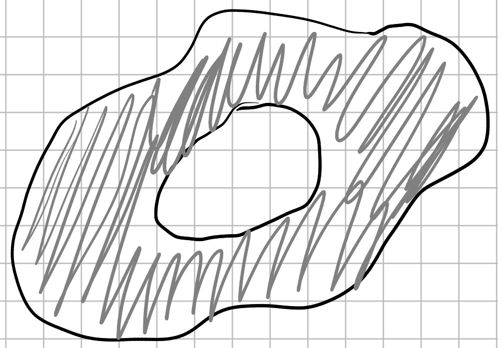
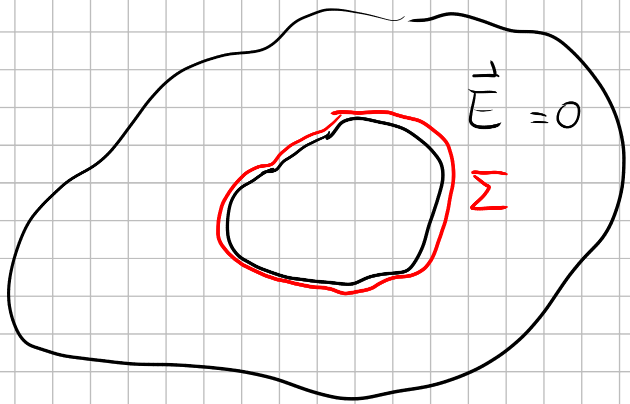
1. DIMOSTRAZIONE IN AMALDI 9/11 (16:00)

2. TUTOR (!)

CONDUTTORI CAVI



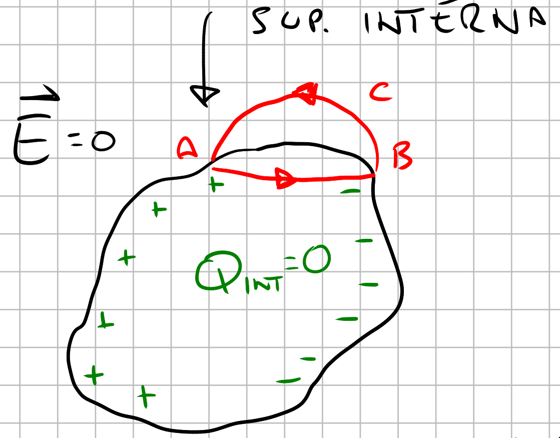


$$\Phi_\Sigma(\vec E) = \int_\Sigma \vec E \cdot \hat n \, d\Sigma = 0$$

$$\Phi_\Sigma(\vec E) = \frac{Q_{INT}}{\varepsilon_0} \Rightarrow$$

$$Q_{INT} = 0$$

RAGIONIAMO PER ASSURDO

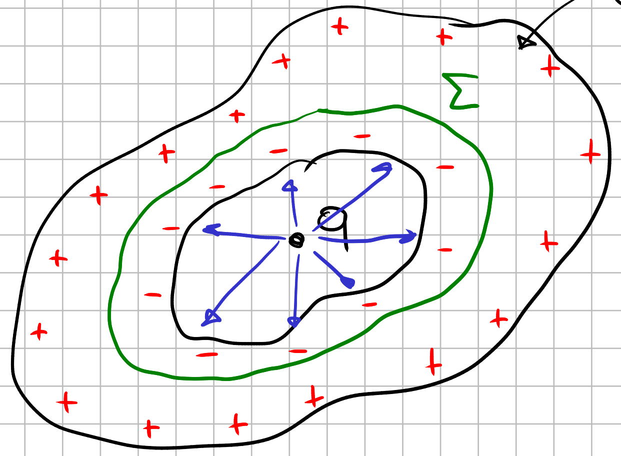


$$\oint_C \vec E \cdot d\vec s = \int_A^B \vec E \cdot d\vec s + \overset{0}{\cancel{\int_B^A \vec E \cdot d\vec s}} = \int_A^B \vec E \cdot d\vec s \neq 0$$

