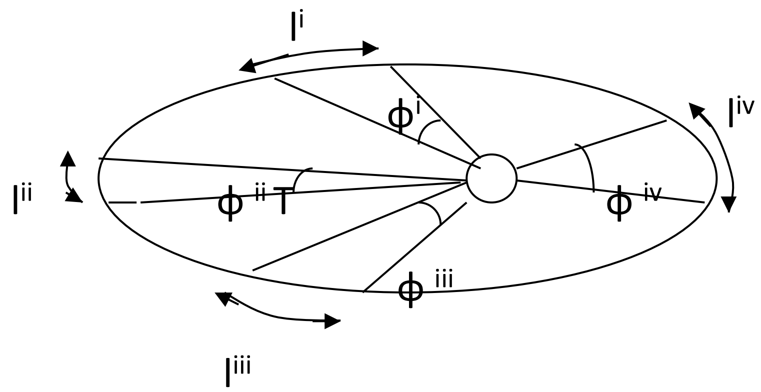
Now, keeping on the study :

Through the following figure I see that



The different slices of the pie are the fragments of the curve traveled in the same "lapse" of time, and the area of each one is constant (otherwise the orbit would end up collapsing or losing its shape: logical).

Knowing that the “l” are each equal to the Radius multiplied by the corresponding angle : d ϕ

In constant time periods the area is constant even though R and ϕ vary .

And that the area, operating with differential or infinitesimal spaces , is the vector product of:

S= $\grave{A}rea = [\|\vec{R}\| \times \|\vec{dl}\|]/2$

we know that $\vec{R}$ and $\vec{dl}$ are perpendicular.

If we replace $\vec{dl}$ by $R \times d\phi$ and this in turn by $d\phi = w.dt$,

$\|\grave{A}rea\| = \|\vec{R}\|.|R|.|w|.\|dt\|/2$

$v = \omega_x R$

Furthermore, the angular momentum $\vec{L}$ is the same at all points in the orbit, since if it were not, it would also end up collapsing or losing its shape.

$\vec{L} = m.\vec{v}.\vec{r}$ and $L^2 = 2.i$E where i=mr^2 and E is the energy that we can deduce from the orbiting body.

When r increases, the speed decreases

Let's assume that $\|\vec{R}\| = |R|$

$\|\grave{A}rea\| / \|dt\|$ = $|R|$.v/2=$|R|.\frac{|L|}{2.m.|R|}$=$\frac{\sqrt{2.I.E}}{2m}$