The Mechanics' Contradiction

I proved in my report "Mémoire en physiques" that:

We can't use \( \sin \gamma = d\gamma \) and \( \cos \gamma = \sqrt{1-d\gamma^2} \).

Now, if we use \( \sin \gamma = d\gamma \) and \( \cos \gamma = \sqrt{1-d\gamma^2} \) then:

\[
e = 1 - \sqrt{1-d\gamma^2} \Rightarrow e^2 = 2 - 2d\gamma^2 - 2\sqrt{1-d\gamma^2}
\]

then:

\[
e^2 + h^2 = e^2 - 2\sqrt{1-d\gamma^2} = d\gamma^2
\]

hence:

\[
e = d\gamma^2 + 2\sqrt{1-d\gamma^2} \Rightarrow 4 = 4d\gamma^4 + 4d\gamma^2
\]

Consequently:

\[
n = \frac{d\gamma^2}{4} + \sqrt{1-d\gamma^2} \Rightarrow (1 - \frac{d\gamma^2}{4})^2 = 1 - d\gamma^2
\]

We conclude that:

\[
1 + \frac{d\gamma^4}{16} - \frac{d\gamma^2}{2} = 1 - d\gamma^2 \Rightarrow d\gamma^2 = -8
\]

We proved that: \( \sin \gamma = d\gamma \) and \( \cos \gamma = \sqrt{1-d\gamma^2} \) \( \Rightarrow d\gamma^2 = -8 \) which is an impossible result.

We finally conclude that instead of using \( \sin \gamma = d\gamma \) and \( \cos \gamma = \sqrt{1-d\gamma^2} \), we should use, to avoid contradictions, \( \cos \gamma = 1 - \frac{d\gamma^2}{2} \Rightarrow \sin \gamma = d\gamma \sqrt{1-d\gamma^2} \) which is explained in my work: "Mémoire en physiques" with the correct results.
The real time at the satellite:
(the case of the GPS system satellites)

* When the speed \( v \) of the satellite is constant \( v = k_1 \), and the initial altitude of the satellite is \( h = k_2 \), then we have by using my derivation in physics:

\[
\frac{d\mathbf{r}}{dt} = \frac{d\mathbf{r}(t)}{dt} = \frac{d^2\mathbf{r}}{dt^2} \cdot \mathbf{e}_i \cdot \mathbf{e}_j \cdot \mathbf{e}_k + \mathbf{r}(t) \cdot \mathbf{e}_i \cdot \mathbf{e}_j \cdot \mathbf{e}_k \cdot \mathbf{e}_l \cdot \mathbf{e}_m \cdot \mathbf{e}_n \cdot \mathbf{e}_o
\]

\( M \) stands for the position of the satellite which has a circular orbit, so we must have:

\[
\frac{d\mathbf{r}(t)}{dt} = v \cdot \frac{d\mathbf{r}}{dt} \cdot \mathbf{e}_i \cdot \mathbf{e}_j \cdot \mathbf{e}_k \cdot \mathbf{e}_l \cdot \mathbf{e}_m \cdot \mathbf{e}_n \cdot \mathbf{e}_o \rightarrow \mathbf{r}(t) = e^{\frac{v}{h}} \cdot \mathbf{r}_0 + \ln h = h \cdot e^{\frac{v}{h}} \cdot \mathbf{r}_0
\]

* Since \( v \) is constant then: \( \mathbf{r}(t) = \frac{d\mathbf{r}}{dt} \cdot \frac{\sqrt{1 - \frac{d\theta}{dt}}}{h} = V \leftarrow \frac{d\theta}{dt} = e^{\frac{v}{h}} \cdot \frac{\frac{d\theta}{dt}}{e^{\frac{v}{h}}}
\]

\[
\leftarrow \frac{d\theta}{dt} = \frac{V}{h \cdot \sqrt{1 - \frac{d\theta}{dt}}}
\]

Remarks:

1) \( \mathbf{r}(t) \) increases because of the speed of the launching of the satellite.
2) \( V = 0 \) at the position where the satellite started orbiting after being launched.
3) \( d\theta \) is the smallest variation of angle that we can detect, and \( dt \) is the time needed for that variation.
4) \( d\theta \) is always positive so we consider \( \theta \) always positive \( (\theta > 0) \).

* Since \( d\theta \) is constant but \( dt \) not constant, we conclude that:

\[
dt = \frac{\frac{V}{h} \cdot \sqrt{1 - \frac{d\theta}{dt}}}{e^{\frac{v}{h}}} \cdot e^{\frac{v}{h}}
\]

Consequently, \( dt \) really depends on the angle \( \theta \) of the satellite, and that angle \( \theta \) is always increasing.

Conclusion:

* The real time needed for a satellite to make one lap around the earth is:

\[
\Delta T = \sum_{i=1}^{K} \frac{\Delta t}{V} \cdot \sqrt{1 - \frac{d\theta}{dt}} \cdot e^{\frac{v}{h}} \cdot e^{\frac{v}{h}} \cdot e^{\frac{v}{h}} = \sum_{i=1}^{K} e^{\frac{v}{h}} \cdot d\theta
\]

with \( K = \left[ \frac{\pi V}{d\theta} \right] \) and \( \Delta t = \frac{h \cdot d\theta}{V} \cdot 2\pi \cdot v \cdot e^{\frac{v}{h}} \cdot e^{\frac{v}{h}} \cdot e^{\frac{v}{h}} \) with \( d\theta = 2\pi - K \cdot d\theta \)