

Chapter 22

Coulomb's Law
(Force between two point charges)

$$F_e = k_e \frac{|q_1||q_2|}{r^2}$$

Force of multiple charges on a single point

$$\sum \vec{F}_i = \vec{F}_{21} + \vec{F}_{31} + \vec{F}_{41}$$

Definition of electric field

$$\vec{E} = \frac{\vec{F}_e}{q_0}$$

Using test charge to determine force direction of the electric field

$$\vec{F}_e = k_e \frac{q q_0}{r^2} \hat{r}$$

Electric field due to a finite num of point charges

$$\vec{E} = k_e \sum_i \frac{q_i}{r_i^2} \hat{r}_i$$

$k_e = 8.987 \times 10^9 \text{ Nm}^2/\text{C}^2$ - Coulomb Constant

$e = \pm 1.602 \times 10^{-19} \text{ C}$ - Charge of electron/proton

q_n = Electric force exerted by charge n

r = Distance between point charges

\vec{F} = Vector representing force on a charge

\vec{E} = Vector representing the force of an electric field

\vec{F}_e = Vector representing the electric force of an electric field acting on a test charge within the bounds of the electric field

\hat{r} = Unit vector pointed from q toward q_0

r_i = Distance from the i^{th} source charge q_i to point P