Rotational Mechanics Equations Comparison

Translation		**Rotation**	
position	$\vec{r}$	angular position	$\vec{\theta}$
velocity	$\vec{v} = \frac{d\vec{r}}{dt}$	angular velocity	$\vec{\omega} = \frac{d\vec{\theta}}{dt}$
acceleration	$\vec{a} = \frac{d\vec{v}}{dt}$	angular acceleration	$\vec{\alpha} = \frac{d\vec{\omega}}{dt}$
constant acceleration: $x = x_0 + v_0 t + \frac{1}{2}at^2$, $v = v_0 + at$, $v^2 = v_0^2 + 2a(x - x_0)$		constant angular acceleration: $\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2$, $\omega = \omega_0 + \alpha t$, $\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$	
2nd Law	$\Sigma\vec{F} = m\vec{a}$	2nd Law	$\Sigma\vec{\tau} = I\vec{\alpha}$
mass	m	rotational inertia	$I = \Sigma m_i r_i^2 = \int r^2\,dm$ $I = I_{CM} + Mh^2$
force	$\vec{F}$	torque	$\vec{\tau} = \vec{r} \times \vec{F} = r_\perp F = rF_\perp$
work	$W = \int \vec{F} \cdot d\vec{r}$	work	$W = \int \vec{\tau} \cdot d\vec{\theta}$
kinetic energy	$K = \frac{1}{2}mv^2$	kinetic energy	$K = \frac{1}{2}I\omega^2$
momentum	$\vec{p} = m\vec{v}$	angular momentum	$\vec{L} = I\vec{\omega}$
impulse	$\vec{J} = \int \vec{F}\,dt = \Delta\vec{p}$	angular impulse	$\vec{A} = \int \vec{\tau}\,dt = \Delta\vec{L}$

"Linking" Equations

$$s = r\theta$$
$$v = r\omega$$
$$a_\theta = r\alpha$$
$$a_r = r\omega^2$$
$$\vec{\ell} = \vec{r} \times \vec{p} = r_\perp p = rp_\perp$$