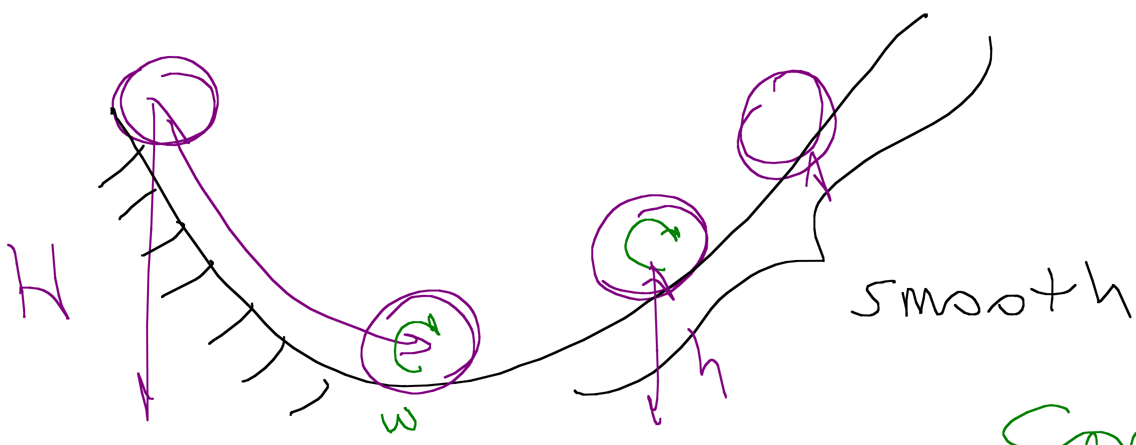
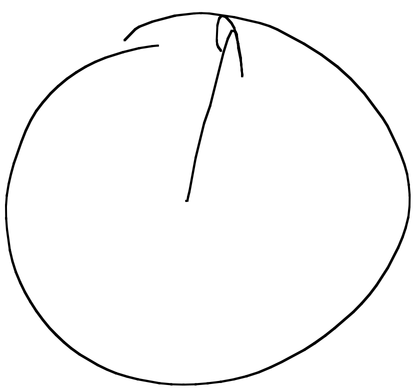
Phys 2110-3 11/10/10

Note Title 11/10/2010



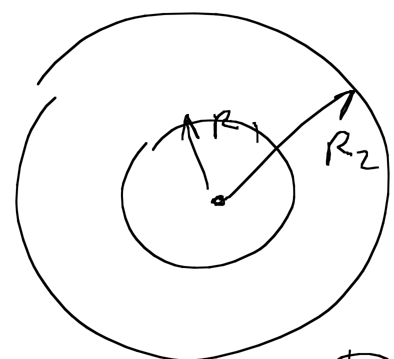
Cons of energy.



$I = \frac{1}{2}MR^2$

$\Sigma\, r\, m\,(\;\;)$

Prob set:



Ring

mass of ring

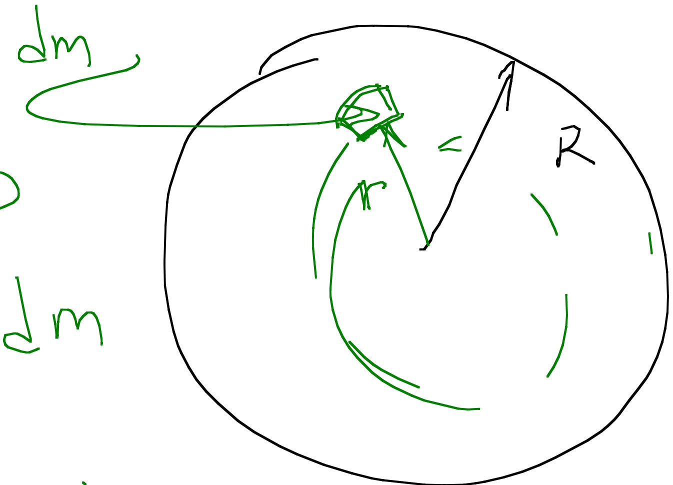
Find mom of inertia of dish

Mass density

$$= \frac{M}{\pi R^2} = \sigma$$

Add up

$r^2\,dm$



$$dm = \rho\,da = \rho\, r\,dr\,d\phi$$

$$\int_0^{2\pi}\int_0^{R} r^2\,\rho\, r\,dr\,d\phi = \rho\int_0^{2\pi} d\phi \int_0^{R} r^3\,dr = \rho\,(2\pi)\left(\frac{R^4}{4}\right) = \frac{\rho\pi R^4}{2}$$

