$$

} 60 + 30 = 90V

$$\Delta V_2 = \frac{Q_2}{C_2} = \frac{120 \cdot 10^{-6}}{2 \cdot 10^{-6}} = 60V$$

⇓

$$\Delta V_4 = 30V$$

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