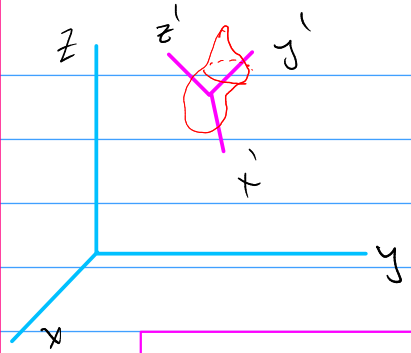


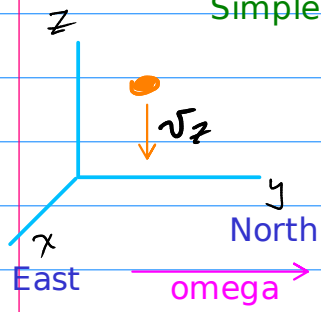
$$\left(\frac{d\bar{r}}{dt}\right)_s = \left(\frac{d\bar{r}}{dt}\right)_r + \bar{\omega} \times \bar{r}$$

$$\bar{F}_{eff} = m\bar{a}_r = \bar{F} - 2m\bar{\omega} \times \bar{v}_r - m\bar{\omega} \times (\bar{\omega} \times \bar{r})$$

Coriolis effect - perp. to rotation and velocity.

Centrifugal force - points outward.

Simple example: Coriolis effect on falling mass on earth's surface.



$$x : (\bar{F})_x = 0 \qquad \text{gravity}$$

$$m(\bar{a}_r)_x = m\ddot{x} = -2m(\bar{\omega} \times \bar{v}_z)_x$$

$$m\ddot{x} = -2m\omega v_z \sin\theta$$

$$v_z = -gt$$

$$m\dot{x} = 2m\omega \sin\theta \, g\frac{t^2}{2}$$

$$z - z_0 = -\frac{1}{2}gt^2$$

$$x = \omega \sin\theta \, g\frac{t^3}{3}$$

$$t = \left(\frac{2(z_0 - z)}{g}\right)^{1/2}$$

$$x = \frac{1}{3}\omega \sin\theta \sqrt{\frac{(2(z_0 - z))^3}{g}}$$

$$x \sim \Delta z^{3/2}$$