FAILURE OF THE FUNDAMENTALS OF EINSTEINIAN GENERAL RELATIVITY.

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ABSTRACT

The incorrectness is demonstrated simply and straightforwardly of the basic claim of Einsteinian general relativity, that the so called "Schwarzschild" metric produces a precessing ellipse. The simplest type of lagrangian dynamics is sufficient to show that this claim cannot be true. It is argued that there is no general force law in cosmology, each system has its own lagrangian force law. Light bending and time delay due to gravitation are developed in terms of simple lagrangian dynamics, and this method is preferred to general relativity by Ockham's Razor.

Keywords: ECE theory, lagrangian dynamics, basic incorrectness of Einsteinian general relativity.

UFT 193

1. INTRODUCTION

In this series of papers developing ECE theory {1 - 10} it has been shown that Einsteinian general relativity is meaningless and riddled with fundamental errors. The principles of Einstein Cartan Evans (ECE) unified field theory have been used to begin the task of suggesting a new cosmology based on the antisymmetric connection. Einsteinian general relativity (EGR) has been heavily criticised for almost as long as it has existed, and is thoroughly obsolete. Not only is the subject riddled with errors, but also with poor historical scholarship. The most glaring mis attribution is the so called "Schwarzschild metric", which is a fabrication, and is not due to Schwarzschild. In historical fact {11, 12} the latter wrote to Einstein on Dec. 22nd 1915 to criticise the latter's claim to have calculated the precession of the perihelion. Schwarzschild pointed out that the calculation was incorrect and genuine scholarship has found that Schwarzschild was correct {11}. There are doubts {11, 12} concerning Einstein's personal integrity as a scientist, because he was under pressure to produce a result from general relativity. At that time very few accepted the theory.

Later the Einstein field equation was criticised by Bauer, Schroedinger, Eddington, Levi-Civita, Dirac, Vigier and many others. In UFT 122 ff of this series (www.aias.us) it has been shown that the field equation is meaningless because of its use of an incorrect Christoffel connection. It is very easy to show that the connection is antisymmetric as in UFT 137, and not symmetric as in the Einstein field equation of 1915. In UFT 190 and 192 of this series, EGR was further criticised in other ways and new types of cosmology suggested. In Section 2 of this paper, the well known {13, 14} Euler Lagrange equations of any orbit in a plane are used to show that the force law of a precessing ellipse is the sum of an inverse square and inverse cube in the radial coordinate r. This result can be arrived at using the most elementary methods of lagrangian dynamics. The incorrect claim of

EGR is that the precessing ellipse is due to the sum of inverse square and inverse fourth terms in r. Exactly the same lagrangian methods are used in EGR {13}, which is therefore irretrievably incorrect and must be discarded. The claims of EGR to have described light deflection and time delay due to gravitation were heavily criticised in UFT 150 and 155, and these claims are complete nonsense. The lagrangian method is used in Section 2 of this paper to produce simpler theories of light bending and time delay due to gravitation. Furthermore, it is shown in Section 2 that there cannot be a universal law of gravitation as proposed by Hooke and communicated to Newton in the seventeenth century. The Newtonian gravitational law produces a static elliptical orbit, but the observed orbit in the solar system is a precessing ellipse. It is known now that the precessing ellipse is not due to EGR, which is well known to fail completely in an object such as a whirlpool galaxy. Dark matter has never been observed, and is a gross fallacy, big bang never occurred, and black holes do not exist. By Ockham's Razor therefore the description of cosmology by simple lagrangian dynamics is preferred. The lagrangian method is straightforward, it begins with the analytical function of the orbit, obtained directly from observation. Each orbit has its force law obtained from the two Euler Lagrange equations of any planar orbit {13, 14}. There is no universal force law that describes all orbits.

