

VACUUM REFRACTION THEORY OF BINARY ORBITS

BY

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Abstract: The VRT of binary orbits was conceived in 1988, see 1), as a vision of solar systems which had to have their own quantum resonance theory, which obviously had to be started with a VRT of binary orbit theory, as is the objective of this paper.

Circular binary orbits are recognised in the VRT as perfectly stable simple orbiting systems with the binary components trapped in eachothers space refraction gradients. They do not have any dynamical interaction with the system velocity or with the system momentum relative the space-ether and the universal mass, unless the orbital plane is not perpendicular relative the system velocity. Circularly orbiting binaries constitute twofold uniform motions, they are possible exclusively when the orbital plane is perpendicular to the system velocity.

Non-circularly orbiting binaries are bound to have momentum interaction between the binary partners and the system's velocity relative the universe, which is defined as the velocity of the binary common turning point. The interaction of momentum is facilitated by the elliptic resonance interaction between the binary kinetic energies and their 'potential energies'. These potential energies are present in the restmasses of the binary components, out of which periodically=elliptically kinetic energy is exteriorised respectively withdrawn into it.

True resonance interaction of a binary system, possible only by non-circular orbiting, has to have an orbit inclination and a system velocity relative the universe, with the latter containing an resonance component in tune with the orbit period. What precisely the state of affairs is has to be found out. This paper commences the theory of same.

The present theory establishes first that, additional to the orbital interaction between binary components, there is a radial resonance of momentum made possible by two kinetic energies which are periodically withdrawn into respectively exteriorised out of the restmasses of the two binary objects.

1. POINTS OF THEORY TO BE SOLVED FOR THE CONVERSION OF CLASSICAL ELLIPTIC ORBIT THEORY TO THE VRT OF BINARY ORBITS

Classical elliptic orbit theory analysed from VRT viewpoint contains the following failings:

1. It does not incorporate the spectrometric mass-velocity equation $m_* = m_0 / \sqrt{1 - v^2/c^2}$ to replace the mysterious potential energy with the reality of kinetic energy of gravitational acceleration or deceleration being exteriorised from respectively withdrawn into the restmass of the accelerated or decelerated mass object. 1)

2. It does not define the classical space-ether as a quantifiable gravitationally induced space refraction index which is the primary most gravitational parameter that controls the release and resorption of kinetic energy out of or into the restmass of a gravitationally accelerated respectively decelerated mass object. 2)

The gravity field of a mass M has to be defined as a space refraction index $n = n_0 + 2GM/c^2r$ corresponding the experimental results of photon deflection and radar dilation by the sun. The local cosmic baselevel refraction n_0 induced by the universal mass is presumed in this paper to be $n_0 = 1$ for simplicity of theory. 3)

3. Points 1 and 2 have to be introduced together in the theory because one without the other leads to theoretical and mathematical inconsistencies. This indispensable link implies also that the space refractivity is inferred philosophically somehow by mass spectrometry.

4. Classical theory does not account for the solar system cosmic velocity in the planet orbit equations, due to which minute errors are inevitably made including the ignored difference between the local cosmic light velocity relative the space-ether-universe and the effective light velocity $c_* = \sqrt{c^2 - V_*^2}$ in the co-moving reference frame of the solar system velocity V_* relative the space-ether.

5. Planet orbit inclinations relative the system velocity V_* are related somehow to other orbit parameters of which the most likely co-variant may be the orbit ellipticity. This relationship is not known sofar. To tackle this problem it needs all the orbit inclinations re- the system velocity V_* and their orientations relative the major axis, of the solar system planets.

2. ELLIPTIC ORBIT RESONANCE OF PLANETS

This section serves as a preliminary study of the VRT elliptic orbit theory. Its reliability as theory is based on the classical accuracy of solar system observations which represent a huge volume of experimental data.

Classical theory describes orbiting of planets as an equilibrium between the centripetal gravity force of the sun acting on a planet and the centrifugal inertia-force of the planet which is resisting any change away from its classically presumed intended linear pathway. The periodically varying velocity in elliptic orbits is interpreted classically to be due to a correspondingly varying gravity potential energy.

The centripetal force is rejected on the ground of an inverse radially varying gravitationally induced space refraction increment that is providing the necessary optical refractive index and the gradient required for orbital motion without the need for force. Planets submit to the optical orbiting process because all mass particles are composed of selfconfined photons which, during the orbital process, are conserving the sum of squared interior/intrinsic and manifested momenta. Centripetal and centrifugal force are misconceptions. Inertia also is an erroneous concept because inertia merely represents the effort required for the transfer of mass-energy necessary for acceleration or deceleration accompanying a restmass diminution respectively augmentation. The effort itself constitutes the transfer of mass-energy.

