

PARALLEL AXIS THEOREM:

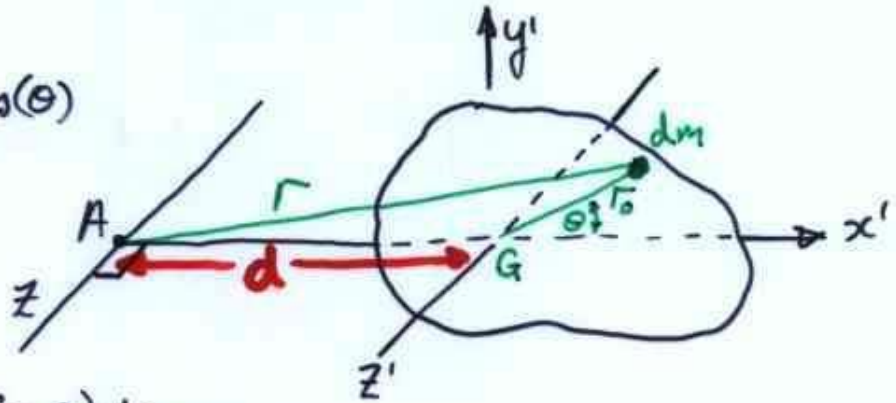
IF I_G is known, then I for another parallel axis is

$$I = I_G + md^2$$

d is \perp distance between the axes

$$r^2 = r_0^2 + d^2 + 2r_0 d \cos(\theta)$$

$$I = \int r^2 dm$$



$$I = \int (r_0^2 + d^2 + 2r_0 d \cos \theta) dm$$

$$= \int r_0^2 dm + d^2 \int dm + 2d \int r_0 \cos \theta dm$$

ZERO BECAUSE of definition of center of mass.

$$\therefore \underline{I = I_G + md^2}$$



RADIUS OF GYRATION k

$$k = \sqrt{\frac{I}{m}}$$

i.e. $I = k^2 m$

if you are told k , m , then you know "I."

N.B. k is "about an axis", just like I

BODY WILL HAVE DIFFERENT k for DIFFERENT axes... in general.