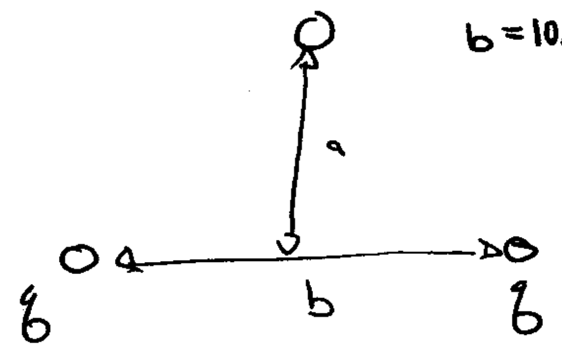
Heres an example of force & charge conservation

net Force on Q from 2q's is attractive & 0.2 N

Then, the charged spheres are brought into contact & the net force after all the spheres have the same charge is 0.02 N on top sphere & repulsive

before

a = 5.0cm
b = 10.0cm

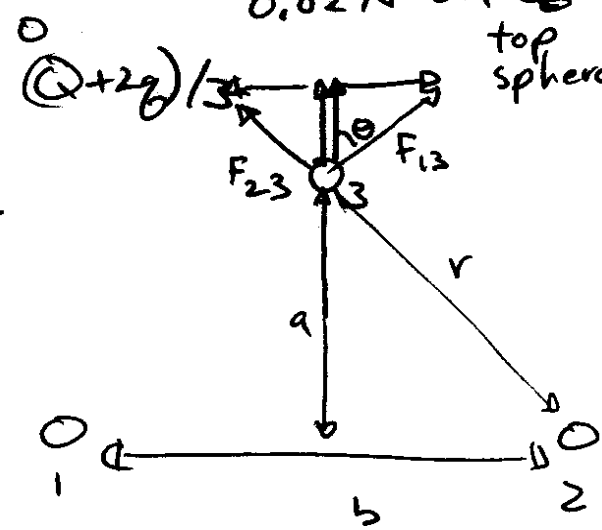


after

(Q+2q)/3

(Q+2q)/3

Figure out net force



$$\vec{F}_{13} = \cancel{\frac{kqQ}{a^2+(b/2)^2}\sin\theta\,\hat{i}} + \frac{kqQ}{a^2+(b/2)^2}\cos\theta\,\hat{j}$$

$$\vec{F}_{23} = \cancel{-\frac{kqQ}{a^2+(b/2)^2}\sin\theta\,\hat{i}} + \frac{kqQ}{a^2+(b/2)^2}\cos\theta\,\hat{j}$$

$$\vec{F}_{net} = \vec{F}_{13} + \vec{F}_{23} = \underbrace{\frac{2kqQ}{a^2+(b/2)^2}}_{\text{know this} < 0}\cos\theta\,\hat{j}$$

cause attractive

So, we know

$$qQ = -|F_{net}|\frac{(a^2+(b/2)^2)}{2k\cos\theta} = \frac{-0.2N(.05m^2+.05m^2)}{2(9\times10^9\frac{Nm^2}{C^2})\cos 45^\circ}$$

$$= -7.8567\times10^{-14}C^2 = -A$$

&

$$\frac{(Q+2q)^2}{3} = |F_{net}^{after}|\frac{(a^2+(b/2)^2)}{2k\cos\theta}$$

or

$$Q+2q = 3\sqrt{|F_{net}^{after}|\frac{(a^2+(b/2)^2)}{2k\cos\theta}}$$

$$= 2.659\times10^{-7}C = B$$

substitute (2 eqn's & 2 unknowns) $Q = B-2q$

so $qB - 2q^2 = -A$ or $\underset{a}{2q^2} - \underset{b}{qB} - \underset{c}{A} = 0$

solve quadratic

$$q = \frac{B \pm \sqrt{B^2 - 4(2)(-A)}}{2(2)}$$

$$= \frac{2.659\times10^{-7}C \pm \overbrace{\sqrt{(2.659\times10^{-7}C)^2+8(7.8567\times10^{-14}C^2)}}^{8.362\times10^{-7}C}}{4}$$

$$= 2.755\times10^{-7}C \;\; \& \;\; -1.42575\times10^{-7}C$$

& now we should solve for Q and check by calculating $|F_{net}|$