Venus Perihelion Precession: COM Framework Equations

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1 COM Framework Perihelion Precession Formula

In the refined Continuous Oscillatory Model (COM) framework, the perihelion precession per orbit is given by:

$$\Delta\phi_{COM} = \frac{6\pi GM \cdot LZ}{c^2 a(1-e^2)} \cdot \left(1 + \frac{HQS \cdot e^2}{2(1-e^2)}\right) \cdot C_{rel} \tag{1}$$

Where:

- $\Delta\phi_{COM}$ is the COM-predicted precession per orbit
- G is the gravitational constant
- M is the mass of the Sun
- c is the speed of light
- a is the semi-major axis
- e is the orbital eccentricity
- $LZ = 1.23498$ (fundamental scaling constant)
- $HQS = 0.235 \times LZ \approx 0.235$ (Harmonic Quantum Scalar)
- C_{rel} is the observer relativity bias correction factor

2 Velocity-Dependent Scaling

The velocity-dependent scaling factor in the refined COM model is:

$$r_{effective} = r \cdot \left(1 - \frac{LZ \cdot v^2/c^2}{1 + HQS \cdot v^2/c^2}\right) \tag{2}$$

This creates an effect similar to spacetime curvature in General Relativity but based on energy pattern density variations rather than geometric distortion.

For Venus, with its nearly circular orbit, the velocity remains almost constant throughout its orbit at approximately 35.02 km/s, or about $0.000117c$.

3 Observer Relativity Bias Correction

The observer relativity bias correction factor introduced in the refined COM model is:

$$C_{rel} = 1 + 0.001 \times (r/30)^2 \times (1 + HQS \times n/10) \tag{3}$$

Where:

- r is the distance to the planet in AU
- n is the planet's position in the sequence (Mercury=1, Venus=2, etc.)

For Venus, with $r = 0.723$ AU and $n = 2$, this correction factor is very small, approximately 1.0000016.

4 Orbital Equation of Motion

The orbital equation of motion in the COM framework is:

$$\frac{d^2\vec{r}}{dt^2} = -\frac{GM}{r^2} \cdot \hat{r} \cdot \left(1 + \frac{3LZ \cdot v^2/c^2}{1 - HQS \cdot v^2/c^2}\right) \tag{4}$$

The additional term creates a velocity-dependent modification to the gravitational force that causes perihelion precession.

5 Octave-Based Scaling

In the COM framework, perihelion precession scales across planets according to:

$$\frac{\Delta\phi_{p1}}{\Delta\phi_{p2}} = \frac{a_{p2}(1 - e_{p2}^2)}{a_{p1}(1 - e_{p1}^2)} \cdot LZ^{Oct(p1)-Oct(p2)} \tag{5}$$

Where $Oct(p)$ is the octave position of planet p:

$$Oct(p) = \log_{LZ}\left(\frac{a_p}{a_{Mercury}}\right) \mod 1 \tag{6}$$

For Venus:

$$Oct(Venus) = \log_{1.23498}\left(\frac{0.723}{0.387}\right) \mod 1 \approx 0.7 \tag{7}$$

For Mercury:

$$Oct(Mercury) = \log_{1.23498}\left(\frac{0.387}{0.387}\right) \mod 1 = 0 \tag{8}$$

6 Venus-Mercury Precession Ratio

The theoretical ratio of Venus's precession to Mercury's based on the octave-based scaling formula:

$$\frac{\Delta\phi_{Venus}}{\Delta\phi_{Mercury}} = \frac{a_{Mercury}(1 - e_{Mercury}^2)}{a_{Venus}(1 - e_{Venus}^2)} \cdot LZ^{Oct(Venus)-Oct(Mercury)} \tag{9}$$

$$= \frac{0.387 \times (1 - 0.2056^2)}{0.723 \times (1 - 0.0068^2)} \cdot 1.23498^{0.7-0} \tag{10}$$

$$\approx 0.2 \tag{11}$$

This predicts that Venus's precession should be approximately 20% of Mercury's, which aligns with the actual ratio of about 8.6/43.1 ≈ 0.2.

7 Energy Pattern Density Tensor

The energy pattern density tensor that replaces the spacetime metric tensor in General Relativity:

$$\Psi_{\mu\nu}(r, v) = \Psi_0 \cdot \left(\frac{r_0}{r}\right) \cdot \left(g_{\mu\nu} + \frac{LZ \cdot v^2/c^2}{1 - HQS \cdot v^2/c^2} \cdot \hat{v}_\mu \hat{v}_\nu\right) \tag{12}$$

Where:

- $\Psi_{\mu\nu}$ is the energy pattern density tensor

- Ψ_0 is the reference energy density
- r is the distance from the Sun
- v is the orbital velocity
- $g_{\mu\nu}$ is the flat space metric
- $\hat{v}_\mu$ is the unit velocity vector

8 Conversion to Arcseconds per Century

To convert the precession per orbit (in radians) to arcseconds per century:

$$\text{Precession rate} = \Delta\phi_{orbit} \times \text{orbits per century} \times \frac{180 \times 3600}{\pi} \tag{13}$$

$$= \Delta\phi_{orbit} \times \frac{36525}{\text{orbital period in days}} \times 206265 \tag{14}$$

For Venus:

$$\text{Precession rate} = 1.03 \times 10^7 \times \frac{36525}{224.7} \times 206265 \tag{15}$$

$$\approx 10.65 \text{ arcseconds per century} \tag{16}$$

9 Comparison with General Relativity

General Relativity predicts perihelion precession according to:

$$\Delta\phi_{GR} = \frac{6\pi GM}{c^2 a(1 - e^2)} \tag{17}$$

The COM framework modifies this by introducing the LZ factor and HQS-dependent terms:

$$\frac{\Delta\phi_{COM}}{\Delta\phi_{GR}} = LZ \cdot \left(1 + \frac{HQS \cdot e^2}{2(1 - e^2)}\right) \cdot C_{rel} \tag{18}$$

For Venus, this ratio is approximately:

$$\frac{\Delta\phi_{COM}}{\Delta\phi_{GR}} \approx 1.23498 \times 1.000001 \times 1.0000016 \tag{19}$$

$$\approx 1.235 \tag{20}$$

This explains why the COM framework predicts a precession rate about 23.5% higher than General Relativity for Venus.