In Section 3 the lagrangian cosmology is illustrated with examples such as the binary pulsar, and it is also demonstrated numerically that the force law of EGR cannot produce a stable precessing ellipse, it produces an unstable result that either shrinks or expands the orbit, and also modulates the orbit with other motions that are never observed. The analytical methods used in EGR {13, 14} are therefore incorrect, they depend on false approximations. The actual analytical result of the EGR force law cannot be found, but in a rough approximation {13}, it is a precessing ellipse modulated by a motion that is not in fact observed. This obviously erroneous result has been discarded for a century in a wholly unscientific manner. Therefore it is impossible for Einstein to have described the precession of the planet Mercury on 22nd Nov. 1915 {11, 12}. According to scholarship {11} this was his only paper on the subject, and caused a century of pseudoscience and endless confusion. Using the elegant eighteenth century methods of Lagrange brings us back on course to science.

2. LAGRANGIAN FORCE LAW OF A PRECESSING ELLIPSE, LIGHT BENDING AND TIME DELAY BY LAGRANGIAN METHODS.

From the two Euler Lagrange equations of any planar orbit {13} the following well known equation can be deduced:

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

where m is the mass of the orbiting object, r is the radial distance between m and the attracting object M, L is the total angular momentum, a constant of motion {13}, and F (r) is the force of gravitational attraction between m and M. The force is:

$$F = -\partial V / \partial r \qquad -(2)$$

where V is the gravitational potential. In Eq. (1) the cylindrical polar coordinates (r, θ) are used in a plane defined by:

$$dZ = 0. \qquad -(3)$$

Consider now the orbit of an object of mass m in the solar system, such as a planet, comet, or photon of mass m. Since ancient times this orbit has been observed by astronomers, and is a precessing ellipse. The equation of the precessing ellipse is:

$$\frac{\alpha}{r} = 1 + \epsilon \cos(x\theta) \qquad -(4)$$

where α is the half right latitude, ϵ is the eccentricity, and x is the precession constant. From Eq. (4) it follows that:

$$\frac{d^2}{d\theta^2}\left(\frac{1}{r}\right) = -\frac{x^2\epsilon}{\alpha}\cos(x\theta) \quad -(5)$$

and that:

$$\frac{d^2}{d\theta^2}\left(\frac{1}{r}\right) + \frac{1}{r} = \frac{1}{\alpha}\left(1 + \epsilon\left(1-x^2\right)\cos(x\theta)\right) \quad -(6)$$

so the force of gravitational attraction is:

$$F(r) = -\frac{L^2}{m\alpha r^2}\left(1 + \epsilon\left(1-x^2\right)\cos(x\theta)\right). \quad -(7)$$

Using Eq. (4), the cosine term is:

$$\cos(x\theta) = \frac{1}{\epsilon}\left(\frac{\alpha}{r} - 1\right) \quad -(8)$$

so the force law is:

$$F(r) = -\frac{L^2}{mr^2}\left(\frac{x^2}{\alpha} + \frac{1}{r}\left(1-x^2\right)\right) \quad -(9)$$

a result that was checked by computer.

This is the sum of an inverse square force law and an inverse cube force law. This is obviously the force law that produces stable precessing elliptical orbit as observed, and no other force law does so. The well known force law of attraction of EGR {1 - 10, 12, 14} is:

$$F(r) =? \; -\frac{mMG}{r^2} - \frac{3MGL^2}{mc^2r^4} \quad -(10)$$

where G is Newton's constant, and this is incorrect. It does not produce a precessing ellipse because it is the sum of an inverse square and inverse fourth terms in r. This is a simple and conclusive demonstration that EGR is incorrect and meaningless.

When

$$x = 1 \quad -(11)$$

the correct lagrangian force law (9) reduces to:

$$F(r) = -\left(\frac{L^2 x^2}{m\alpha}\right)\frac{1}{r^2} \quad -(12)$$

which is an inverse square law. The law (12) reduces to the inverse square law of Newton if

$$\alpha = \frac{L^2}{m^2 M G}. \quad -(13)$$

In historical fact, the law (12) was discovered by Robert Hooke and communicated to Isaac Newton, who developed Hooke's discovery (see online version of John Aubrey, "Brief Lives", entry on Robert Hooke). For a circular orbit:

$$\alpha = r \quad -(14)$$

and the force law for a circular orbit is an inverse cube law, not an inverse square law. There is no Newtonian law of universal gravitation. The lagrangian method developed in this paper is far more generally applicable.

