16/1/2018

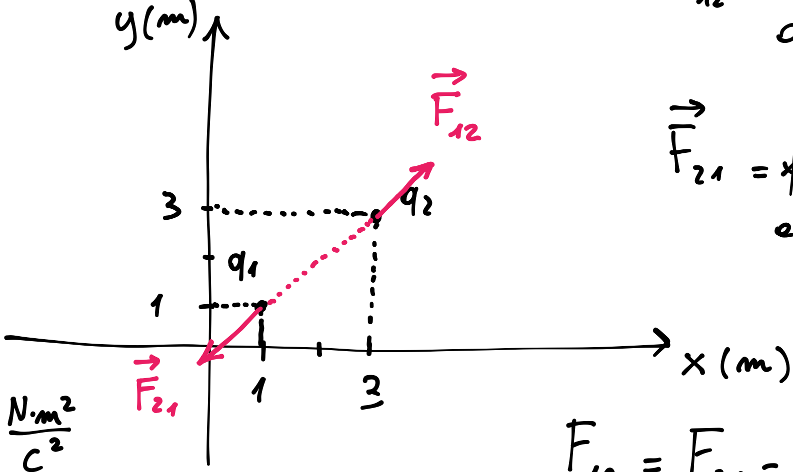
$q_1 \quad (1,1)$

$q_2 \quad (3,3)$

$q_1 = q_2 = 4\,C$

$\vec{F}_{12}$ = forza con cui q_1 agisce su q_2

$\vec{F}_{21}$ = forza con cui q_2 agisce su q_1



$K_0 \cong 9 \times 10^9 \ \frac{N \cdot m^2}{C^2}$

$$F_{12} = F_{21} = K_0 \frac{|q_1||q_2|}{r^2}$$

r = distanza fra le cariche $= 2\sqrt{2}$

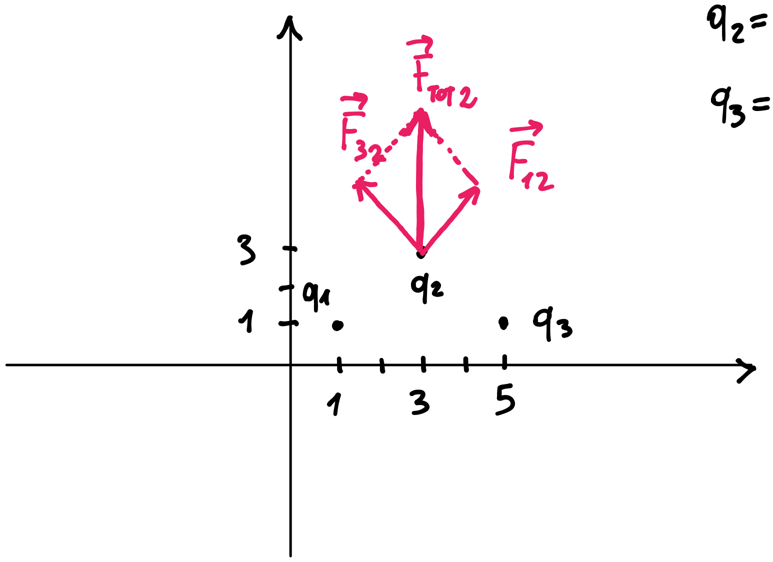
$$F_{12} = F_{21} = K_0 \frac{16}{8} = 2K_0$$

(NON SCRIVENDO LE U. DI MISURA)

$q_1 = 4\,C \quad (1,1)$

$q_2 = 4\,C \quad (3,3)$

$q_3 = 4\,C \quad (5,1)$



Calcoliamo la forza totale (elettrica) su q_2.

