DEFINITIVE PROOF SECTION

DIFFERENTIATION OF THE PRECESSING ELLIPSE

In plane polar coordinates (r, θ) the precessing ellipse is:

$$r = \frac{\alpha}{1 + \epsilon \cos(x\theta)} \quad -(1)$$

where α, ϵ and x are constants. We wish to find $dr / d\theta$, and compare the result with Einstein's theory of general relativity (EGR). The latter claims to give eq. (1), which is the experimental result - the orbit of a planet.

The rule of differentiation is to differentiate the numerator, multiply by the denominator, subtract from this the differential of the denominator multiplied by the numerator, and divide by the square of the denominator. In mathematical notation, if:

$$y = f(x) = \frac{f_1(x)}{f_2(x)} \quad -(2)$$

then

$$\frac{dy}{dx} = (f_1' f_2 - f_2' f_1) / f_2^2 \quad -(3)$$

where

$$f_1' = df_1 / dx \quad -(4)$$

$$f_2' = df_2 / dx \quad -(5)$$

2.) Eq. (1) is:

$$r = f(\theta) = f_1(\theta) / f_2(\theta) \quad -(6)$$

where

$$f_1(\theta) = \alpha \quad -(7)$$

$$f_2(\theta) = 1 + \epsilon \cos(x\theta). \quad -(8)$$

So

$$f_1'(\theta) = \frac{d\alpha}{d\theta} = 0 \quad -(9)$$

$$f_2'(\theta) = -\epsilon x \sin(x\theta) \quad -(10)$$

because:

$$\frac{d}{d\theta} \cos(x\theta) = -x \sin(x\theta) \quad -(11)$$

So:

$$\frac{dr}{d\theta} = \frac{0 + \epsilon x \alpha \sin(x\theta)}{(1+\epsilon\cos(x\theta))^2} \quad -(12).$$

$$= \frac{\epsilon x \alpha \sin(x\theta)}{(1+\epsilon\cos(x\theta))^2}$$

$$= \left(\frac{\epsilon x}{\alpha}\right)\left(\frac{\alpha}{1+\epsilon\cos(x\theta)}\right)^2 \sin(x\theta)$$

$$\boxed{\frac{dr}{d\theta} = \frac{\epsilon x}{\alpha} r^2 \sin(x\theta)} \quad -(13)$$

This is the experimental result.

From eq. (1):

3)

$$1 + \epsilon \cos(x\theta) = \frac{\alpha}{r} \quad -(14)$$

So

$$\cos(x\theta) = \frac{1}{\epsilon}\left(\frac{\alpha}{r} - 1\right). \quad -(15)$$

Now use:

$$\cos^2(x\theta) + \sin^2(x\theta) = 1 \quad -(16)$$

so

$$\sin(x\theta) = \left(1 - \cos^2(x\theta)\right)^{1/2} \quad -(17)$$

i.e.

$$\sin^2(x\theta) = 1 - \frac{1}{\epsilon^2}\left(\frac{\alpha}{r} - 1\right)^2 \quad -(18)$$

$$= 1 - \frac{1}{\epsilon^2}\left(\frac{\alpha^2}{r^2} - 2\frac{\alpha}{r} + 1\right)$$

$$\boxed{\sin^2(x\theta) = \left(1 - \frac{1}{\epsilon^2}\right) + \frac{2\alpha}{\epsilon^2}\frac{1}{r} - \left(\frac{\alpha}{\epsilon}\right)^2\frac{1}{r^2}} \quad -(19)$$

This is the experimental result. Here:

2α = right latitude

ϵ = ellipticity

x = precession constant.

The experimental result is the sum of three terms, a constant, a term in $1/r$, and a term in $1/r^2$. The constants x, α and ϵ are observed in astronomy.

Einstein's Theory of General Relativity.

This gives:

$$\frac{dr}{d\theta} = r^2\left(\left(\frac{1}{b^2} - \left(1 - \frac{r_0}{r}\right)\left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right)\right)^{1/2} \quad -(20)$$

Here:

$$a = \frac{L}{mc}, \quad b = \frac{cL}{E}, \quad r_0 = \frac{2MG}{c^2}, \quad -(21)$$

where:

m = mass of attracted planet
M = mass of the sun
c = vacuum speed of light
G = Newton's constant
E = total energy
L = total angular momentum.

It is claimed that eq. (20) gives eq. (1) very precisely. This claim is not correct. If it were correct then from eqs (13) and (20):

$$\left(\frac{xE}{d}\right)^2 \sin^2(x\theta) =? \frac{1}{b^2} - \left(1 - \frac{r_0}{r}\right)\left(\frac{1}{a^2} + \frac{1}{r^2}\right) \quad -(22)$$

where ? indicates that something is wrong.

4) From eqs (22):

$$\boxed{\sin^2(x\theta) = ? \left(\frac{\alpha}{x\epsilon}\right)^2 \left(\frac{1}{b^2} - \frac{1}{a^2} + \frac{r_0}{a}\frac{1}{r} - \frac{1}{r^2} + \frac{r_0}{r^3}\right) \quad \text{from EGR} \qquad -(23)}$$

This is not the experimental result (19) at all.

Not only is EGR wrong, it is not even approximately right, because eq. (23) is the sum of four terms, a constant, a term in $1/r$, a term in $1/r^2$ and a term in $1/r^3$.

If for example the terms in $1/r^2$ are compared from eqs. (19) and (23), then:

$$\left(\frac{\alpha}{\epsilon}\right)^2 = ? \left(\frac{\alpha}{x\epsilon}\right)^2 \qquad -(24)$$

which is true if and only if:

$$x = 1 \qquad -(25)$$

in which case there is no precession. The EGR theory fails to produce the precession it set out to describe, reductio ad absurdum.