For example, a binary pulsar system was considered in UFT 108 (www.aias.us) and consists of two objects of nearly equal mass orbiting each other in a precessing ellipse that is not stable. For a binary pulsar the orbit is shrinking. For purposes of illustration consider the orbit of a precessing ellipse that is spiralling outwards:

$$r = \frac{\alpha}{1 + \epsilon\cos(x\theta)}\, e^{a\theta} \quad -(15)$$

where a is the pitch of the spiral. From Eqs. (1) and (15) the lagrangian force law of attraction between the two masses of the binary pulsar is:

$$F(r) = -\frac{L^2}{mr^3}\left(\frac{1+a^2+\epsilon\left(1-x^2+a^2\right)\cos(x\theta) + 2a\epsilon\sin(x\theta)}{1+\epsilon\cos(x\theta)}\right). \quad -(16)$$

This force law is illustrated numerically in Section 3 and is a periodically modulated force law. Another example illustrated in Section 3 is that of a whirlpool galaxy, where the stars are arranged on a spiral. If this is a hyperbolic spiral, the force law is also a spiral, the mirror image of the star spiral. This is discussed further in Section 3, and this force law is again non Einsteinian and non Newtonian. As has been argued, even the simple circular orbit is non Newtonian.

If the mass m is a photon orbiting the sun, its orbit is:

$$\frac{d\theta}{dr} = \frac{\alpha}{xr}\left(\epsilon^2 r^2 - (\alpha - r)^2\right)^{-1/2} \quad -(17)$$

an equation obtained by simple differentiation of the orbital equation (4):

$$r = \frac{\alpha}{1+\epsilon\cos(x\theta)}, \quad -(18)$$

and is non Einsteinian and non Newtonian. The light deflection is obtained following the methods of UFT 150 (www.aias.us) and is

$$\Delta\theta = \frac{2\alpha}{x}\int_{R_0}^{\infty}\frac{1}{r}\left(\epsilon^2 r^2 - (\alpha - r)^2\right)^{-1/2} dr - \pi \quad -(19)$$

where R_0 is the distance of closest approach. Using the transformation:

$$u = \frac{1}{r} \quad -(20)$$

Eq. (19) simplifies to:

$$\Delta\theta = -\frac{2\alpha}{x}\int_{1/R_0}^{0}\left(\epsilon^2-(\alpha u-1)^2\right)^{-1/2}du - \pi. \quad -(21)$$

In Section 3 Eq. (21) is integrated numerically to give a simple analytical result. Lagrangian dynamics can therefore describe light deflection due to gravitation, and in a correct, scientific way. The EGR claim is famous (or infamous) and wholly meaningless.

Similarly, (see accompanying note 193(7)) the time delay due to gravitation is given in lagrangian dynamics by:

$$\Delta t = t_3 - t_0 \quad -(22)$$

where:

$$t_3 = \frac{2}{c}\left(\int_{R_0}^{R_E} f(r)\,dr + \int_{R_0}^{R_P} f(r)\,dr\right). \quad -(23)$$

Here the time t_3 is given by:

$$f(r) = \left(\frac{m\alpha}{Lx}\right) r\left(\epsilon^2 r^2 - (\alpha - r)^2\right)^{-1/2} \quad -(24)$$

and the time t_0 by:

$$t_0 = 2(t_1 + t_2) \quad -(25)$$

where

$$t_1 = \frac{1}{c}\int_{R_0}^{R_E}\left(1-\frac{R_0^2}{r^2}\right)^{-1/2}dr = \frac{r_1}{c}, \quad -(26)$$

$$t_2 = \frac{1}{c}\int_{R_0}^{R_P}\left(1-\frac{R_0^2}{r^2}\right)^{-1/2}dr = \frac{r_2}{c}. \quad -(27)$$

The Einsteinian result (see UFT 155 on www.aias.us) is again complete nonsense because its force law is incorrect, and for many other reasons. The lagrangian method is correct. The self consistency of time delay and light bending experiments should be tested carefully. The EGR results (UFT 155) showed no consistency at all.

