



POLITECNICO
MILANO 1863

Elettromagnetismo

Elettricità. Corrente. Magnetismo

Maurizio Zani

Elettromagnetismo

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[Magnetostatica](#)

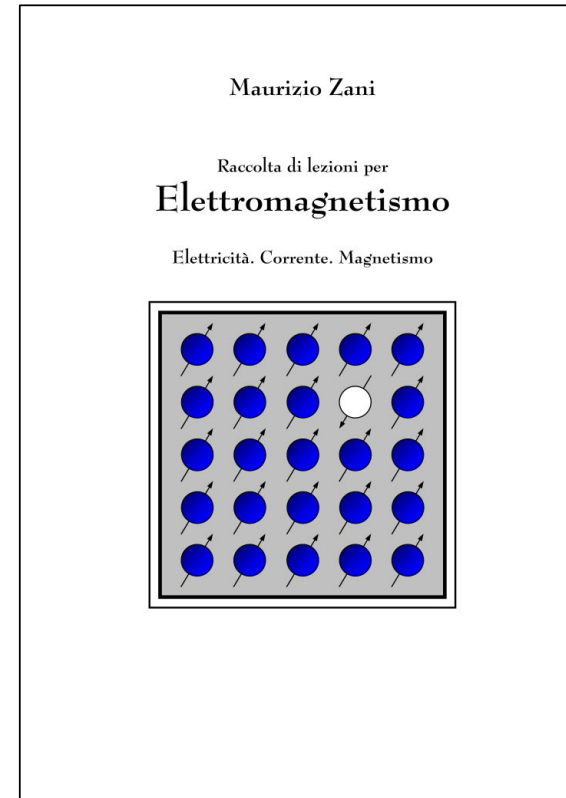
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<http://www.mauriziozani.it/wp/?p=1128>



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Elettromagnetismo

Capacità elettrica

Energia elettrica

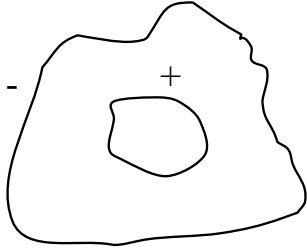
Serie e parallelo

Mutua capacità

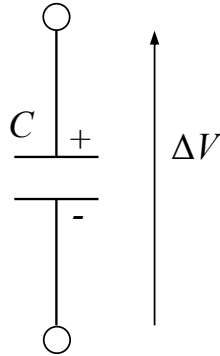


Capacità elettrica

condensatore



induzione elettrostatica
completa



rapporto
causa/effetto

dipende da
materiale/geometria

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

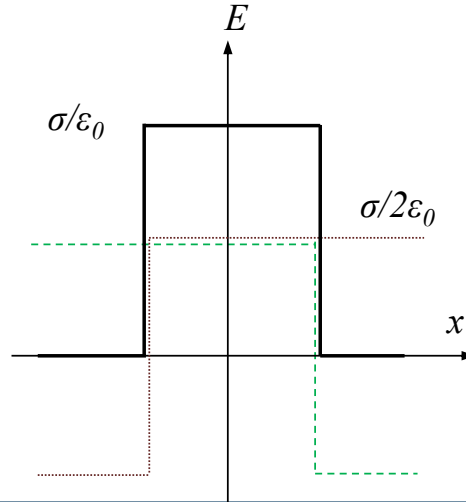
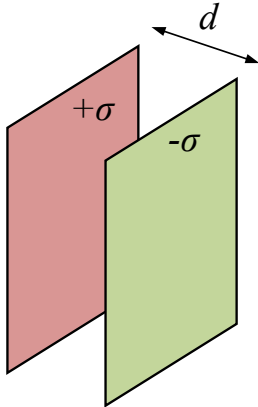
$$[C] = \frac{[q]}{[V]} = \frac{C}{V} = F$$

