HERETICAL PHYSICS – DEFINING G

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ABSTRACT

Investigate the source of Newton's 'G' and unexplored dynamic applications, beyond the value of 'g'

KEY WORDS

Newton's and Kepler's equations, centripetal accelerations and forces

INTRODUCTION

Feynman R. is quoted as defining scientific method;-
"… Defining a hypothesis, testing with known data, if it matches then O.K. otherwise it is abandoned…"
Newton is famous for the hypothesis "$F = m_2. a. \rightarrow = m_2. g.$"; 'Static application' as the gravitational mechanism, which successfully passed the static data test. He extended the hypothesis to;-
$F = M_{1.} m_2 /R^2$, as the gravitational mechanism. His theorized mass multiplication was way too high and required a massive 'Statics' fudge factor 'G'. The final equation becoming;- $F = G. M_1 m_2 / R^2$
Notwithstanding that planets spend less than 0.001% of their orbit at the mathematical 'Standard Model' Kepler radius (R) allocated. He extended the hypothesis to $F = G. M_{1.} m_2 /R^2$ as the planetary **Dynamic** gravitational mechanism, which will be tested here.
Plank and Einstein also had use for the 'fudge factor' as a problem solver.
Concerning Newton's 'F' equation of 'Statics'; allegedly based on a suspended apple (mass $m_{a;}$ density (δa), resisting a tension force to leave its supporting branch. No distance travelled (L), no work done (j), no inertial force (Fi) developed.
Kanarev notes, at a dynamic constant velocity, there is no 'acceleration', so no apparent 'F'.
Mathis also wrote an extensive paper "CELESTIAL MECHANICS – UNANSWERED QUESTIONS' outlining the existing failures in hypotheses and mathematics, which cannot support existing gravitational evidence.

DATA

STATICS
Earth mass = 5.9742×10^{24} kg (M_E)
Earth radius = $6,378.1 \times 10^3$ m (r_e)
'G_M' = 6.67×10^{-11}
Earth Surface area = 510×10^{12} m^2 (A_E)
Earth Vol.(V_E) = $1.083.10^{12}$ km^3 =$1.083.10^{21}$ m^3 ;
Newton's $F = m_2 \times g = G_M \times M_E \times m_2 / r^2$
Earth density = 5,515 kg/m^3 (δ_E)
Earth mass = $5.9727.10^{24}$ kg (M_E)

INVESTIGATION

STATICS at Earth surface as an example (M_E) acting on the apple m_a

$$F\ (N) = m_a(kg)\ \times a(m/s^2) = m_{a.} \times G_M. \times M_{E.} / r_e^2 \qquad (1$$

Checking 'G_M' dimensions;- $a = m/s^2 = G_M \times kg / m^2$

Dimensions; $G_M = m/s^2 \times m^2 /kg = m^3/kg.s^2$

Same dimensions as Kepler Constant divided by mass (kg)

[Mathis uses 'G_M' as dimensionless ratio, by defining mass kg as m^3 /t^2]

ALTERNATIVE HYPOTHESIS

Re-writing Newton in volumetric terms as;-

$$F(N) = [G_M \times \text{Volume } (V_E) \times \text{density } (\delta_E) / r_e^2] \times \text{volume}(v_a) \times_{.} (\delta_a) \qquad (2$$

Although tests show acceleration of m_a is independent of either mass or volume.

[Brian Cox "Human Universe"]

Brian Cox also quotes two experimenters;- Nevil Maskelyne (1774) and Henry Cavendish (1798) defining density of Earth and hence the mass. No mention of 'G_M'!

Applying the Newton 'Fudge $G_M = 6.67/10^{11}$' from known data to manufacture the result of $9.8 m/s^2$.

$$a = G_M \times M_E / r_e^2 = (6.67/10^{-11}) \times (5.9743.10^{24}) / (6.3781.10^6)^2\ m = 9.79\ m/s^2$$

Observation 1;-

The Standard Model defines quantity G_M as a universal constant' for Earth values;

Dimensions; $(m^3 /s^2/kg) \times kg = m^3/s^2$ [Same dimensions as Kepler Constant]

A) $\mathbf{G_M \times M_E} = 6.67/10^{11} \times 5.9727.10^{24}\ kg = 3.983 \times 10^{14}\ kg.m^3 /s^2 =$ ($M_{a,}$ as active mass)

(This is the gravitational 'g' active mass component if G_M is a ratio).

Applying M. Mathis value 'G_M' as a dimensionless number (a ratio) to Newton's equation;

'$G_M. \times M_E$' becomes active mass proportion (M_a) causing gravitational acceleration 'g' or 'a'

The active mass proportion (M_a) which matches value '$a = 9.81 m/s^2$

Applying this active mass to Earth volume $1.083.10^{21}\ m^3$ and solve for 'active density';

Average 'Active density' $(\boldsymbol{\delta_E}) = (M_a) / \mathbf{V_E.} = 3.983.10^{14}\ m^3 / 1.083.10^{21} = \mathbf{3.6365 / 10^7\ kg/m^3}$

Insignificant, but is the matching value!