3. NUMERICAL ANALYSIS BASED ON THE LAGRANGIAN METHOD

Section by Dr. Horst Eckardt.

ACKNOWLEDGMENTS

The British Government is thanked for a Civil List Pension and rank of Armiger. the staff of AIAS and others are thanked for many interesting discussions. David Burleigh, CEO of Annexa Inc., is thanked for voluntary posting, Alex Hill for voluntary translation and broadcasting, and Robert Cheshire for voluntary broadcasting, schematics and animations.

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Failure of the fundamentals of Einsteinian General Relativity

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3 Numerical analysis based on the Lagrangian method

The force laws and the result for light deflection derived in section 2 are studied in grater detail in this section.

3.1 Force law for binary pulsars

The force law (16) of binary pulsars depends on coordinates r and θ. These are not independent because the force relates to an orbit of the mass m. The orbital function $r(\theta)$ (Eq. (15)) has to be inserted into Eq. (16) to obtain a pure $F(r)$ dependence. The result obtained by computer algebra is

$$\begin{aligned} F(r) = \; & -\frac{e^{-a\,\theta}\,x^2\,L^2}{\alpha\,m\,r^2} \\ & -\frac{2\,a\,e^{-a\,\theta}\,\sqrt{(\epsilon+1)\;r-\alpha\,e^{a\,\theta}}\,\sqrt{(\epsilon-1)\;r+\alpha\,e^{a\,\theta}}\,x\,L^2}{\alpha\,m\,r^3} \\ & +\frac{\left(x^2-a^2-1\right)\,L^2}{m\,r^3}. \end{aligned} \tag{28}$$

It is seen that there remains an exponential θ depemdence indicating some spiralling behaviour. The first term is essentially the Newtonian multiplied by an exponential. The result is plotted in Fig. 1. Parameters are chosen as indicated in the Figure caption. Three negative values were used for the pitch a of the decreasing elliptical orbit. The decrease of radius requires growing force

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over time or the angle θ respectively. This growth is exponential but modulated by the ellipse as can be seen from the figure. The orbit together with the force is shown in Fig. 2 in a polar diagram for $a = -0.01$. The decrease of the orbit and the rise of the force is manifest. The mass falls into the centre.

In a second example we used a positive parameter $a = 0.1$ to describe the inverse case, an increasing orbit and falling force. This leads to a roughly logarithmic spiral in force as well as in orbit, see Fig. 3. Observe that the orbit pertains from inner to outer while the corresponding force runs from outer to inner.

3.2 Force law for whirlpool galaxies

The orbit of Fig. 3 may resemble a spiral galaxy, but we know that galaxies are formed more in a hyperbolic than a logarithmic spiral. The orbit has the simple form

$$r = \frac{\alpha}{\theta} \tag{29}$$

where α is a characteristic length and the spiral describes the linear asymptote for $\theta \to 0$. The direction of θ is inverse to the direction of star movement from inner to outer. The Euler Lagrange equation (1) of this orbit is extremely simple since the second derivative of $1/r$ according to θ vanishes. The folrce law is

$$F = -\frac{\theta^3 L^2}{\alpha^3 m}, \tag{30}$$

i.e. F is proportional to θ^3, a third power force law. The graph (Fig. 4) shows the spiralling orbit (with the asymptote) and the force. Observe that for positive theta direction the orbit goes from outer to inner and the force from inner to outer. The polynomial spiral characteristic of the force is different to that of the orbit.

3.3 Light deflection

The Lagrangian result for light deflection (21) can be handled analytically. The integral is in general

$$\begin{aligned} \int \frac{2\alpha}{x\sqrt{\epsilon^2 - (\alpha u - 1)^2}} du &= -\tfrac{2}{x} \operatorname{asin}\left(\tfrac{2\alpha - 2\alpha^2 u}{\sqrt{4\alpha^2(\epsilon^2-1)+4\alpha^2}}\right) \\ &= \tfrac{2}{x} \operatorname{asin}\left(\tfrac{\alpha u - 1}{\epsilon}\right). \end{aligned} \tag{31}$$

