Angular Momentum

defined as the moment of linear momentum

e.g. $\vec{H}_G = \sum \vec{\rho}_i \times m_i \vec{v}_i$

$\vec{\rho}_i$ vector from centre of mass to m_i
$\vec{v}_i$ velocity of m_i
m_i mass of particle

for 2-D Problems + Rigid Bodies...

$$H_G = I_G \omega$$ ← scalar eqn for 2-D.

also we have

$$\sum M_G = \dot{H}_G$$

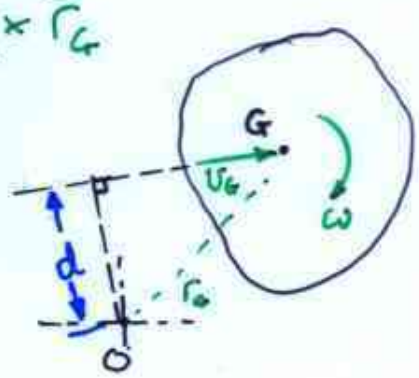
$$\int_{t_1}^{t_2} \sum M_G \, dt = H_{G_2} - H_{G_1}$$ ← {angular impulse}

Note H_G is angular momentum about an axis through the centre of mass

For an arbitrary point "O"

$$H_O = I_G \omega + m v_G d$$

$\vec{V}_G \times \vec{r}_G$



I_G: moment of inertia about G
$\vec{v}_G$: velocity of centre of mass
d: perpendicular distance from O to line of actin of $\vec{v}_G$
m: mass of body.