QUESTO NON PUÒ ESSERE

QUINDI ANCHE NELLA CAVITÀ NON SONO PRESENTI CARICHE

CONDUTTORI CAVI CARICHI



$Q_{COND} = 0 \quad , \quad q > 0$

$$\Phi_\Sigma(\vec{E}) = 0 \quad , \quad \Phi_\Sigma(\vec{E}) = \frac{Q_{INT}}{\varepsilon_0} = \frac{q + q_{INT}}{\varepsilon_0} = 0$$

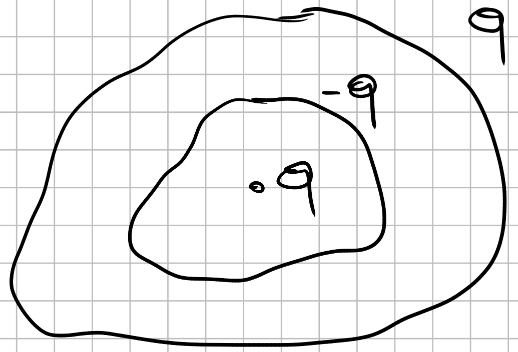
$$\Rightarrow \boxed{q_{INT} = -q}$$

INDUZIONE COMPLETA

QUANTO VALE q_{EXT}?

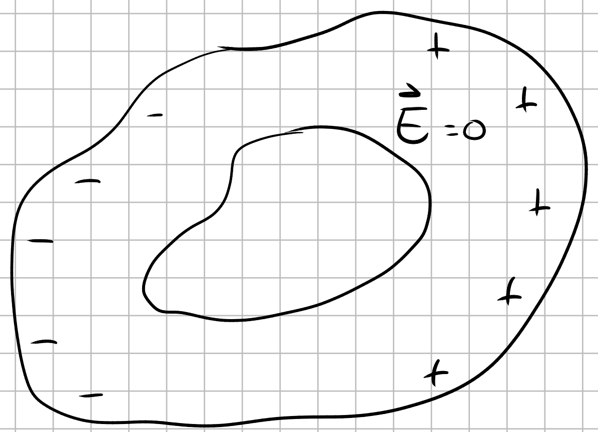
$$Q_{COND} = 0 = q_{INT} + q_{EXT} = -q + q_{ext} \Rightarrow q_{ext} = q$$

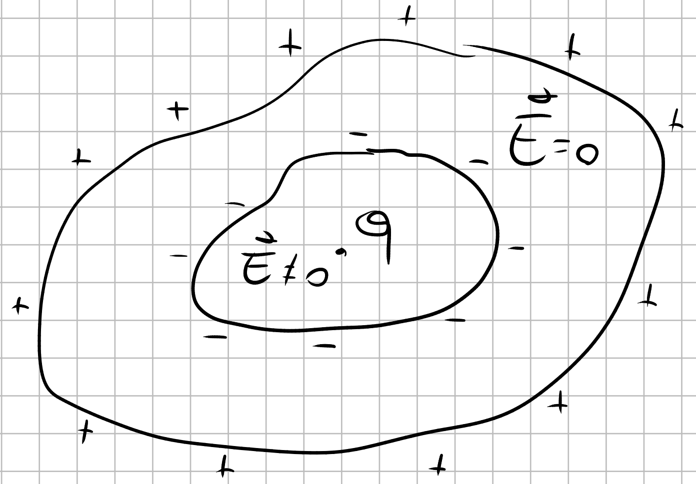
$\Downarrow$



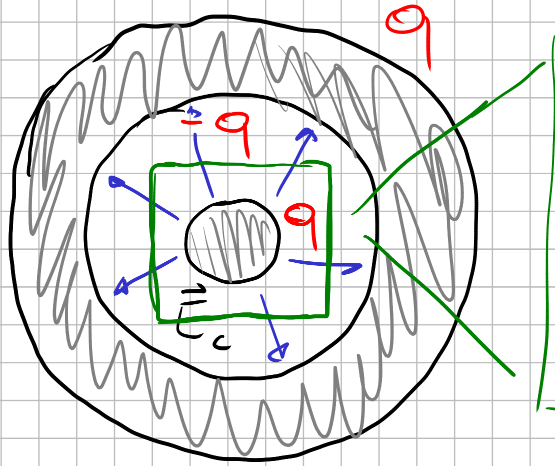
$\vec{E} \rightarrow$

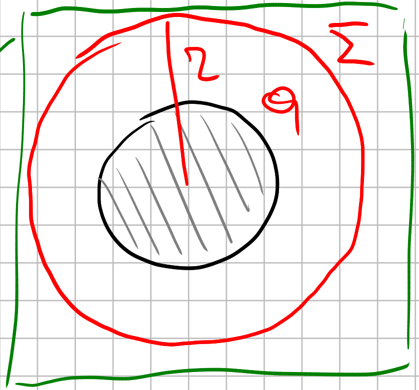
GABBIA DI FARADAY
(SCHERMO ELETTROSTATICO)





