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INTRODUCED PLANE KINETICS OF RIGID BODIES

$$\sum \vec{F} = m\vec{a}_G \qquad \sum \vec{M}_G = \dot{\vec{H}}_G = \alpha I_G$$

(FOR 2-D CASE)

$I_G = \int r^2 dm$ moment of inertia

$= \rho \int r^2 dV$ if ρ is constant throughout volume

Parallel axis theorem: $I = I_G + md^2$

Radius of Gyration: $k = \sqrt{\frac{I}{m}} \Leftrightarrow I = k^2 m$

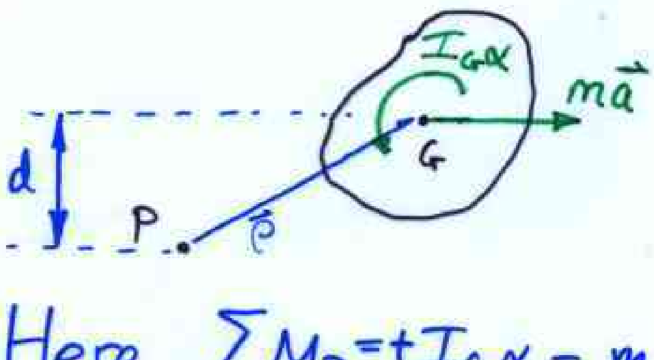
Consider alternative forms of moment eqn..

$\sum \vec{M}_P = \dot{H}_G + \vec{\rho} \times m\vec{a}_G$ $\quad \vec{\rho}$ is vector $\vec{PG}$

or 2D:

$\sum M_P = I_G \alpha \pm m a_G d$ $\quad d = \perp$ dist between P & vector of accln

sign depends on right hand rule.



Here $\sum M_P = +I_G\alpha - mad$ NOTE sign

P is a nonaccelerating point