For simplicity and consistency of theory we treat the planet as a point-mass, by which we exclude marginal phenomena such as minute momentum exchange between planet rotation and orbiting, etc. Theory thus is based on the classical perfect elliptic orbits of equations (1.1) (1.2) 1.3), see Fig. 1.

r_1 is the varying orbit radius of M
 r_2 is the varying orbit radius of m
 $r=(r_1+r_2)$ is the varying distance M – m
 r_{01} is the semimajor axis of M's orbit
 r_{02} is the semimajor axis of m's orbit
 $r_0=(r_{01} + r_{02})$

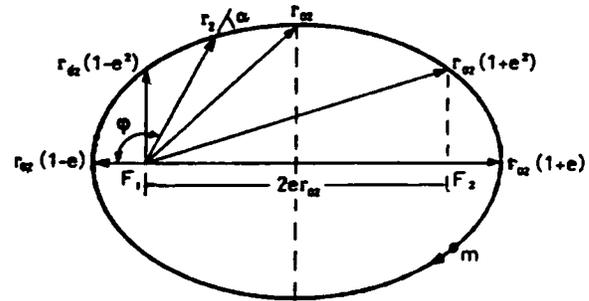


Fig.1: Elliptic orbit radii of m

$$r_1 = \frac{r_{01}(1-e^2)}{1+e.\cos\phi} \tag{1.1}$$

$$r_2 = \frac{r_{02}(1-e^2)}{1+e.\cos\phi} \tag{1.2}$$

$$r = \frac{r_0(1-e^2)}{1+e.\cos\phi} \tag{1.3}$$

The question is "what kind of resonance does an elliptic orbit represent?" A circular orbit is not a resonance phenomenon but a simple optical motion along a convenient refraction index gradient, a side-slip outward decelerates and side-inward accelerates. Elliptic resonance as an addition to a circular orbit becomes evident by modifying (1.3) into:

$$\frac{1}{r} = \frac{1+e.\cos\phi}{r_0(1-e^2)} \tag{1.4}$$

When both sides are multiplied with $2GM/c^2r$ respectively $2Gm/c^2r$ we obtain (1.5) (1.6) which represent the physical interactions of each binary object with its partner's gravity field represented in its orbit by a space refraction increment.

$$(n_1-1) = \frac{n_{01}-1}{1-e^2}(1+e.\cos\phi) \tag{1.5}$$

$$(n_2-1) = \frac{n_{02}-1}{1-e^2}(1+e.\cos\phi) \tag{1.6}$$

$n_1=1+2GM/c^2r$ is the elliptically varying space refraction in m's orbit.
 $n_2=1+2Gm/c^2r$ is the elliptically varying space refraction in M's orbit.
 n_{01} and n_{02} are the respective space refractions at r_0 distance.

Observe that the variant parts of the orbital refractions are zeroed at $\phi=90^\circ$, which means that an elliptically orbiting binary does not have sufficient kinetic energy to orbit circularly at r_0 distance. Its real circular orbit distance is $r_0(1-e^2)$, signifying that elliptical orbiting happens at the cost of longer periods and longer average distance between the binary partners.

The invariant components in (1.5) (1.6), when multiplied with $-0.5mc^2$ respectively with $-0.5Mc^2$, result in the average orbital 'potential energy' GMm/r . It is not an average in time but geometrically, representing the exact potential energy mean between perihelion and aphelion. Elliptic binaries have a radial resonance between their kinetic energies and their restmass-energies i.e. potential energies. In concise VRT language, it is a geometric resonance interaction between

the orbital space refraction and the release or withdrawal of kinetic energy from the radiative electromagnetic energy which is self-entrapped as mass particle restmass in the mass of the binary objects. The relationship between restmass and space refraction is shown in the following equations with M_{00} and m_{00} being the reference restmasses for the reference space refraction $n=1$. 4)5)

$$M_o = M_{00}/\sqrt{n_2} \tag{2.1}$$

$$m_o = m_{00}/\sqrt{n_1} \tag{2.2}$$

Reciprocal action applied to the orbital velocities of M and m results in:

$$v^2 = GM/r \quad \text{approximately (e is not in it)} \tag{3.1}$$

$$V^2 = Gm/r \quad \text{" (")} \tag{3.2}$$

$$v^2/v^2 = (r_1/r_2)^2 = m/M \quad (r_1+r_2) = r \tag{3.3}$$

Equation (3.3) confirms the mechanical law of vibration free rotating objects, and the reciprocally applied principle of the De Broglie wave.

