

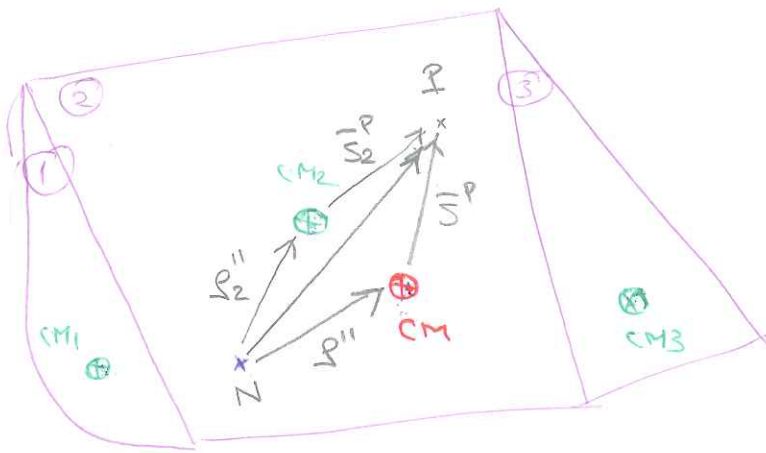
$$\int_m \underline{s}''^{PT} \cdot \underline{s}''^P d\mu(P)$$

$$= \int_m (\underline{r}'' + \underline{s}^P)^T (\underline{r}'' + \underline{s}^P) d\mu(P)$$

$$= \int_m \underline{r}''^T \cdot \underline{r}'' d\mu(P) + 2 \int_m \underline{r}''^T \underline{s}^P d\mu(P) + \int_m \underline{s}^{PT} \cdot \underline{s}^P d\mu(P)$$

$$= \underline{r}''^T \cdot \underline{r}'' \cdot \underbrace{\int_m d\mu(P)}_m + 2 \underline{r}''^T \underbrace{\int_m \underline{s}^P d\mu(P)}_0 + \underbrace{\int_m \underline{s}^{PT} \cdot \underline{s}^P d\mu(P)}_{\bar{J}}$$

$$= \bar{J} + m \cdot \underline{r}''^T \cdot \underline{r}''$$



$$\int (\underline{r}'' + \underline{s}^P) dm(\rho) = \int (\underline{r}_1'' + \underline{s}_1^P) dm_1(\rho) + \int (\underline{r}_2'' + \underline{s}_2^P) dm_2(\rho) + \int (\underline{r}_3'' + \underline{s}_3^P) dm_3(\rho)$$

$\boxed{m}$   
 $m_1 + m_2 + m_3$

$$\text{LHS} = \underline{r}'' \int dm(\rho) + \int \underline{s}^P dm(\rho) = \underline{r}'' \cdot m$$

$$\text{RHS} = \underline{r}_1'' \cdot m_1 + \int \underline{s}_1^P dm_1(\rho) + \underline{r}_2'' \cdot m_2 + \int \underline{s}_2^P dm_2(\rho) + \dots$$

$$\underline{r}'' \cdot m = \sum_{i=1}^K \underline{r}_i'' \cdot m_i \Rightarrow \boxed{\underline{r}'' = \frac{1}{m} \sum_{i=1}^K \underline{r}_i'' \cdot m_i}$$