SUMMARY DYNAMICS N6

SUBJECT	EQUATION	DISCUSSION
Newton's 2nd Law	$\sum_{i=1}^{n} \bar{F}_i = \sum_{i=1}^{n} m_i \bar{a}_i$	For a system of particles all forces between particles are cancelled and only external forces affect the system.
	$\sum_{i=1}^{n} \bar{r}_i \times \bar{F}_i = \sum_{i=1}^{n} \bar{r}_i \times m_i \bar{a}_i$	
Linear and Angular	$\bar{L} = \sum_{i=1}^{n} m_i \bar{v}_i$	The linear and angular moment are summative.
Angular Momentum	$\bar{M}_0 = \sum_{i=1}^{n} \bar{r}_i \times m_i \bar{v}_i$	
	$\Sigma \bar{F} = \frac{d\bar{L}}{dt}$	
	$\Sigma \bar{M}_0 = \frac{d\bar{M}_0}{dt}$	
Motion of	$\Sigma \bar{F} = m\bar{a}$	For a system of particles the C. M. moves as though all forces were concentrated at that point.
	$\Sigma \bar{M}_G = \frac{d\bar{H}'_G}{dt}$	The sum of the moments about the center of a system is equal to the angular momentum as calculated in the centroidal (primed) system or the fixed (non-primed) system.
	$= \frac{d\bar{H}_G}{dt}$	
Energy	$T = 1/2\ mv_g^2 + 1/2 \sum_{i=1}^{n} m_i v_i^2$	The kinetic energy equals the K. E. of the CM plus the kinetic energy relative to the centroidal reference frame.
	$E_1 + {}_1u_2 = E_2 + {}_1L_2$	Energies are calculating for all particles and added algebraically.

Linear Momentum	$\overline{L}_1 = \Sigma \int_1^2 \overline{F} dt = \overline{L}_2$	Impulses are calculated for all particles and forces.
Angular Momentum	$\overline{H}_{01} + \int_1^2 \overline{M}_0 \, dt = \overline{H}_{02}$	