CONDENSATORI



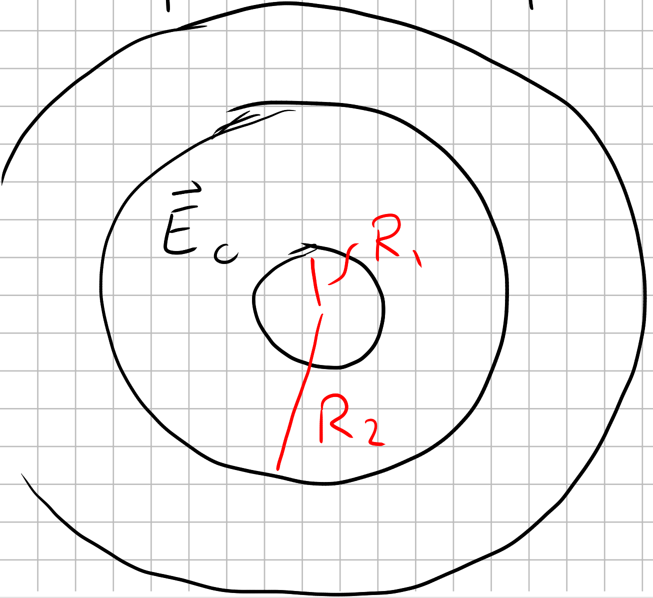


$$\Phi_\Sigma(\vec E) = \int_\Sigma \vec E \cdot \hat n \, d\Sigma = E \int_\Sigma d\Sigma = E\, 4\pi r^2$$

$$= \frac{Q_{INT}}{\varepsilon_0} = \frac{q}{\varepsilon_0} \Rightarrow$$

$$E = \frac{q}{4\pi\varepsilon_0}\frac{1}{r^2}$$

quindi in questo caso $\boxed{\vec E_c = \frac{q}{4\pi\varepsilon_0}\frac{1}{r^2}}$ perché il conduttore è sferico



$$\Delta V_{12} = \int_{R_1}^{R_2} E_c \, dr = \frac{q}{4\pi\varepsilon_0}\left(\frac{1}{R_1} - \frac{1}{R_2}\right) = \frac{q}{4\pi\varepsilon_0}\frac{R_2 - R_1}{R_1 R_2}$$

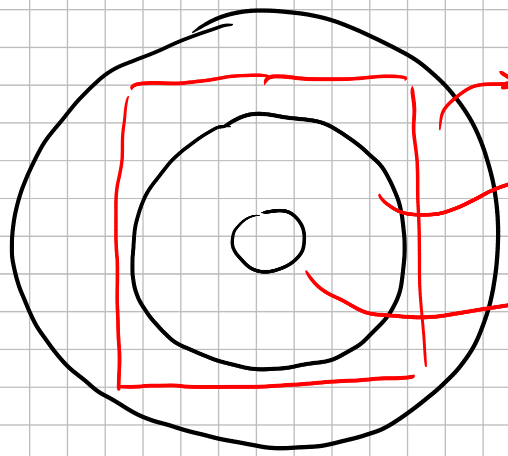
$\Delta V_{12} \propto q$, quindi definiamo $\frac{1}{C}$ la costante di proporzionalità

