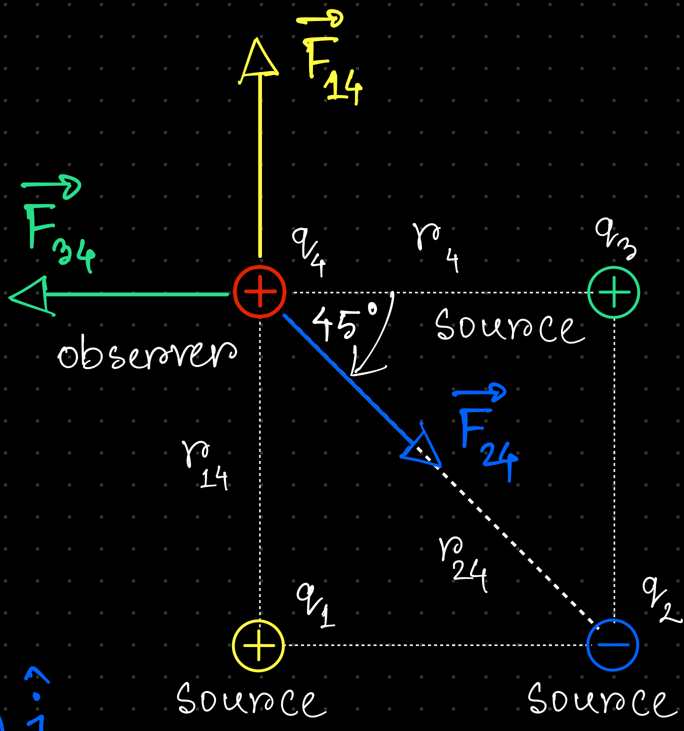
Q: Find the net force on q_4.



$$\vec{F}_4 = \vec{F}_{14} + \vec{F}_{34} + \vec{F}_{24}$$

$$= \frac{C q_1 q_4}{r_{14}^2}\hat{j} + \frac{C q_3 q_4}{r_{34}^2}(-\hat{i}) + \frac{C q_2 q_4}{r_{24}^2}\cos(-45°)\,\hat{i} + \frac{C q_2 q_4}{r_{24}^2}\sin(-45°)\,\hat{j}$$

$$= \left\{ 4{\cdot}494\times10^{11}\,\hat{j} - 4{\cdot}494\times10^{11}\,\hat{i} + 1{\cdot}589\times10^{11}\,\hat{i} - 1{\cdot}589\times10^{11}\,\hat{j} \right\} N$$

$$= \left\{ \left(-4{\cdot}494\times10^{11} + 1{\cdot}589\times10^{11}\right)\hat{i} + \left(4{\cdot}494\times10^{11} - 1{\cdot}589\times10^{11}\right)\hat{j} \right\} N$$

$$= \left(-2{\cdot}905\times10^{11}\,\hat{i} + 2{\cdot}905\times10^{11}\,\hat{j}\right) N$$

This is the net force on q_4 in vector form.

The magnitude can be found as,

$$|\vec{F}_4| = \sqrt{\left(-2{\cdot}905\times10^{11}\right)^2 + \left(2{\cdot}905\times10^{11}\right)^2}$$

$$= 4{\cdot}1083\times10^{11}\ N$$

You could also find the direction in the following way.

2.905×10^{11}

$$\theta = 180^\circ - \tan^{-1}\left|\frac{F_{4,y}}{F_{4,x}}\right|$$

-2.905×10^{11}

$$= 180^\circ - 45^\circ$$

$= 135^\circ$; counterclockwise with the $+x$-axis.