Therefore the angle of light deflection is

$$\Delta\theta = \frac{2}{x}\left(\operatorname{asin}\left(\frac{\alpha - R_0}{R_0\,\epsilon}\right) + \operatorname{asin}(\frac{1}{\epsilon})\right). \tag{32}$$

For an orbit around the sun it is in good approximation $x \approx \epsilon \approx 1$. Then follows

$$\Delta\theta = -2\operatorname{asin}\left(\frac{\alpha - R_0}{R_0}\right) - 2\pi \tag{33}$$

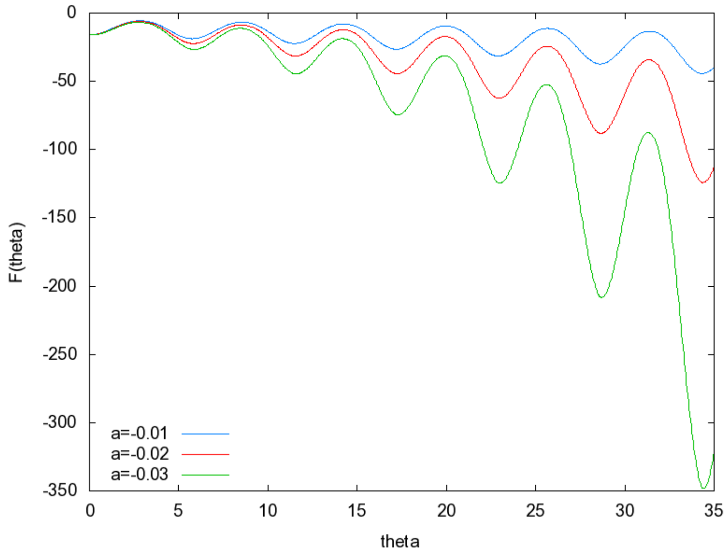

Figure 1: Force for shrinking ellipses with parameters $L = 1, m = 0.1, \alpha = 1, x = 1.1, \epsilon = 0.3$.

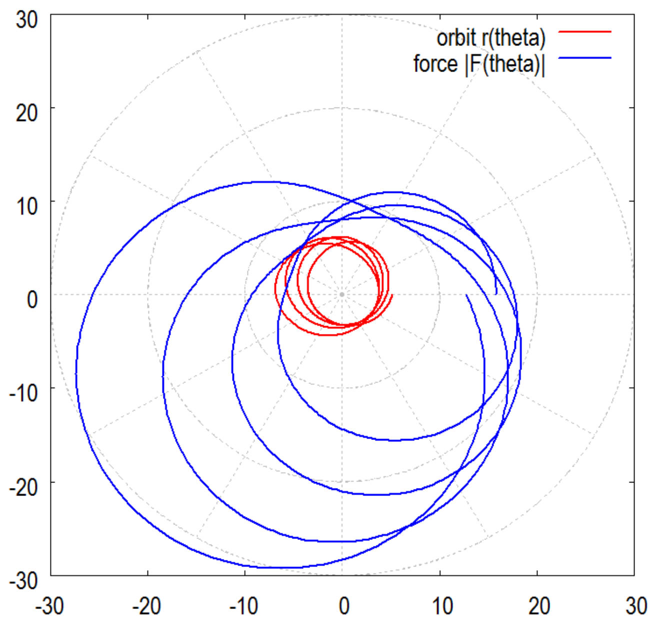

Figure 2: Orbit and force for shrinking ellipses with parameters $L = 1, m = 0.1, \alpha = 1, x = 1.1, \epsilon = 0.3, a = -0.01$.