CAPACITÀ

$$\boxed{C = \frac{4\pi\varepsilon_0 R_1 R_2}{R_2 - R_1}}$$

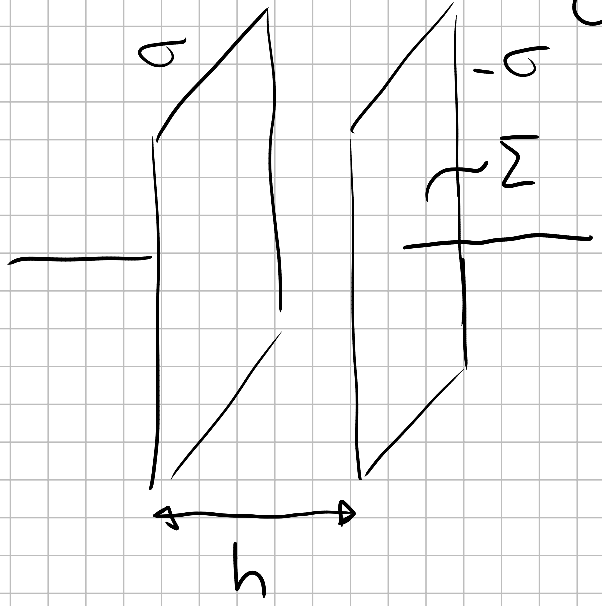
CAPACITÀ DEL SISTEMA

↳ DEL CONDENSATORE



$$\Delta V = \frac{q}{C} \Rightarrow C = \frac{q}{\Delta V}, \quad [C] = \frac{C}{V} = F \quad (\text{FARAD})$$

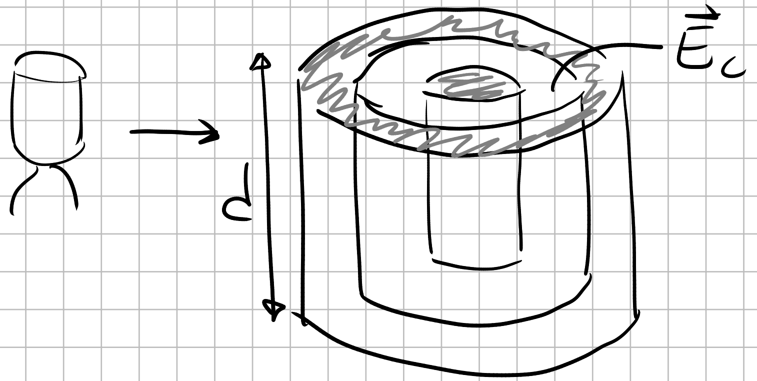
CONDENSATORE PIANO

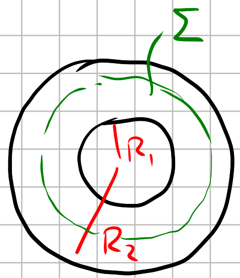


$$E = \frac{\sigma}{\varepsilon_0}, \quad \Delta V = Eh = \frac{\sigma h}{\varepsilon_0} = \frac{q}{\Sigma}\frac{h}{\varepsilon_0} \equiv \frac{q}{C} \Rightarrow$$

$$\boxed{C = \frac{\Sigma \varepsilon_0}{h}}$$

CONDENSATORI CILINDRICI



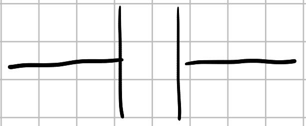


il cilindro ha carica q
altezza $d \Rightarrow \lambda = \frac{q}{d}$

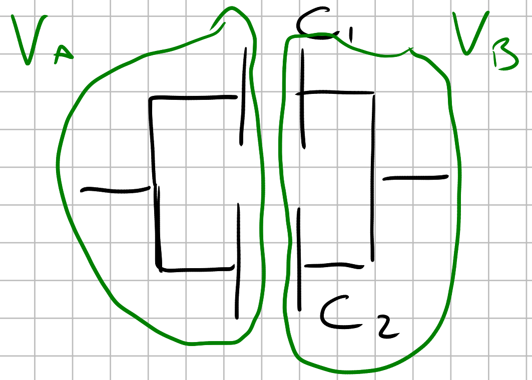
$$E = \frac{\lambda}{2\pi\varepsilon_0 r} \Rightarrow$$