$$0.5mv^2 = 0.5MV^2 \tag{3.4}$$

Equation (3.4) proves to first order that there is no energy exchange between the binary partners. Higher order exchange can not be ruled out.

$$r_1 = r/(1+\sqrt{M/m}) \tag{3.5}$$

$$r_2 = r/(1+\sqrt{m/M}) \tag{3.6}$$

The sum $[E_{kin}+E_{pot}]$ of each binary object has to be invariant, with the kinetic energies being exhausted at the distance $r=2r_o(1-e^2)$.

$$[0.5mv^2 - GMm/r] = [0.5MV^2 - GMm/r] = - GMm/2r_o(1-e^2) \tag{4.1}$$

$$v^2 = 2GM/r - GM/r_o(1-e^2) = GM(1+2e.\cos\phi)/r_o(1-e^2) \tag{4.2}$$

$$V^2 = 2Gm/r - Gm/r_o(1-e^2) = Gm(1+2e.\cos\phi)/r_o(1-e^2) \tag{4.3}$$

$$v^2 = r_2^2(d\phi/dt)^2 + (dr_2/dt)^2 \tag{4.4}$$

$$V^2 = r_1^2(d\phi/dt)^2 + (dr_1/dt)^2 \tag{4.5}$$

When (4.2) (4.4) respectively (4.3) (4.5) are combined they result in:

$$r^2(d\phi/dt)^2 = \frac{G(\sqrt{M}+\sqrt{m})^2(1+2e.\cos\phi)(1+e.\cos\phi)^2}{r_o(1-e^2)(1+2e.\cos\phi+e^2)} \tag{5.1}$$

Kepler's 2e law $r^2(d\phi/dt) = (\sqrt{M}+\sqrt{m}) \left| \frac{Gr_o(1-e^2)(1+2e.\cos\phi)}{1+2e.\cos\phi+e^2} \right| \tag{5.2}$

Kepler's 3rd law: $r^3(d\phi/dt)^2 = \frac{G(\sqrt{M}+\sqrt{m})^2(1+2e.\cos\phi)(1+e.\cos\phi)}{1+2e.\cos\phi+e^2} \tag{5.3}$

Consistent application of Kepler's 1st law leads to minute but significant variation of his 2e and 3rd law.

$$T = \frac{[r_o(1-e^2)]^{3/2}}{\sqrt{GM}} \times \int_0^{2\pi} \left[\frac{1+2e.\cos\phi+e^2}{1+2e.\cos\phi} \right]^{1/2} \frac{d\phi}{(1+e.\cos\phi)^2} \tag{6}$$

It is consistent with the theory that $r_o(1-e^2)$ represents the radial parameter in all the above equations because the kinetic energy of an elliptic orbit would do a circular orbit at $r=r_o(1-e^2)$, i.e. r_o is the semimajor axis.

Each binary object has an elliptic kinetic energy directed radially parallel with the semimajor axis, which is:

$$E_{rad.} = \frac{GMm}{r_0} \times \frac{e^2 \cdot \sin^2 \phi}{1-e^2} \quad (7)$$

Radial elliptic resonance in the solar system easily escapes accurate observation because of orbital interference by neighbouring planets. It constitutes the prime parameter for collisions between co-orbiting planets and moons, and for the related 'forbidden' orbits.

$$\sin \alpha = \frac{1+e \cdot \cos \phi}{\sqrt{1+2e \cdot \cos \phi + e^2}} \quad \text{see Fig.1}$$

$$v_{rad} = \sqrt{\frac{GM}{r_0(1-e^2)}} \times e \cdot \sin \phi \quad (8.1)$$

$$V_{rad} = \sqrt{\frac{Gm}{r_0(1-e^2)}} \times e \cdot \sin \phi \quad (8.2)$$

Comment: The equations in this section are accurate to first order.