Rewriting Newton in term of volumes with 'G_M' a dimensionless ratio;-

a) 'a' $= G_M.V_{E.} (\delta_E) / r_E^2 = 6.67/10^{11} \times 1.083.10^{21} \times 5{,}515 / (6.378.1)^2 \times 10^{12}\ m = 9.79 m/s^2$ (O.K.)

b) $G_{M.}V_{E.} = 6.67/10^{11} \times 1.083.10^{21} = 7.22.10^{10}\ m^3 = (V_a)$ [Volume active in Newton's equation]

c) $G_M.V_{E.} (\delta_E) = 7.22.10^{10}\ m^3 \times 5{,}515 = 3.9838.10^{14}\ kg = M_a$ [Active mass in Newton's equation]

[Active mass causing $9.8 m/s^2$.]

Active Mass of $3.9838.10^{14}$ kg contained in active volume of $7.22.10^{10}\ m^3$. $= 5{,}515 kg/m^3$

Speculate how this tiny volume causes 'a' the acceleration on a spherical surface – e.g. a thin shell; Brian Cox in a vacuum demonstration showed a bunch of feathers and a bowling ball with equal gravitational acceleration. In which he put forward the Standard Model hypothesis that the equality is considered due to Earth volume expanding (Relativity). The following discussion is based on a differing volumetric behaviour.

$G_M.V_E = V_a$;- now defines this thin shell's active volume.

$V_a = 7.22.10^{10}\ m^3$ and thickness 'th'

With shell surface area $A_E = 510.10^{12}\ m^2$

Thickness of shell $7.22.10^{10}\ m^3 / 510.10^{12}\ m^2 = 0.000,141,5m = 0.1415mm$ = 'th'

[mighty thin! at density of 5,515 kg/m^3]

However a shell of Earth surface is mostly water at 1,000kg/m^3, so there is some density anomaly.
This is the form of Newton's $G_M.\ M_E$ (in volume $V_a = 7.22x10^{10}\ m^3$)
If we add 10% for land rock mass to obtain observed shell density of 1,100kg/m^3 = (δ_d),
To be more realistic to observational data.

Enlarged Shell volume required (V_{ss}) = $7.22.10^{10}$ x 5,515 / 1,100 = $36.198.10^{10}\ m^3$ [at (δ_d)]
And defining a new matching 'Gv' ;-New $Vss = G_V \times V_E$ (3
New fudge ratio;- $\mathbf{G_V} = V_{SHELL} / V_{EARTH} = 36.198.\ 10^{10}\ m^3 / 1.083.10^{21}\ m^3$

$\mathbf{G_V = 33.424.\ 10^{-11}}$ [at density (δ_d)] (4

'th' for new shell thickness = $36.198.10^{10}\ m^3 / 510.10^{12} = 0.000,709m = 0.709mm$

[still insignificant?]

Re checking Newton effect on the apple (v_a);

$F = v_a. (\delta a)$. 'a' → 'a'= $G_V.V_E. (\delta_d) / r_E^2$

$= 36.198.10^{10}\ m^3 \times 1,100kg/m^3 / [(6.378)^2 x10^{12}]$

$= 9.788m/s^2$ [it holds true]

ALTERNATIVE

Going whole hog, omitting density term and therefore mass and creating the matching fudge; G_{VR}

'a' = G_{VR} x 4/3. π. r_e = 4.1888 x G_{VR} x r_e = m/s^2

'a' = k x G_{VR} x r_e = 4.1888 x G_{VR} x $6.3781 \times 10^6 = 9.79m/s^2$

$\mathbf{G_{VR} = 9.81 / [4.1888 \times 6.3781 \times 10^6] = 3.676.10^{-7}}$ [in lieu of G_M] (5

[Dimensions, m/s^2 /m = acceleration/metre = $1/t^{-2}$

$G_{VR} = 3.676.10^{-7}\ (1/t^2)$ (6

SUMMARY

'G?' can adopt several guises, which could indicate that it has more than one component.
Newton's equation has same outcome with modified G to G_v. = $3.4238.\ 10^{-11}$ when equation is written with volumes and uses observed Earth surface density of 1,100kg/m^2.

Final dimensions of Newton's $G_M.M/R^2$, replaced by;
Shell volume = $G_V.V_E$. =$36.198.10^{10}\ m^3$; Density = 1,100 kg/m^3 ; r_e = 6,370km ; a=9.81m/s^2

Final dimensions of second alternative to $G.M/R^2$, replaced by;

'a' = G_{VR} x k x V_E / r^2_e = $\mathbf{G_{VR}}$ **x 4/3. π. $\mathbf{r_e}$** = $3.676.10^{-7}$ x 4.1888 x 6,370km = 9.81m/s^2 **(7)**

[$\mathbf{G_{VR}}$ property of radius interacting with **SPACE**; and mass of 'The Apple' is not relevant, as per Kepler]

Kepler's dynamic Constant written as;- $V^2_{ORBITAL} \times R_{ORBITAL} / (2.\ \Pi)^2$ [acceleration]
This constant is a property of SPACE in the 'Standard Model'.

