218(6): Straightforward Refutation of EGR

Consider the Lagrangian equation:

$$\frac{d^2}{d\theta^2}\left(\frac{1}{r}\right) + \frac{1}{r} = -\frac{mr^2}{L^2}F(r) \quad -(1)$$

Here L is the constant total angular momentum, m the orbiting mass, and $F(r)$ the force between m and the attracting mass M, in the plane polar coordinates (r, θ).

As shown in note 218(5) any orbital function can be expressed as:

$$r = f(\theta) = \frac{\alpha}{1 + \epsilon \cos(x(\theta)\theta)} \quad -(2)$$

which is a fractal conical section in which α is the half right latitude, ϵ is the ellipticity, and x is a function of the precession factor x is a function of the polar angle θ.

Einsteinian general relativity (EGR) claims that:

$$\frac{d^2}{d\theta^2}\left(\frac{1}{r}\right) + \frac{1}{r} = \frac{Gm^2M}{L^2} + \frac{3GM}{c^2}\frac{1}{r^2} \quad -(3)$$

(J.B. Marion and S.T. Thornton, "Classical Dynamics of Particles and Systems" (Harcourt Brace, 1988, 3rd edition, page 268, eq. (7.74))). EGR also claims that x is a constant. For

2) the planet Mercury for example:

$$2\pi(x-1) = 43'' \text{ per century} \quad -(4)$$

which is a constant.

It is obvious that these claims of EGR are then not true, because if x were a constant

$$r = \frac{\alpha}{1+\epsilon\cos(x\theta)} \quad -(5)$$

and from eqs. (1) and (5):

$$F = -\frac{mMGx^2}{r^2} + (x^2-1)\frac{L^2}{mr^3}. \quad -(6)$$

whereas the force needed to produce eq. (3) is:

$$F = -\frac{mMG}{r^2} - \frac{3MGL^2}{mc^2r^4} \quad -(7)$$

as in UFT193, eq. (10).

The $x(\theta)$ needed to produce the EGR force law (7) can be calculated straightforwardly with elementary algebra. The latter can be done by computer.

From eq. (2):

$$\frac{d^2}{d\theta^2}\left(\frac{1}{r}\right) = -\frac{\epsilon}{\alpha}\left(\frac{d^2y}{d\theta^2}\sin y + \left(\frac{dy}{d\theta}\right)^2\cos y\right) \quad -(8)$$

where

$$y = x(\theta)\theta \quad -(9)$$

3) From eqs. (3) and (8):

$$\frac{\epsilon}{\alpha}\left(\frac{d^2y}{d\theta^2}\sin y + \left(\frac{dy}{d\theta}\right)^2\cos y\right) = \frac{1}{r} - \frac{Gm^2M}{L^2} - \frac{3GM}{c^2}\frac{1}{r^2} \qquad -(10)$$

where:

$$\frac{dy}{d\theta} = \frac{d(x\theta)}{d\theta} = x + \frac{dx}{d\theta} \qquad -(11)$$

$$\frac{d^2y}{d\theta^2} = 2\frac{dx}{d\theta} + \theta\frac{d^2x}{d\theta^2} \qquad -(12)$$

In general eq. (10) is a complicated second order differential in $y = \theta x(\theta)$. This is a difficult numerical problem, but it is already clear that x is not a constant as claimed in the Einstein theory.

If x were a constant then eq. (10) reduces to:

$$\frac{Gm^2M}{L^2} + \frac{3GM}{c^2r^2} = \frac{1}{r} \mp \frac{\epsilon x^2}{\alpha}\cos(x\theta) \qquad -(13)$$

i.e.

$$\frac{Gm^2M}{L^2} + \frac{3GM}{c^2\alpha^2}\left(1+\epsilon\cos(x\theta)\right)^2 = \frac{1}{\alpha}\left(1+\epsilon\cos(x\theta)\right) \mp \frac{\epsilon x^2}{\alpha}\cos(x\theta) \qquad -(14)$$

or

$$\frac{Gm^2M}{L^2} + \frac{3GM}{c^2\alpha^2} - \frac{1}{\alpha} = \left(\frac{\epsilon}{\alpha}\left(1\mp x^2\right) - \frac{6GM\epsilon}{c^2\alpha^2}\right)\cos(x\theta) - \frac{3GM\epsilon^2}{c^2\alpha^2}\cos^2(x\theta) \qquad -(15)$$

4) This is a reductio to absurdity because the left hand side is a constant and the right hand side is a variable. The equation is of the type:

$$A\cos^2(x\theta) + B\cos(x\theta) + C = 0 \quad -(16)$$

where:

$$A = \frac{3GM\epsilon^2}{c^2 d^2}, \quad -(17)$$

$$B = \frac{\epsilon}{d}\left(1 - x^2\right) - \frac{6GM\epsilon}{c^2 d^2} \quad -(18)$$

$$C = \frac{Gm^2 M}{L^2} + \frac{3GM}{c^2 d^2} - \frac{1}{d} \quad -(19)$$

so

$$\cos(x\theta) = \frac{1}{2A}\left(-B \pm \left(B^2 - 4AC\right)^{1/2}\right) \quad -(20)$$

which would mean that $\cos(x\theta)$ could only have two values. Since x is a constant, θ could only take two values, reductio ad absurdum