3. $m_* = m_0 / \sqrt{1-v^2/c^2}$ INTRODUCED IN BINARY SYSTEM THEORY OF CIRCULAR ORBITS

The mass-velocity relationship is in the VRT understood to be with an absolute velocity v relative the space refraction and the universal mass. Its introduction involves only higher order corrections to the classical equations (3.1) (3.2). There are also other corrections to be done than the ones here but they are not yet relevant to the theory at hand.

$$0.5mv^2 = m_*c^2 - m_0c^2 = GMm/2r = mc^2[1/\sqrt{1-v^2/c^2} - 1]$$

$$1/\sqrt{1-v^2/c^2} = 1 + GM/(2c^2r) = \hat{V}\sqrt{1 + 2GM/c^2r}$$

$$\sqrt{1-v^2/c^2} \times \hat{V}n_1 = 1 = (m_0/m_*)\hat{V}n_1 \quad (9.1)$$

$$\sqrt{1-v^2/c^2} \times \hat{V}n_2 = 1 = (M_0/M_*)\hat{V}n_2 \quad (9.2)$$

Equations (9.1) (9.2) combined with (2.1) (2.2) result in:

$$m_{00} = m_*n_1^{1/4} = m_0n_1^{1/2} \quad (10.1)$$

$$M_{00} = M_*n_2^{1/4} = M_0n_2^{1/2} \quad (10.2)$$

Equations (2.1) (2.2) are exact but (9.1) (9.2) are approximations which are highly accurate for circular planet orbits. The correct procedure has not been found yet to replace $n_1^{1/4} n_2^{1/4}$ by exact expressions.

The above equations have produced clear evidence that the space-ether (n) plays an indispensable role in astronomical processes. For convenience we have eliminated the cosmic baselevel n_0 by presuming $n_0=1$, but this baselevel refraction plays a major role in cosmological and central galactic processes.

The widespread tradition of using but a singular mass concept, or at most m_* and m_0 , for the same mass object, is here falsified by m_{00} m_* m_0 . It is even necessary to use a fourth mass concept m_{**} as used below. From these four mass concepts 6 differences can be used in theory, of which at the least ($m_{00}-m_0$) (m_*-m_0) and ($m_{**}-m_*$) are playing major roles in the phenomenal world, wherein distinctly definable different 'potential energies' interplay with kinetic energies.

4. THE MASS-VELOCITY RELATIONSHIP OF BINARY ELLIPTIC ORBITS

The exact binary elliptic orbit equation ought to be derived by the theory of an individual mass particle (packed in a mass object) in the optical gravity field $n=1+2GM/c^2r$. Several attempts to achieve this theory have failed because of its complexity. The orbits of electrons and of photons auto-orbiting and selfconfined as mass particles are distorted gravitationally in two ways. The space refraction gradient causes the orbital velocity to be smaller on the side of the gravity centre, and the radial nature of the gravity field causes geometric distortion of the orbits.

For rigid theory it seems best to solve the problem in two steps, derive first optical mass particle behaviour in a planimetric gravity field, after which the field has to be 'radialised'. Attempts to find a solution in a single step suffer theoretical incredibility because it can no longer be followed conceptually even though the mathematics may be impeccable. Experimental confirmation is not a proof because the case involves significant second and third order terms.

In the following, two sets of pragmatic solutions are shown wherein the mass-velocity equations have been modified to comply with the VRT by changing $v^2/c^2; V^2/c^2$ into $n_1^2v^2/c^2; n_2^2V^2/c^2$ to include the effects of velocity slowdown by ether-drag in n_1, n_2 space refractions. The solutions, developed from equations (4.2) (4.3) may suffer all four from left-over higher order inaccuracies in the theory, although the first set of solutions could conceivably be exact as attempts of consistent theory have indicated.

$$0.5mv^2 = (m_* - m_0)c^2 = \frac{GMm}{r} - \frac{GMm}{2c^2r_0(1-e^2)} \quad (4.2)$$

$$\frac{m_*}{m_0} = \frac{1}{\sqrt{1-n_1^2v^2/c^2}} = 1 + \frac{GM}{c^2r} - \frac{GM}{2c^2r_0(1-e^2)} = [n_1 - (n_0 - \sqrt{n_0})] \quad (11.1)$$

$$\frac{M_*}{M_0} = \frac{1}{\sqrt{1-n_2^2V^2/c^2}} = 1 + \frac{Gm}{c^2r} - \frac{Gm}{2c^2r_0(1-e^2)} = [n_2 - (n_0 - \sqrt{n_0})] \quad (11.2)$$

$$n_1 = 1 + 2GM/c^2r; \quad n_0 = 1 + 2GM/c^2r_0; \quad n_2 = 1 + 2Gm/c^2r; \quad n_0 = 1 + 2Gm/c^2r_0$$

Equations (4.2) (4.3) have to be combined with the following equations below.

$$v^2 = (r_2 d/dt)^2 + (dr_2/dt)^2 \quad dr_2/dt = (dr/dt)/(1 + \sqrt{m/M})$$

The solution of (11.1) (11.2) requires a lot of courage in calculus. It is a math exercise with unavoidable approximations which invalidate the theoretically required accuracy to second and third order.

