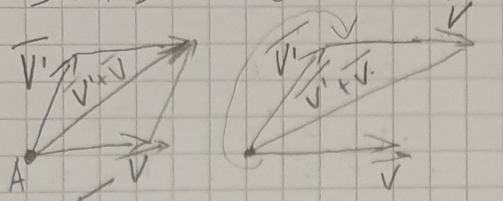
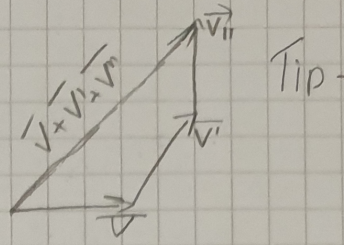
Statistics of Particle





Tip → Tail

Force

- Fixed - one point
- Free - can move

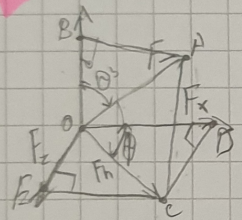
Product of Vect and Scalar

$\bar{P}+\bar{P}=2\bar{P}$

$\bar{P}+0.5\bar{P}=1.5\bar{P}$

$\bar{P}-\bar{Q}$

3D Forces



$F_y = F\cos\theta_y$

$F_h = F\sin\theta_y$

$F_x = F_h\cos\phi$

$F_z = F_h\sin\phi$

$F_x = F_h\cos\phi = F\sin\theta_y\cdot\cos\phi$

$F_z = F_h\sin\phi = F\sin\theta_y\cdot\sin\phi$

$F_y = F\cdot\cos\theta_y$

$F^2 = OA^2 = OB^2 + BA^2 = F_y^2 + F_h^2$

$F_h^2 = OC^2 = OD^2 + DC^2 = F_x^2 + F_z^2$

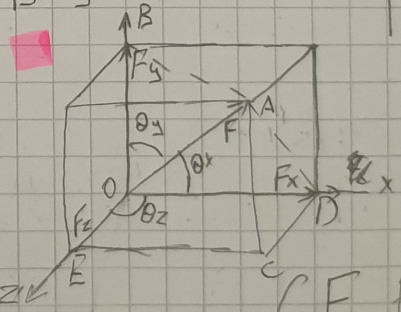
$\therefore F^2 = F_y^2 + F_h^2$

$= F_y^2 + F_x^2 + F_z^2$ - Magnitude of F

i - x-axis

j - y-axis

k - z-axis



$l_x = \cos\theta_x$

$l_y = \cos\theta_y$

$l_z = \cos\theta_z$

$l_x^2 + l_y^2 + l_z^2 = 1^2 = 1$

$\therefore \cos\theta x + \cos\theta y + \cos\theta z = 1$

$\bar{F} = F_x\bar{i} + F_y\bar{j} + F_z\bar{k}$

$\Rightarrow F = F\cos\theta_x i + F\cos\theta_y j + F\cos\theta_z k$

$F = F(\cos\theta_x i + \cos\theta_y j + \cos\theta_z k)$

$F = F\cdot\lambda$

$\cos\theta x = \frac{F_x}{F}$; $\cos\theta y = \frac{F_y}{F}$; $\cos\theta z = \frac{F_z}{F}$

$F_x = F\cos\theta_x$

$F_z = F\cos\theta_z$

$F_y = F\cos\theta_y$