q_2 risente della forza dovuta a q_1 sommata a quella dovuta a q_3 $\quad \vec{F}_{TOT\,2} = \vec{F}_{12} + \vec{F}_{32}$

$$F_{12} = F_{32} = 2K_0 \Rightarrow F_{TOT_2} = 2\sqrt{2}\,K_0$$

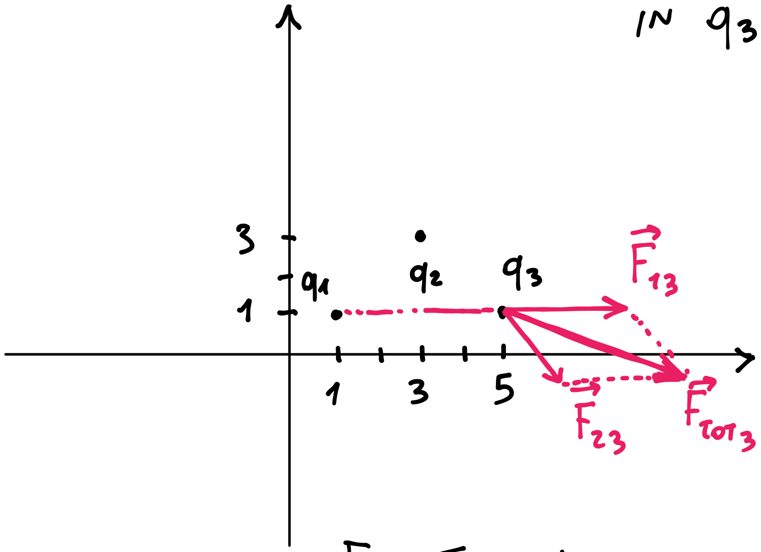
SE USO LE COMPONENTI CARTESIANE

$\vec{F}_{12} = (\sqrt{2}\,K_0, \sqrt{2}\,K_0) \qquad \vec{F}_{32} = (-\sqrt{2}\,K_0, \sqrt{2}\,K_0)$

$$\vec{F}_{TOT\,2} = \vec{F}_{12} + \vec{F}_{32} = (\sqrt{2}\,K_0 - \sqrt{2}\,K_0,\ \sqrt{2}\,K_0 + \sqrt{2}\,K_0) =$$

$$= (0,\ 2\sqrt{2}\,K_0) \rightsquigarrow F_{TOT_2} = \sqrt{0^2 + (2\sqrt{2}\,K_0)^2} = 2\sqrt{2}\,K_0$$

COSA SUCCEDE IN q_3?



$$F_{23} = F_{32} = 2K_0$$

$$\vec{F}_{23} = (\sqrt{2}K_0, -\sqrt{2}K_0)$$

DA CALCOLARE, COINCIDE CON IL MODULO DI $\vec{F}_{13}$

$$\vec{F}_{13} = (\ldots\ldots, 0)$$

$$\downarrow$$

$$F_{13} = k_0 \frac{|q_1||q_3|}{r_{13}^2} = K_0 \frac{16}{4^2} = K_0 \nearrow \quad \vec{F}_{13} = (K_0, 0)$$

$$\vec{F}_{TOT_3} = \vec{F}_{23} + \vec{F}_{13} = (\sqrt{2}K_0 + K_0, -\sqrt{2}K_0) = ((1+\sqrt{2})K_0, -\sqrt{2}K_0)$$

$$F_{TOT_3} = \sqrt{[(1+\sqrt{2})K_0]^2 + [-\sqrt{2}K_0]^2} = K_0\sqrt{(1+\sqrt{2})^2 + 2} =$$

$$= K_0\sqrt{1+2+2\sqrt{2}+2} = \boxed{K_0\sqrt{5+2\sqrt{2}}}$$

$$\sqrt{a+\sqrt{b}} = \sqrt{\frac{a+\sqrt{a^2-b}}{2}} + \sqrt{\frac{a-\sqrt{a^2-b}}{2}}.$$

$$\sqrt{5+2\sqrt{2}} = \sqrt{5+\sqrt{8}}$$

$a = 5 \quad b = 8$

$25 - 8 = 17$ che non è un quadrato perfetto!