A third method is the application of resonance analysis via the velocity-mass equation as occurring in mass spectrometry. This equation can be rewritten as follows.

$$m_*^2 c^2 = m_0^2 c^2 + n_1^2 m_*^2 v^2 \quad \text{exact} \quad (12.1)$$

$$M_*^2 c^2 = M_0^2 c^2 + n_2^2 M_*^2 V^2 \quad \text{"} \quad (12.2)$$

Equations (2.1) (2.2) combined with the above two produce:

$$m_*^2 c^2 = m_{00}^2 c^2 / n_1 + n_1^2 m_*^2 v^2 \quad \text{exact} \quad (12.3)$$

$$M_*^2 c^2 = M_{00}^2 c^2 / n_2 + n_2^2 M_*^2 V^2 \quad \text{"} \quad (12.4)$$

The masses $m_*; m_{00}$ and $M_*; M_{00}$ are invariant, which enables the conversion in the following velocity equations $v^2 = f(n_1)$ and $V^2 = f(n_2)$.

$$v^2 = \frac{c^2}{n_1^2} - \frac{c^2}{n_1^2} \times \frac{m_{00}}{m_*} \quad (12.5)$$

$$V^2 = \frac{c^2}{n_2^2} - \frac{c^2}{n_2^2} \times \frac{M_{00}}{M_*} \quad (12.6)$$

Special attention is required for V and v which are functionally related to r , and r_2 whilst n_1 and n_2 are functionally dependent on $r=(r_1+r_2)$.

Equations (12.5) (12.6) prove that the classical elliptic orbit defined in (1.1) (1.2) is false because the singular harmonic resonance of same can not be found in the above exact equations. However the author is convinced there is a singular sinoidal resonance in which r is an irrelevant parameter. Most likely resonance parameters are the kinetic energy, the potential energy as restmass, restmass, and the orbit angle ϕ .

The indubitable conclusion of the radial elliptic falsity does not exclude the possibility that another parameter, different from the radius, has an elliptic resonance performance. Fig.1 with its ellipticity dependent radii is false, but it can guide us, together with the foregoing conclusion that at $\phi=90^\circ$ the 'potential energy' and kinetic energy are both average. This observation is sufficiently accurate to conclude indubitably that elliptic resonance is a harmonic interaction between restmass and kinetic energy, alternatively between the auto-orbiting photon momenta inside all mass particles and the manifested momentum of the mass object.

For the advancement of theory we use the experimentally based exact equations (12.1) (12.2). Compare also with Fig.1. The following two arbitrary equations seem to invite us for checking their consistency with (12.1).

$$m_0 c = a - b \cdot \cos \phi \quad n_1 m_* v = c + b \cdot \cos \phi$$

But substitution in (12.1) of these two equations produces inadmissibly varying squared total momentum and total energy. A consistent pair arbitrary equations which meet the theoretical requirements of an invariant sum of squared momenta combined with singular harmonic interaction, is as follows:

$$m_0^2 c^2 = a - b \cdot \cos \phi \quad n_1^2 m_*^2 v^2 = c + b \cdot \cos \phi \quad (13.1)$$

$$M_0^2 c^2 = A - B \cdot \cos \phi \quad n_2^2 M_*^2 V^2 = C + B \cdot \cos \phi \quad (13.2)$$

The following is an attempt to achieve exactness of binary orbit theory to improve on conventional theory. To avoid confusion it is necessary to use different symbols for the various radii which are distinguished by a dash atop. The meaning may also differ, as follows:

\bar{r}_{01} is the orbital radius of M where its available kinetic energy can be used exclusively for circular orbiting. This radius coincides with $\phi=90^\circ$ and with the elliptic average of 'potential energy' and kinetic energy. This radius is related to the circular orbit period but unrelated to the elliptic orbit period. This definition differs from r_{01} in the above which represents the semimajor axis at which the binary object is not at its average energy equilibrium point.

\bar{r}_{02} is the orbital radius of m at $\phi=90^\circ$.

