$v = \frac{ds}{dt} = \dot{s}$	$a = \frac{dv}{dt} = \dot{v} = \frac{d^2s}{ds^2} = \ddot{s}$	$v\,dv = a\,ds$	$\vec{v} = \frac{d\vec{r}}{dt}$	$\vec{a} = \frac{d\vec{r}}{dt} = \frac{d^2\vec{r}}{dt^2}$

$v = v_0 + a_c\,t$	$s = s_0 + v_0\,t + \frac{1}{2}a_c t^2$	$v^2 = v_0^2 + 2a_c\,(s - s_0)$

$\vec{v} = v\,\vec{e}_t = \rho\,\dot{\beta}\,\vec{e}_t$	$\dot{e}_t = \dot{\beta}e_n$ $\rho = \frac{\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}}}{\frac{d^2y}{dx^2}}$	$\vec{a} = a_n\vec{e}_n + a_t\vec{e}_t$ $a_n = \frac{v^2}{\rho} = \rho\dot{\beta}^2 = v\dot{\beta}$ $a_t = \dot{v} = \ddot{s}$

$\vec{r} = r\,\vec{e}_r = \rho\,\dot{\beta}\,\vec{e}_t$ $\dot{\vec{e}}_r = \dot{\theta}\vec{e}_\theta$	$\vec{v} = \dot{r}\vec{e}_r + r\dot{\theta}\vec{e}_\theta$ $\dot{\vec{e}}_\theta = -\dot{\theta}\vec{e}_r$	$\vec{a} = a_r\vec{e}_r + a_\theta\vec{e}_\theta$ $a_r = \ddot{r} - r\dot{\theta}^2$ $a_\theta = r\ddot{\theta} + 2\dot{r}\dot{\theta} = \frac{1}{r}\frac{d}{dt}(r^2\dot{\theta})$

$\vec{v} = v_r\vec{e}_r + v_\theta\vec{e}_\theta + v_\emptyset\vec{e}_\emptyset$ $v_r = \dot{R}$ $v_\theta = R\dot{\theta}cos\emptyset$ $v_\emptyset = R\dot{\emptyset}$	$\vec{a} = a_R\vec{e}_R + a_\theta\vec{e}_\theta + a_\emptyset\vec{e}_\emptyset$ $a_r = \ddot{R} - R\dot{\emptyset}^2 - R\dot{\theta}^2cos^2\emptyset$ $a_\theta = \frac{cos\emptyset}{R}\frac{d}{dt}(R^2\dot{\theta}) - 2R\dot{\theta}\dot{\emptyset}sin\emptyset$ $a_\emptyset = \frac{1}{R}\frac{d}{dt}\left(R^2\dot{\emptyset}\right) + R\dot{\theta}^2sin\emptyset cos\emptyset$

$\sum \vec{F} = m\vec{a}$	$dU = \vec{F}.d\vec{r}$	$P = \vec{F}.\vec{v}$

$U'_{1-2} = \Delta T + \Delta V_g + \Delta V_e$ $T = \frac{1}{2}mv^2$ $V_g = mgh$ $V_e = \frac{1}{2}kx^2$	$\int_{t_1}^{t_2}\sum \vec{F}\,dt = \vec{G}_2 - \vec{G}_1$ $\vec{G} = m\vec{V}$	$\int_{t_1}^{t_2}\sum \vec{M}_o\,dt = \vec{H}_{o_2} - \vec{H}_{o_1}$ $\sum \vec{M}_o = \vec{r} \times \sum \vec{F} = \vec{r} \times m\dot{\vec{v}}$ $\vec{H}_o = \vec{r} \times \vec{G}$

$\vec{v}_A = \vec{v}_B + \vec{v}_{A/B}$ $\vec{v}_{A/B} = \vec{\omega} \times \vec{r}_{A/B}$	$\vec{a}_A = a_B + \vec{a}_{A/B}$ $\vec{a}_{A/B} = (\vec{a}_{A/B})_n + (\vec{a}_{A/B})_t$ $(\vec{a}_{A/B})_n = \vec{\omega} \times (\vec{\omega} \times \vec{r}_{A/B}) = \frac{v_{A/B}^2}{r}\vec{e}_n = r\omega^2\vec{e}_n$ $(\vec{a}_{A/B})_t = \vec{\alpha} \times \vec{r}_{A/B}$
$\vec{v}_A = \vec{v}_P + \vec{v}_{rel}$	$\vec{a}_A = a_P + 2\omega \times \vec{v}_{rel} + \times \vec{a}_{rel}$

$T = \frac{1}{2}m\bar{v}^2 + \sum\left(\frac{1}{2}m_i\left\|\dot{\vec{r}}_{m_i/G}\right\|^2\right)$	$\vec{G} = m\vec{V}$
$\vec{H}_G = \sum(\vec{r}_{m_i/G} \times m_i \dot{\vec{r}}_{m_i/G})$	$\vec{H}_P = \vec{H}_G + \vec{r}_{G/P} \times m\,\vec{\bar{v}}$ $\left(\vec{H}_P\right)_{rel} = \sum(\vec{r}_{m_i/P} \times m_i \dot{\vec{r}}_{m_i/P})$

$\vec{\bar{r}} = \frac{\sum m_i \vec{r}_i}{m}$	$\sum \vec{F}_i = m\,\vec{\bar{a}}$	$\sum \vec{F}_i = \dot{\vec{G}}$

$\sum \vec{M}_o = \dot{\vec{H}}_o$	$\sum \vec{M}_P = \dot{\vec{H}}_G + \vec{r}_{G/P} \times m\,\vec{a}_G$	$\sum \vec{M}_P = \left(\dot{\vec{H}}_P\right)_{rel} + \vec{r}_{G/P} \times m\,\vec{a}_P$
$\sum \vec{M}_G = \dot{\vec{H}}_G$		

$\sum \vec{F} = m\vec{\bar{a}}$	$\sum \vec{M}_G = \bar{I}\vec{\alpha}$	
$\sum \vec{M}_o = I_o\vec{\alpha}$	$\sum \vec{M}_P = I_G\vec{\alpha} + \vec{r}_{G/P} \times m\,\vec{a}_G$	$\sum \vec{M}_P = I_P\vec{\alpha} + \vec{r}_{G/P} \times m\,\vec{a}_P$

$U = \int M\,d\theta$	$P = M\omega$

$T = \frac{1}{2}m\bar{v}^2 + \frac{1}{2}\bar{I}\omega^2$	$T = \frac{1}{2}I_o\omega^2$	$T = \frac{1}{2}I_C\omega^2$

$\vec{G} = m\vec{\bar{v}}$	$\vec{\bar{H}} = \bar{I}\vec{\omega}$

$Slender\ rod\ \bar{I} = \frac{1}{12}ml^2$	$Disk\ \bar{I} = \frac{1}{2}mr^2$	$I = \bar{I} + md^2$