227(2): Criticism of the Einstein Claim to have Evaluated Perihelion Precession

Setting aside other errors, Einstein had to integrate:

$$\phi = \int_{x_1}^{x_2} \frac{dx}{\left(\alpha(x-x_1)(x-x_2)(x-x_3)\right)^{1/2}} \quad -(1)$$

where

$$x_1 = \frac{1}{r_1}, \quad x_2 = \frac{1}{r_2}, \quad x_3 = \frac{1}{r_3}. \quad -(2)$$

Using the Wolfram online integrator this integral is:

$$\phi = \frac{2(x-x_1)^{3/2}\left(\frac{x-x_2}{x-x_1}\right)^{1/2}\left(\frac{x-x_3}{x-x_1}\right)^{1/2} F\left(\sin^{-1}\left(\frac{x_2-x_1}{x-x_1}\right)^{1/2} \middle| \frac{x_1-x_3}{x_1-x_2}\right)}{(x_2-x_1)^{1/2}\left(\alpha(x-x_1)(x-x_2)(x-x_3)\right)^{1/2}} \quad -(3)$$

where $F(a|b)$ is the elliptical integral of the first kind. In eq. (1):

$$x = \frac{1}{r} \quad -(4)$$

Therefore ϕ can be plotted against r from eq. (3) without any approximation. This immediately gives the true Einstein orbit.

As shown by Vankov, Einstein used

2) the approximations:

$$\left(-\alpha(x-x_1)(x-x_2)(x_3-x)\right)^{-1/2} \quad -(5)$$

$$\sim \frac{1}{\left(-(x-x_1)(x-x_2)\right)^{1/2}} + \frac{\alpha(x_1+x_2+x)}{2\left(-(x-x_1)(x-x_2)\right)^{1/2}}$$

and a in Vankov's Eq. (3.7):

$$r(\theta) = \frac{r_0}{1+\epsilon\cos(\omega\theta)} \quad -(6)$$

However eq. (6) is identical in structure with:

$$r = \frac{\alpha}{1+\epsilon\cos(x\theta)} \quad -(7)$$

and the UFT papers show that the force law needed for eq. (7) is not the Einstein force law..

It is also obvious that eq. (5) is a rough approximation because it uses:

$$\frac{1}{\alpha} = x_1 + x_2 + x_3 \quad -(8)$$

Computer algebra can check whether Eq. (5) gives any kind of sensible result, using eq. (8).