M2, M2R

M2 – curve up → similar M1

→ final scores tonight on Compass and PL

→ M2 on PL

M2R – from Sun–Wed

→ some Qs from M2
some other PL Qs
some tweaked Qs.

→ no completely new Qs.

→ difficulty similar to M1K

Discuss final after M2R is done

Rigid Body Kinetics

$$\sum \vec{F} = m\vec{a}_c$$

$$\sum M_{c,z} = I_{c,z}\alpha_z$$

2D: planar

moments

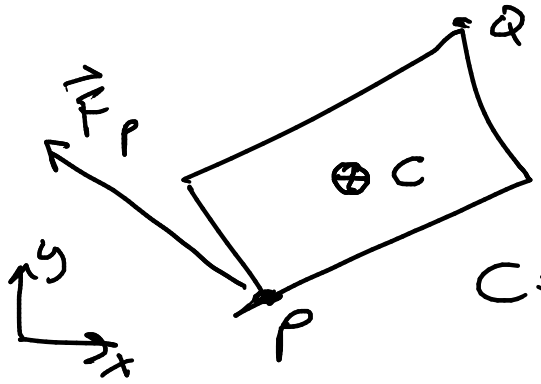
moment of inertia

ang acc.

OR

$$\sum M_{o,z} = I_{o,z}\alpha_z$$

O = fixed point on the RB.



C = CoM

$$\vec{M}_c = \vec{r}_{cp} \times \vec{F}_p$$

$M_{c,z}$ = Scalar Moment about C in dir z

α_z = ang. acc. in z

$\vec{\alpha} = \alpha_z \hat{k}$

$\vec{M}_c = M_{c,z}\hat{k}$

Mass

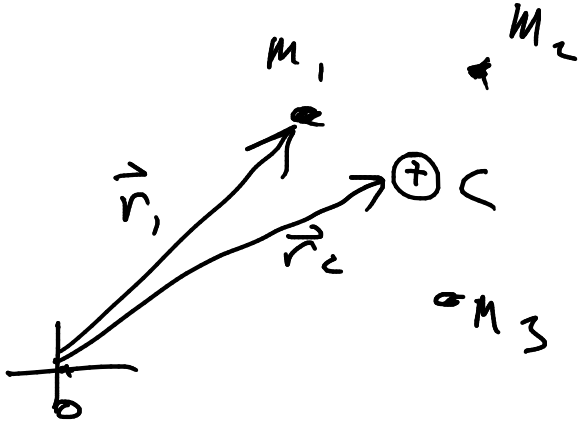
m_i = resistance to acceleration (inertial mass)

m_g = Source of gravity $\quad F_g = \frac{GMm}{r^2}$ (gravitational mass)

A. $m_i = m_g$ Gravity Probe B.

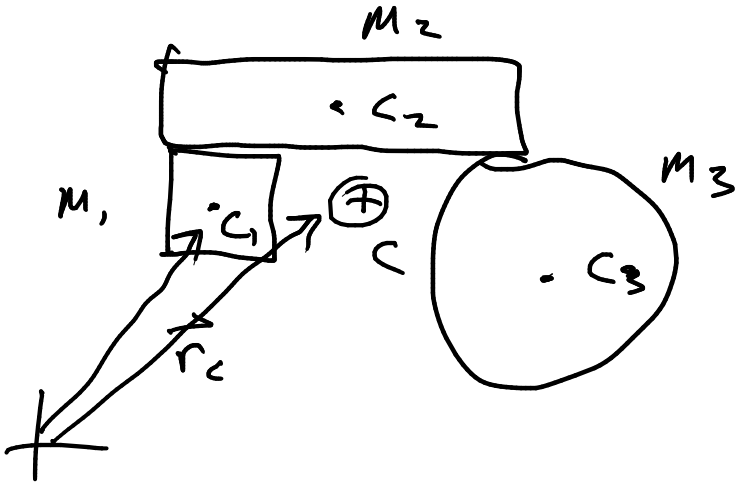
B. $m_i \neq m_g$

Center of Mass



$M = \sum_i m_i$ tot. mass

$\vec{r}_c = \frac{1}{M} \sum_i m_i \vec{r}_i$



Same formulas.

$$\vec{r}_c = \frac{1}{m} \sum_i m_i \vec{r}_{c_i}$$