Physics Reference #01

Vector in Cartesian Coordinates

$\vec{A}=A_x x+A_y y+A_z z$

Centripetal Acceleration

$A_r=-\frac{v^2}{r}$

Trajectory / Position

$\vec{X}(t)$

Velocity / Derivative of Position

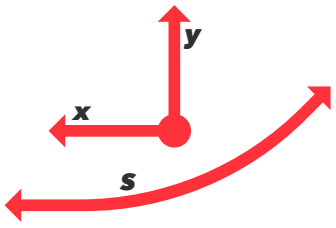
$\vec{V}(t)$

Acceleration / Derivative of Velocity

$\vec{A}(t)$

Inertial Reference Frame

A set of non-moving coordinates in which the motion of various objects is described



Newton's First Law

If $\vec{F}=0$, V is constant

Newton's Second Law

$\vec{F}=m\vec{A}$

Newton's Third Law

$\vec{F}_{ij}=\vec{F}_{ij}$

Derivative of X^n

$\frac{dx^n}{dx}=nx^{n-1}$

Integration or X^n

$\int x^n dx=\frac{x^{n+1}}{n+1}$

Force of Gravity near surface

$\vec{F}=-mg$

Gravitational Constant

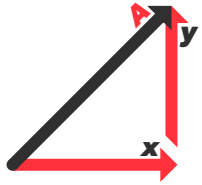
$g=9.80665\ (-0.0005)$

Specifically at 45°32'33"

Decomposition of a vector at angle θ

$\vec{A}_x=A\cos(\theta)$

$\vec{A}_y=A\sin(\theta)$



Equations of Motion

$\vec{V} = \vec{A}T + \vec{V}_0$

$R = R_0+\vec{V}_0T+\frac{1}{2}\vec{A}T^2$

$R = R_0+\frac{1}{2}(\vec{V}+\vec{V}_0)T$

$\vec{V}^2 = \vec{V}_0^2+2\vec{A}(R-R_0)$

$R = R_0+\vec{V}T-\frac{1}{2}\vec{A}T^2$

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