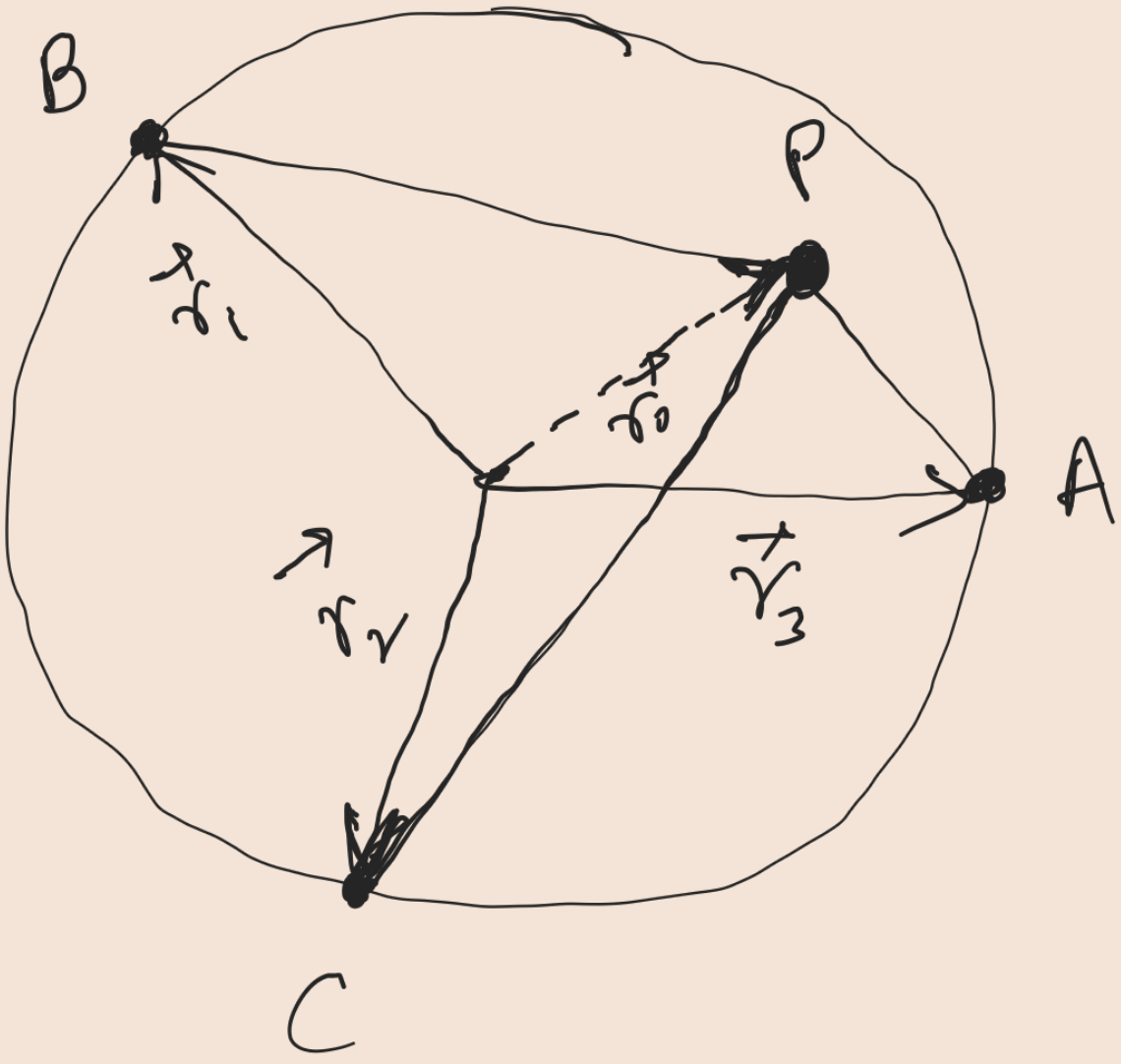


Since ABC are points of equilateral triangle, $\vec{r}_1 + \vec{r}_2 + \vec{r}_3 = 0$. So, force on particle 'P'

$$= k\left[\left(\vec{r}_1 - \vec{r}_0\right) + \left(\vec{r}_3 - \vec{r}_0\right) + \left(\vec{r}_2 - \vec{r}_0\right)\right]$$

$= (-3k\vec{r}_0)$.

acc' of particle 'P'

$= 3kr_0/m$. Acc'

of ring centre $= \frac{3kr_0}{\eta m}$.

So, acc' of particle

wrt ring centre is

$\frac{3kr_0}{m}\left(\frac{\eta+1}{\eta}\right)$. Hence,

$\omega^2 = \frac{3k(1+\eta)}{\eta m}$.

Hence, the time period of the oscillatory motion will be

$$2\pi\sqrt{\frac{\gamma m}{3k(\gamma+1)}}$$

. Also, the equations of motion can be easily obtained by assuming the origin to be shifted from the mean position.