$$= \frac{\rho \pi R^4}{2}$$

$$\rho = \frac{M}{\pi R}$$

$$\pi R^2 \rho = M$$

$$= \frac{M R^2}{2}$$

$$= \frac{1}{2} M R^2$$

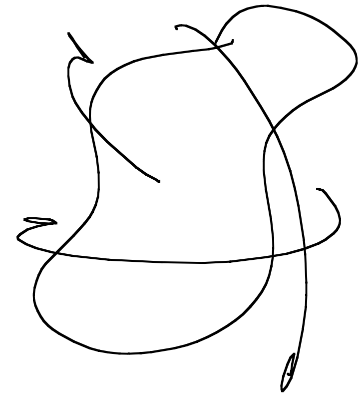
Ring:

$$\int_{R_1}^{R_2}$$

$$\longrightarrow R_2^4 - R_1^4$$

$$= (R_2^2 - R_1^2)(R_2^2 + R_1^2)$$

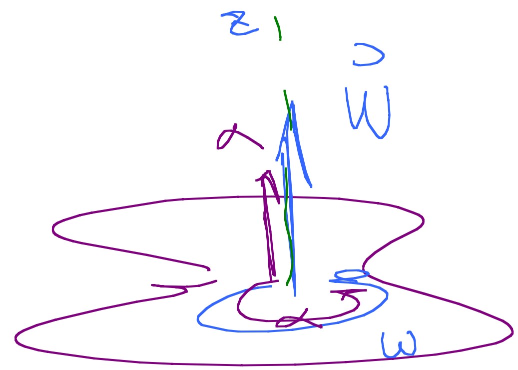
Chap 11 More on rotations



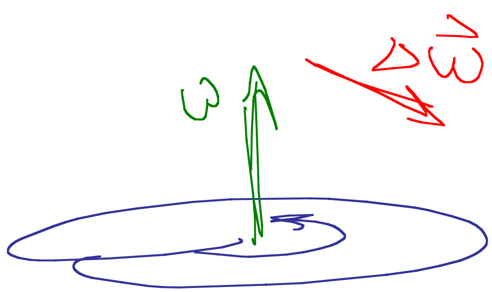
Complicated rotations

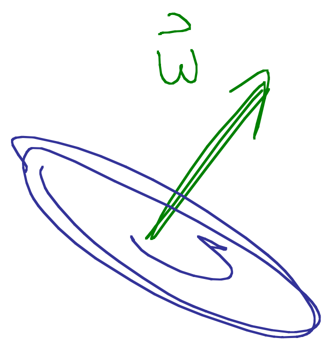
Analog of momentum.

Vector nature of quantities



Suppose axis not fixed



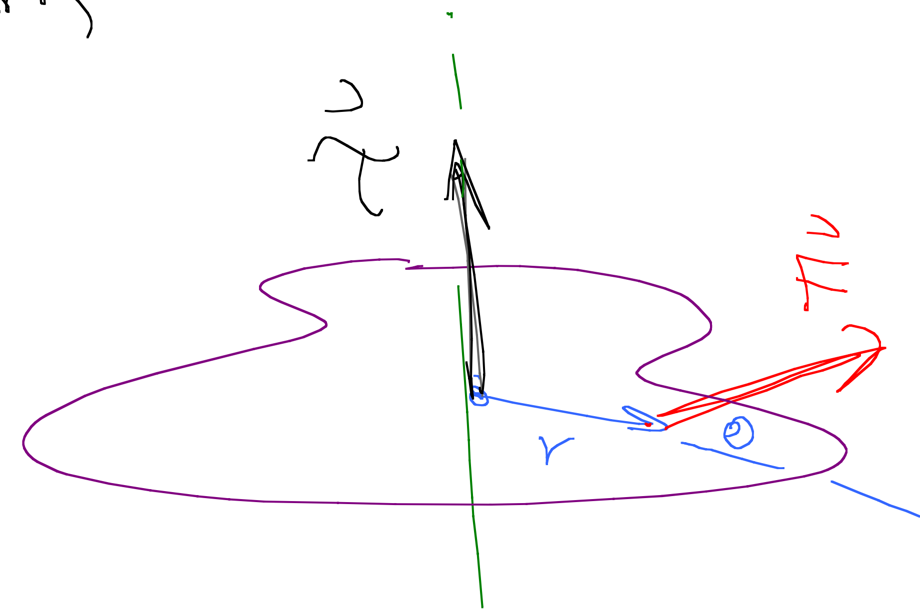


$$\vec{\alpha} = \frac{d\vec{\omega}}{dt} \qquad \frac{\Delta\vec{\omega}}{\Delta t}$$

Torque gives α, $\vec{\tau}$

How does it come from $\vec{r}$ & $\vec{F}$

$$\vec{\tau} = \vec{r} \times \vec{F}$$



Dot Product: Two Vectors $\longrightarrow$ Scalar

Cross Product: Two Vec's $\longrightarrow$ Vector