$\bar{r}_0 = (\bar{r}_{01} + \bar{r}_{02})$ is the radial distance $M - m$ at $\phi=90^\circ$.

\bar{v}_0 is the true circular orbit velocity of m

\bar{V}_0 is the true circular orbit velocity of M

$\bar{n}_{01} = 1 + 2GM/c^2 \bar{r}_0$

$\bar{n}_{02} = 1 + 2Gm/c^2 \bar{r}_0$

The constants B b are eliminated in circular orbits, and A;C a;c are then the exclusive binary interaction constants. For the circular orbits we thus obtain two cubic equations for the relationships $v^2=f(n_o)=g(M;r_o)$ and $V^2=f(n_o)=g(m;r_o)$.

$$\bar{n}_{o1}^3(\bar{v}_o^2/c^2) - \bar{n}_{o1} + (m_{oo}/m_*)^2 = 0 \tag{12.7}$$

$$\bar{n}_{o2}^3(\bar{V}_o^2/c^2) - \bar{n}_{o2} + (M_{oo}/M_*)^2 = 0 \tag{12.8}$$

Elliptic orbits and the binary period have to be calculated with equations (13) (14) (15).

$$v^2(1+\sqrt{m/M})^2 = V^2(1+\sqrt{M/m})^2 = (rd\phi/dt)^2 + (dr/dt)^2 \tag{14}$$

$$m_*^2(1+2GM/c^2r)^2[(rd\phi/dt)^2+(dr/dt)^2] = (1+\sqrt{m/M})^2[c+b.\cos\phi] \tag{15.1}$$

$$M_*^2(1+2Gm/c^2r)^2[(rd\phi/dt)^2+(dr/dt)^2] = (1+\sqrt{M/m})^2[C+B.\cos\phi] \tag{15.2}$$

The circular orbit period is:

$$\bar{T}_o/2\pi = m_*(\bar{r}_o+2GM/c^2)/\sqrt{C} = M_*(\bar{r}_o+2Gm/c^2)/\sqrt{C} \tag{16.1}$$

$$C/c = (M_*/m_*)^2(\bar{r}_o+2Gm/c^2)^2/(\bar{r}_o+2GM/c^2)^2 = (M_*/m_*)^2 \tag{16.2}$$

The aphelion velocity v_a at distance r_a from M is determined with:

$$(1+2GM/c^2r_a)^2m_*^2v_a^2 = (c-b) \tag{17.1}$$

The perihelion velocity v_p at distance r_p from M is determined with:

$$(1+2GM/c^2r_p)^2m_*^2v_p^2 = (c+b) \tag{17.2}$$

The ratio of the two velocities v_p and v_a is:

$$v_a/v_p = [(1+2GM/c^2r_p)/(1+2GM/c^2r_a)]\sqrt{(c-b)/(c+b)} = \sqrt{(c-b)/(c+b)} \tag{17.3}$$

The classical definition of ellipticity remains useful.

$$e = (r_a-r_p)/(r_a+r_p) \quad r_p/r_a = (1-e)/(1+e) \tag{18.1}$$

Kepler's second law of equal areas per unit time is not exact but accurate, from which follows:

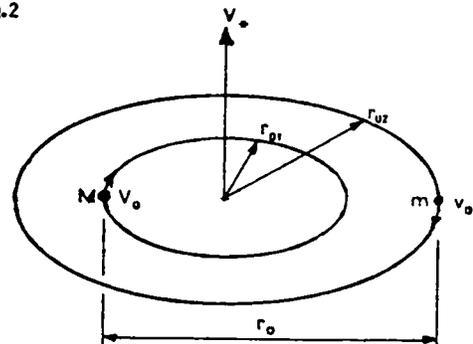
$$(c-b)/(c+b) = (1-e)^2/(1+e)^2 \tag{18.2}$$

The above equations are all derived for a binary system at rest relative the universe. For a system with velocity relative the universe some ideas are developed in the following section.

5. CIRCULARLY ORBITING BINARY WITH SYSTEM VELOCITY

In the analysis of binary system velocity relative the universe we ignore possible non-radial distortion of the gravity field as there is inadequate experimental evidence of same. The real subject matter consists of the various relative and effective velocities, the corresponding relatively conceived mass values, and the 'velocity contraction' of the gravity field. For lucidity of this section circular orbits are chosen and orbit equations are simplified.