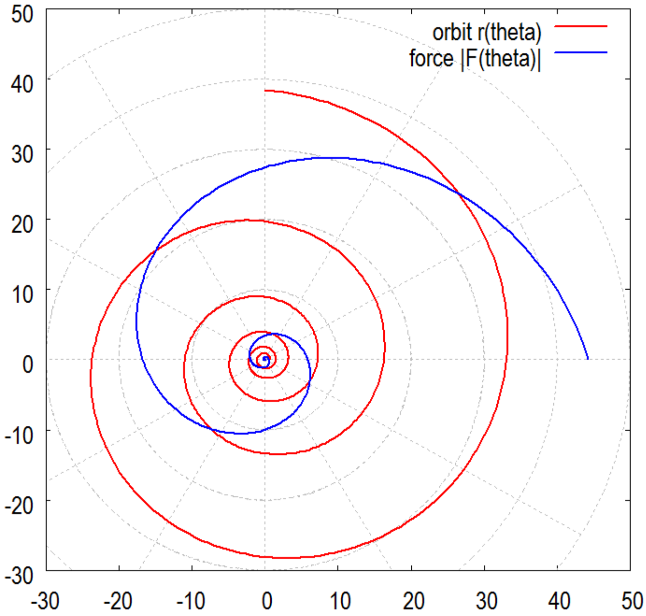

Figure 3: Orbit and force for strongly expanding ellipses (spirals) with parameters $L = 1, m = 0.1, \alpha = 1, x = 1.1, \epsilon = 0.3, a = 0.1$.

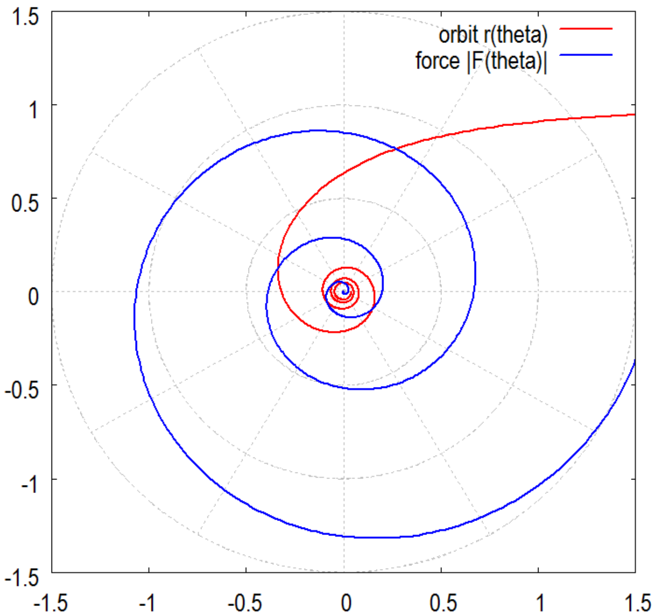

Figure 4: Orbit and force for a hyperbolic spiral with parameters $L = 1, m = 0.1, \alpha = 1$.

or

$$\frac{\alpha}{R_0} - 1 = \sin\left(\frac{\Delta\theta}{2}\right) \tag{34}$$

from which follows

$$\alpha = R_0 \sin\left(\frac{\Delta\theta}{2}\right) + R_0. \tag{35}$$

Because $\Delta\theta$ is very small, the sinus term is neraly zero. This means that in good approximation

$$\alpha \approx R_0. \tag{36}$$

The characteristic radius α practically coincides with the sun radius.

Finally we calculate the integrals of the time delay (23)-(27). Computer algebra yields

$$t_1 = \frac{\sqrt{R_E^2 - R_0^2}}{c}, \tag{37}$$

$$t_2 = \frac{\sqrt{R_P^2 - R_0^2}}{c}, \tag{38}$$

$$\begin{aligned} t_3 \quad &= \tfrac{2\sqrt{\alpha}\, m}{3cL} \left(R_P \sqrt{2\, R_P - \alpha} + \alpha \sqrt{2\, R_P - \alpha} + R_E \sqrt{2\, R_E - \alpha}\right. \\ &\quad \left. + \alpha \sqrt{2\, R_E - \alpha} - 2 \sqrt{2\, R_0 - \alpha}\, \alpha - 2\, R_0 \sqrt{2\, R_0 - \alpha}\right). \end{aligned} \tag{39}$$

The total time delay, formula (22),

$$\Delta t = t_3 - 2(t_1 + t_2), \tag{40}$$

contains more terms than the formula of Wald given by Eq. (29) of paper 155.

In total the Lagrangian method is suited to compute the time delay as well as all kind of gravitational forces.