capacità elettrica

farad

tensione

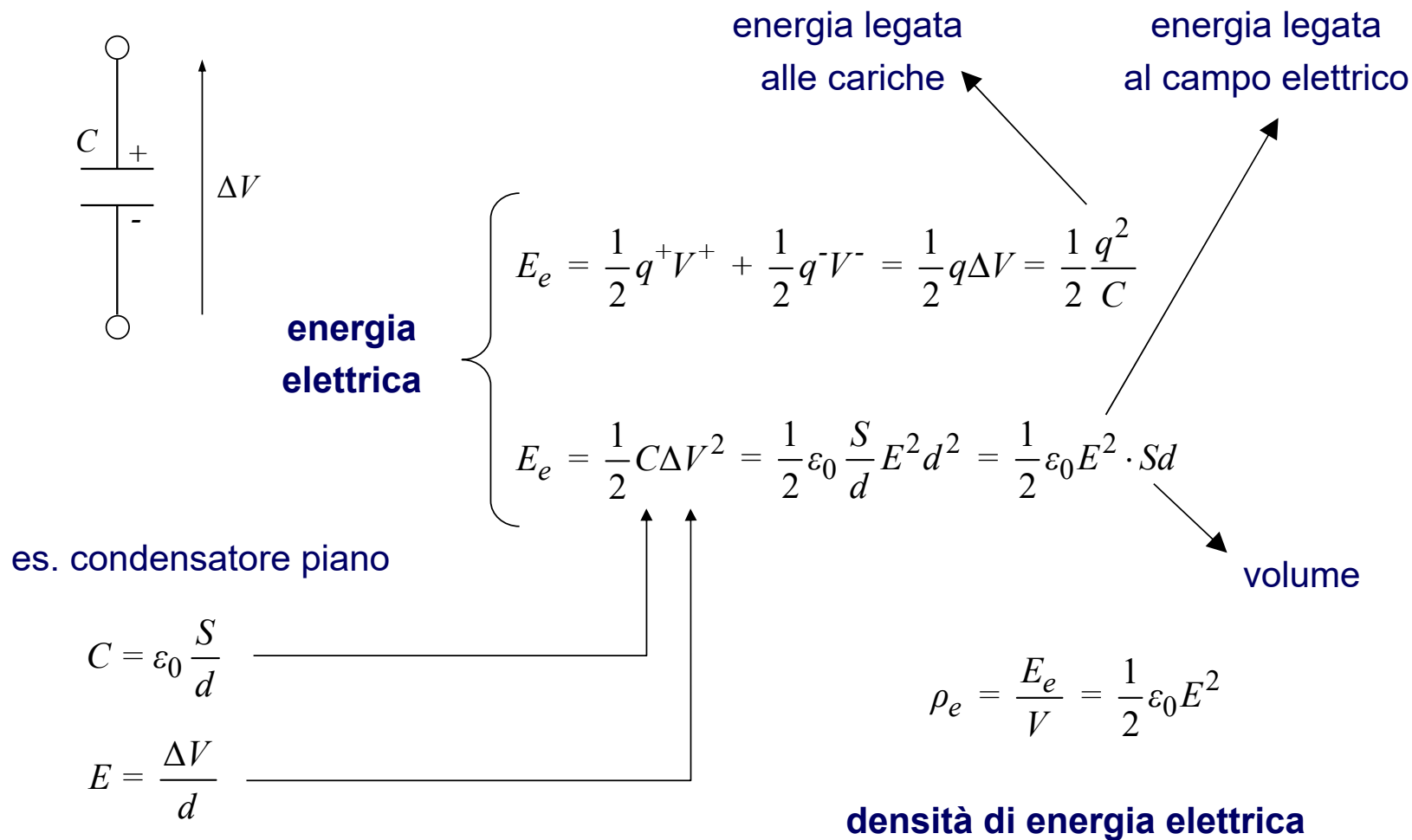
es. conduttore piano

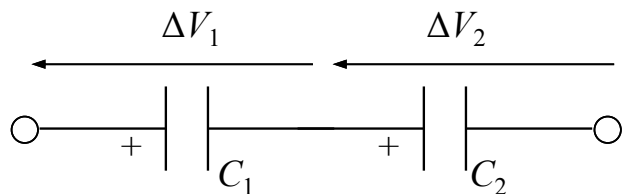


$$|\Delta V| = \int E \, dx = \frac{\sigma}{\epsilon_0} d$$

$$C = \frac{q}{\Delta V} = \epsilon_0 \frac{S}{d}$$





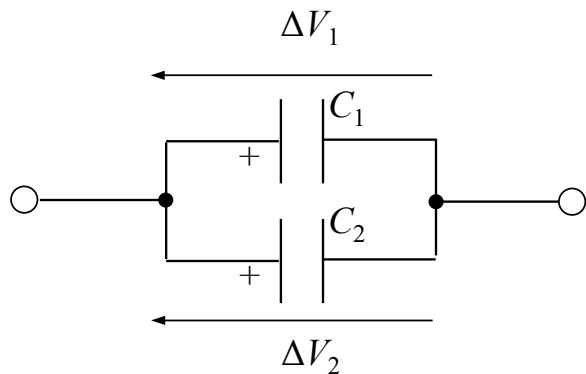


condensatori in serie

$$q_1 = q_2 = q$$

$$\Delta V = \Delta V_1 + \Delta V_2 = \frac{q_1}{C_1} + \frac{q_2}{C_2} = q \left(\frac{1}{C_1} + \frac{1}{C_2} \right)$$

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

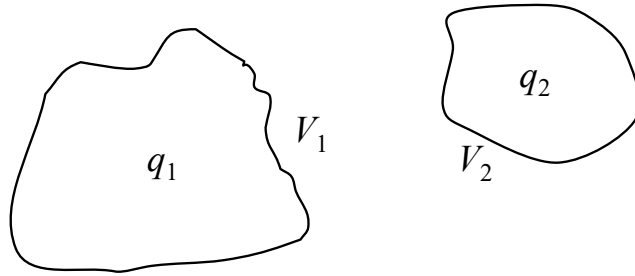


condensatori in parallelo

$$\Delta V_1 = \Delta V_2 = \Delta V$$

$$q = q_1 + q_2 = C_1 \Delta V_1 + C_2 \Delta V_2 = (C_1 + C_2) \Delta V$$

$$C_{eq} = \frac{q}{\Delta V} = \frac{(C_1 + C_2) \Delta V}{\Delta V} = C_1 + C_2$$



$$\begin{cases} V_1 = K_{11}q_1 + K_{12}q_2 \\ V_2 = K_{21}q_1 + K_{22}q_2 \end{cases}$$

$$\begin{cases} K_{ij} = K_{ji} \\ K_{ij} > 0 \\ K_{ii} > K_{ji} \end{cases}$$

$$\begin{cases} q_1 = C_{11}V_1 + C_{12}V_2 \\ q_2 = C_{21}V_1 + C_{22}V_2 \end{cases}$$

$$C = \begin{bmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{bmatrix}$$

$$\begin{cases} C_{ij} = C_{ji} \\ C_{ij} < 0 \\ C_{ii} > 0 \end{cases}$$

coefficienti di capacità