Notes

Pierson Lipschultz

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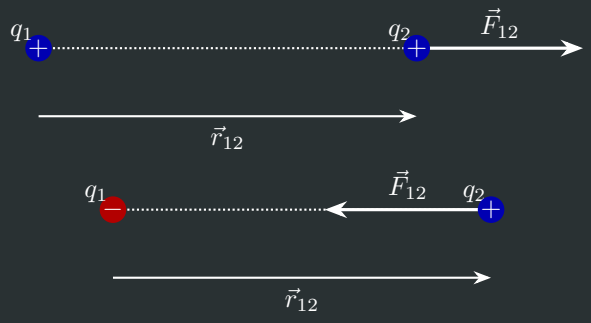
Contents

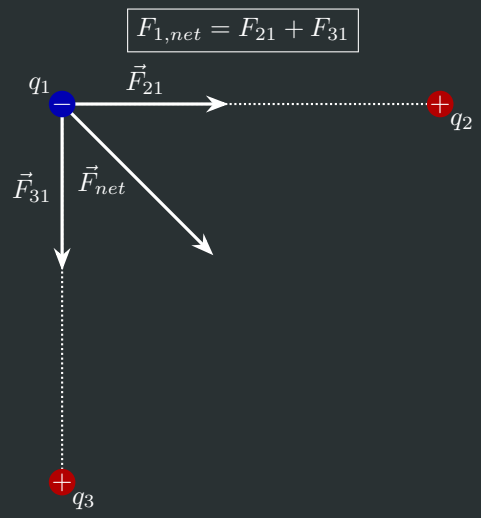
1 Coulomb's Law

Coulomb's Law

$$\vec{F_{12}} = k\frac{q_1 q_2}{r_{12}^2}\hat{r_{12}} \tag{1}$$

Give a force along the line of two charges.
If q_1 and q_2 have the same sign (i.e. charge) then the force must be repulsive. But if they have the *same* sign, then it must be attractive.
Because of Newton's second law, $F_{12} = -F_{21}$





Superpostion Principle

$$F_{net} = \sum_i \vec{F}_i \tag{2}$$

Electron Charge

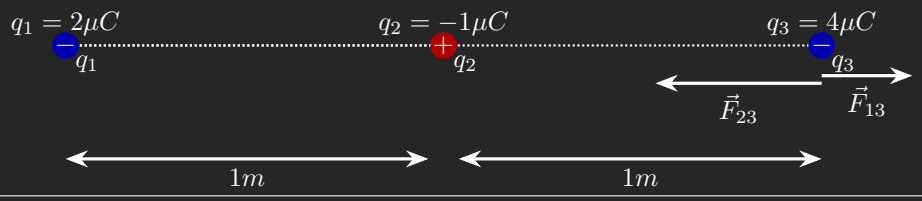
$$e = -1.6 \times 10^{-19} C$$

k

$$k = 9 \times 10^9 \frac{NM^2}{C^2}$$

1.1 Examples

Example 1.1 $F_{3,net} = ???$



Using Coulomb's Law[1]...

$$F_{3,net} = F_{31} + F_{32}$$

$$F_{31} = k\frac{q_3 q_1}{r_{31}^2}\hat{r}_{31}$$

$$F_{32} = k\frac{q_3 q_2}{r_{32}^2}\hat{r}_{32}$$

2 Equations

$$\vec{F_{12}} = k\frac{q_1 q_2}{r_{12}^2}\hat{r_{12}} \quad (1)\ (Coulomb's\ Law)$$

$$F_{net} = \sum_i \vec{F_i} \quad (2)\ (Superpostion\ Principle)$$

3 Constants

$$e = -1.6 \times 10^{-19} C \quad (1)\ (Electron\ Charge)$$

$$k = 9 \times 10^9 \frac{NM^2}{C^2} \quad (2)\ (k)$$