$$\boxed{C = \frac{2\pi\varepsilon_0 d}{\log\frac{R_2}{R_1}}}$$

COLLEGAMENTO DI CONDENSATORI



COLLEGAMENTO IN PARALLELO



$$q_1 = C_1 \Delta V \quad , \quad \Delta V \equiv V_B - V_A$$

$$q_2 = C_2 \Delta V$$

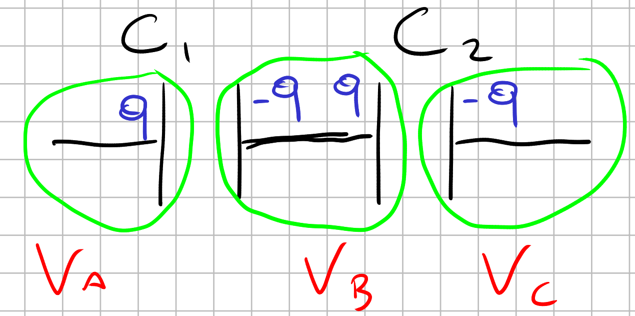
$$q_1 + q_2 = (C_1 + C_2)\Delta V \equiv C_{eq} \Delta V$$

$\|$ $\|$

$=$

$C_{eq} = C_1 + C_2$

COLLEGAMENTO IN SERIE



$$\Delta V_1 = \frac{q_1}{C_1} = \frac{q}{C_1} = V_B - V_A$$

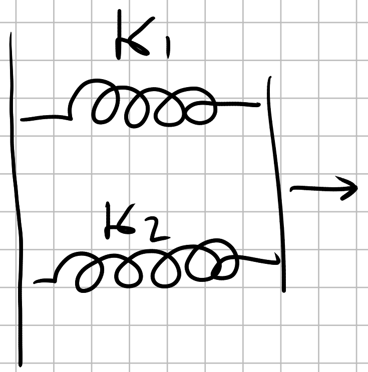
$$\Delta V_2 = \frac{q_2}{C_2} = \frac{q}{C_2} = V_C - V_B$$

$$\Delta V = V_C - V_A = \Delta V_1 + \Delta V_2 = \frac{q}{C_1} + \frac{q}{C_2} = q\left(\frac{1}{C_1} + \frac{1}{C_2}\right) \equiv \frac{q}{C_{eq}}$$

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

$$\boxed{C_{eq} = \frac{1}{C_1} + \frac{1}{C_2}}$$ ← ABOMINIO

SISTEMI DI MOLLE



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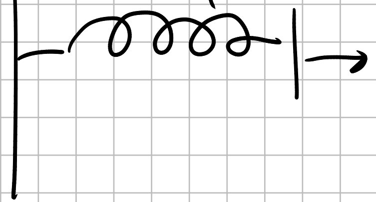
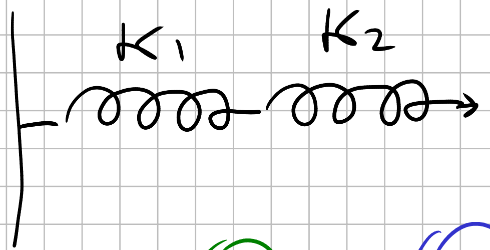
$$K_{eq} = K_1 + K_2$$





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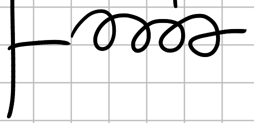
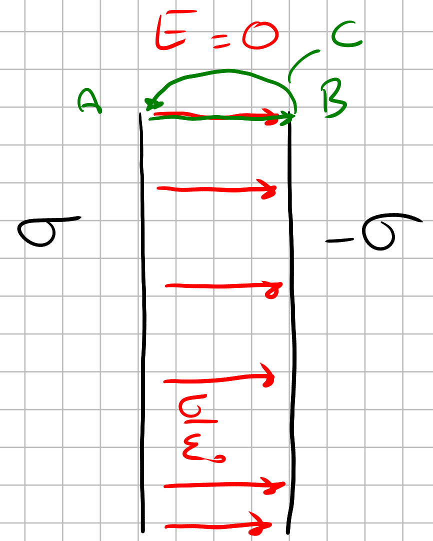
$$\frac{1}{K_{eq}} = \frac{1}{K_1} + \frac{1}{K_2}$$



$$F = k\,\Delta x \longleftrightarrow q = C\,\Delta V$$

DISPERSIONE



$$E = \frac{\sigma}{\varepsilon_0}$$

$$\oint_C \vec{E} \cdot d\vec{s} = \overset{0}{\int_A^B \vec{E} \cdot d\vec{s}} + \cancel{\int_B^A \vec{E} \cdot d\vec{s}} = 0 \neq 0$$

NON PUÓ ESSERE