Fig.2



Binary system velocity V perpendicular to orbit plane

In the following double indices $**$ indicate real dynamical mass values which are increased above the orbitally significant mass by the system velocity V_* . The word 'real' is here useful because an observer who is co-moving with the binary system can not observe the real parameters, which have been changed by velocity. His instruments and his eyes have been contracted by V_* , due to which he can not measure the real parameters nor the contraction, and he must rely on theory to find out. The contraction and mass deception, i.e. $(m_{**}-m_*)$ disappearing, is part of nature's phenomenal universality of the physical laws.

Single indices indicate mass values as they are perceived and experienced by the co-moving observer. To find out what precisely happens we have to use the VRT version of the mass-velocity equation and its modified appearance as an equation of squared momenta.

$$M_{**}^2 c^2 = M_0^2 c^2 + M_{**}^2 (V_*^2 + n_{0z}^2 V_0^2) \quad (19.1)$$

$$M_{00}^2 = M_0^2 n_{0z}^2 \quad (19.2)$$

The binary mass M measured by a co-moving observer, who has an effective light velocity $c_* = \sqrt{c^2 - V_*^2}$, is:

$$M_* = M_{**} \sqrt{1 - V_*^2/c^2} \quad (19.3)$$

Eliminate M_{**} by substitution and we then place ourselves mentally next to the co-moving observer without suffering his velocity contraction and other co-variant natural illusions linked with the finiteness of the light velocity and its propagation relative the space-ether universe.

$$M_*^2 (c^2 - V_*^2) = M_0^2 (c^2 - V_*^2) + M_*^2 n_{0z}^2 V_0^2 \quad (19.4)$$

Nature has done a beautiful job, the co-moving observer does not measure any change in the natural laws because he thinks he measures light velocity c whilst he really measures $c_* = \sqrt{c^2 - V_*^2}$ with his instruments and yardsticks which have co-varied at the same rate. See 5)6). As long as he thinks that c_* is the true invariable light velocity he will never discover how clever nature is handling the mass-velocity equation and other related fundamentals.

Whilst sitting at the binary common turning point CoM does not know that his binary has an increased mass $M_{**} + m_{**}$ due to the system velocity V_* , but does it change other parameters too in unobservable fashion? His observed binary orbital momenta remained invariantly $M_* n_{0z} V_0$ and $m_* n_{01} v_0$ despite really being $M_{**} n_{0z} V_0$ and $m_{**} n_{01} v_0$ at system velocity V_* .

All mass-energy parameters have been increased unobservably for CoM in proportion with M_{**}/M_* respectively m_{**}/m_* . Kinetic energies have increased by adding mass and keeping the orbital velocities invariant. However it is forbidden to make similar arguments about 'potential energy', they reveal inconsistencies which are due to the falsity of the classical concept. When it is substituted with restmass philosophy everything becomes consistent again.

Despite the magical show of which CoM is an unknowing witness, an observer at rest relative the universe occupies the highest office and observes clearly what is going on with CoM and his physics. He sees that the binary masses have increased to M_{**} m_{**} and through consistent theory he knows that all linear dimensions have changed proportional with the effective light velocity, and he therefore concludes that the De Broglie wavelengths of co-orbiting M_{**} and m_{**} have diminished equally, due to which the orbital pathlengths became shorter in proportion with the effective light velocity c_* . Above discussed mass-related contraction is adding onto an equal contraction $\sqrt{1 - V_*^2/c^2}$ due to the shorter wavelength of the effective light velocity c_* , causing a total contraction $(1 - V_*^2/c^2)$.

In the following the same binary system will be analysed but now with system velocity V_* in the orbital plane, see Fig.3.

We do not need to prove now the parameter dependency on velocity V_* and the object contraction at right angles to the velocity. But how about co-directional dimensions? From 5)6) it is known that a 'preferential' extra contraction occurs in the direction of motion, which was predicted by Fitzgerald in 1892 as a physical contraction for which he did not have a theory. Fitzgerald made his conclusion to explain the invariant results of the Michelson-Morley experiments. His interpretation is physical contraction which is not comparable with the Lorentz' and SRT contraction, which are only geometric-observational distortions caused exclusively by the finiteness of the light velocity, for which a velocity v is essential between the observer and his object of observation. Relativistic theories are not relevant for physical phenomena, they can only inform us about the observational distortions caused by the finiteness of the light velocity, and as such they are only approximating.

