$$x_{CM} = \frac{\sum_{i=1}^{n} m_i x_i}{\sum_{i=1}^{n} m_i}$$

$$y_{CM} = \frac{\sum_{i=1}^{n} m_i y_i}{\sum_{i=1}^{n} m_i}$$

$$\vec{\boldsymbol{r}} = x\hat{\boldsymbol{\imath}} + y\hat{\boldsymbol{\jmath}} + z\hat{\boldsymbol{k}}$$

$$M = \sum_{i=1}^{n} m_i$$

$$\vec{\boldsymbol{r}}_{CM} = \frac{\sum_{i=1}^{n} m_i \vec{\boldsymbol{r}}_i}{\sum_{i=1}^{n} m_i}$$

$$v_{CM-x} = \frac{m_1 v_{1x} + m_2 v_{2x} + \cdots}{m_1 + m_2 + \cdots}$$

$$v_{CM-y} = \frac{m_1 v_{1y} + m_2 v_{2y} + \cdots}{m_1 + m_2 + \cdots}$$

$$\vec{\boldsymbol{v}}_{CM} = \frac{\sum_{i=1}^{n} m_i \vec{\boldsymbol{v}}_i}{\sum_{i=1}^{n} m_i} = \frac{\vec{\boldsymbol{P}}}{M}$$

$$\vec{\boldsymbol{P}} = M\vec{\boldsymbol{v}}_{CM} = \sum_{i=1}^{n} m_i \vec{\boldsymbol{v}}_i$$

$$\vec{\boldsymbol{a}}_{CM} = \frac{\sum_{i=1}^{n} m_i \vec{\boldsymbol{a}}_i}{M}$$

$$\sum \vec{\boldsymbol{F}} = \frac{d\vec{\boldsymbol{p}}}{dt}$$

$$\sum \vec{\boldsymbol{F}} = \sum \vec{\boldsymbol{F}}_{ext} + \sum \vec{\boldsymbol{F}}_{int} = M\vec{\boldsymbol{a}}_{CM}$$

$$\sum \vec{\boldsymbol{F}}_{ext} = M\vec{\boldsymbol{a}}_{CM}$$

Si, $\sum \vec{\boldsymbol{F}}_{ext} = 0 \rightarrow \Delta\vec{\boldsymbol{P}} = 0$

$$\vec{\boldsymbol{L}} = \vec{\boldsymbol{r}} \times \vec{\boldsymbol{p}} = \vec{\boldsymbol{r}} \times m\vec{\boldsymbol{v}}$$

$$K_1 = \frac{1}{2} m_1 v_1^2 = \frac{1}{2} pv$$

$$K_{sist} = \sum_{i=1}^{n} K_i$$