The sum of the binary momenta in Fig.3 compared with the sum 180 further along the orbits, have a difference:

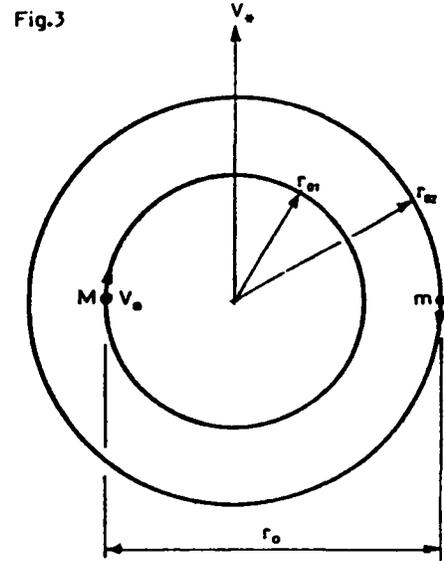
$$2[M_{**}^2 V_o - m_{**}^2 v_o]V_*$$

This difference can not be eliminated by consistent theory, which necessitates the conclusion that circularly orbiting binaries can not be in equilibrium unless their orbit plane is perpendicular to the system velocity V_* relative the universe

6. BINARY ELLIPTIC ORBIT THEORY WITH SYSTEM VELOCITY

Binary elliptic orbit theory with system velocity V_* relative the universe commences with the reasonable assumption that the aphelion orbit parts are trailing perihelion, i.e. a dragging effect of which the cause must be found, see Fig.4 in which the two heavy lines represent the orbit planes seen sidewise.

Elliptic motion is not possible unless the two binary objects have the individual freedom to adjust their orbit orientation to the system velocity. But what is the principle that governs the orientation? It can not be the kinetic energy which like the restmass merely controls the supply and volume of dynamic motion. Angular momentum determines the orbital balance around the common turning point CTP, but binary object momenta primarily determine the spatial coordinates. The two binary object momenta at equinox positions are determinative for the inclinations β and γ in Fig.4. The equinox momentum component parallel with the semimajor axis is the principle parameter for each binary object.



Binary system velocity V in the orbit plane

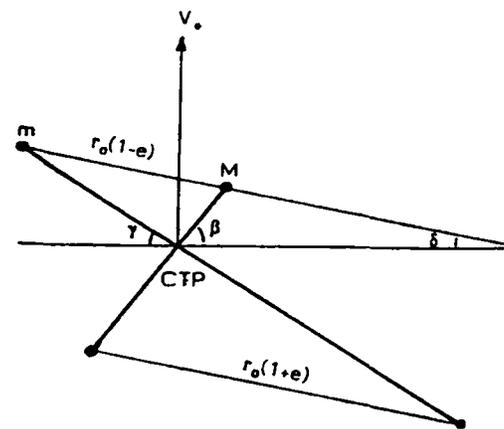


Fig.4

The orbital momenta derived with (4.6) (4.7) are the principle parameters from which the β and γ components, parallel to the major axis, are used for the perihelion advancements and the aphelion retardations relative the CTP. The radial components at right angles to V_* have to balance to zero, ergo:

$$\sqrt{M}.\cos\beta = \sqrt{m}.\cos\gamma \quad \sin\beta = \sqrt{1-(m/M)\cos^2\gamma}$$

At the equinox, the sum of the orbital momenta components parallel with V_* is:

$$P = \sqrt{\frac{GMm}{r_0(1-e^2)}} \times [\sqrt{M}.\sin\beta + \sqrt{m}.\sin\gamma] x e.\sin\phi \quad (20)$$

The orbital inclination is determined with:

$$\tan\delta = 0.5[\sqrt{(M/m)/\cos^2\gamma - 1} - \tan\gamma] \quad (21)$$

The orbit plane, Fig.4 line M-m, is oscillating relative CTP with a sum momentum P in the direction of V_* : The oscillating component P, relative the uniform velocity V_* , is supplied by simultaneous kinetic energy exteriorisation from respectively withdrawal into the restmasses M_0 and m_0 . P has to be measured astronomically via the velocity variation ΔV_* of one or both binary objects. This measurement ought to be done at equinox position. At perihelion and aphelion the $\Delta V_*=0$ and V_* of both objects equal the system velocity.

CONCLUSION

The gravitational space refraction increment, the mass-velocity equation $\sqrt{1-v^2/c^2}$, the binary system velocity relative the universe and the mass-ether resonance nature of binary elliptic orbiting have all been proven separately to be significant processes which are related to each other, although they are waiting for a common integrated theory.

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