CONCLUSION
Newton's gravitational equation defines the Earth as a spherical shell structure;-
Surface area = 510 x 10^{12} m^2 and Thickness = 0.14mm of density 5,515kg/m^3
Of Mass = G_M.M = 3.983. 10^{14} kg (applying Standard Model universal constant)
Note the G_M standard density value of 5,515kg/m^3, inherent makes matters worse.
These 'G_M' values derived from Newton's equation are in conflict, with observed data of the shell structure (δ_d).
In terms of dimensions;- F_a for the 'apple' now rewritten = $v_{apple.}$ (δ_{apple}) . 'a'

F_a = $v_{a.}$ (δ_a). x G_V. V_E . (δ_d) / r_e^2

Or 'a' = G_{VR} x k x V_E / r^2_e = **G_{VR} x 4/3. π. r_e**

Alternative 'g' Examples;-
Sun 'g' = 696,000,000 x 4.1888 x 3.676. 10^{-7} = 1071.7 m/s^2
Moon 'g' = 1,700,000 x 4.1888 x 3.676. 10^{-7} = 2.6177m/s^2 [Mathis;- 2.671 Via charge mechanics]

NEWTONIAN Examples;-
Sun;- at Earth radius 'a' = $V^2_{ORBITAL}$ / $R_{ORBITAL}$ = 29,800 m/s^2 / 149.6 x10^9 m = 5.936 / 10^3 m/s^2
Matching Sun 'g' with 214 radii;- Sun 'g' = 5.936 x 214^2 /10^3 = 271.8 m/s^2

Standard Model
'G';-Sun 'g' = (6.67 x 10^{-11}) x (1.99 x 10^{30}) / (696,000,000) ^{2} = 274m/s^2
[Note Miles MATHIS calculates Sun 'g' as 1070m/s^2 = 109 x 9.816m/s^2]

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APPENDIX
A download of existing procedure from a typical science site.
Then inserting the above alternative methodology to the table of values.
"…

Calculate Surface Gravity

This activity will illustrate how to calculate the surface gravity of planets, satellites and the Sun.

Procedures
You have learned that the surface gravity (g) of a body depends on the mass (M) and the radius (r) of the given body. The formula which relates these quantities is:
g = G * M / r^2 where G is called the Gravitational constant.
The notation r^2 means r to the 2nd power, or r squared.
Calculate the surface gravity for a number of bodies using the MKS system where the units for distance are metres, the units for mass are kilograms, and the units for time are seconds. In this system, the gravitational constant has the value:
G = 6.67 * 10^{-11} Newton-meter^2/kilogram^2. [N = m_2. a. = G. $M_{1.}$ $m_{2.}$ / r^2] …"

[Author - Fundamental 'G' dimensions;- a = m/s^2 = G x kg / m^2
Dimensions; G = m/s^2 x m^2 /kg = m^3/ kg.s^2]

"…As an example, the mass M of the Earth is 5.98 * 10^{24} kilograms. The radius r of the Earth is 6,378 kilometres, which is equal to 6.378 * 10^6 metres. The surface gravity on Earth can therefore be calculated by:

$$g = G * M / r^2$$
$$= (6.67 * 10^{-11}) * (5.98 * 10^{24}) / (6.378 * 10^6)^2$$
$$= 9.81 \text{ meters/second}^2$$

A simple formula from the science of Physics can be used to calculate the surface gravity for a body (in this case the Earth) if you know the mass of the body and its radius! The assumption in using this formula is that the body is spherical, but this is a pretty good assumption. If the radii of a body at its equator and pole are very different, then the surface gravity is different at those places and should be calculated separately.

The surface gravity for the Earth is therefore 9.81 metres per second^2, or 9.81 metres per second per second. This is the **acceleration** due to gravity that an object feels near the surface of the Earth. For example, if an object were dropped from rest near the Earth's surface, it would accelerate to a velocity of 9.81 meters per second after one second, and the velocity would increase by another 9.81 meters per second for every additional second that the object was falling (in the vicinity of the Earth's surface).

A table of masses and radii is given below for many bodies in the Solar System. Make sure to convert the radii from kilometres to metres when making the calculation, and make sure that you can calculate the surface gravity of the Earth correctly. Then, calculate the surface gravity at each of the other bodies. Think about how much you would weigh on the surface of these bodies relative to how much you weigh on the surface of the Earth…"

AUTHOR

Now here **'G_{VR}' applied in lieu of above theory;-**

(Mass ignored)

$$\text{'a'} = G_{VR} \times V_E / r^2_e = \mathbf{G_{VR} \times 4/3.\ \pi.\ r_e} \qquad \mathbf{(7)}$$

Body	Mass (kg)	Radius (km)
Earth	$5.98 * 10^{24}$	$3.676.10^{-7}$ x 4/3. π. 6378 = 9.82m/s^2
Mercury	$3.30 * 10^{23}$	$3.676.10^{-7}$ x 4/3. π. 2439 = 3.75557m/s^2
Venus	$4.87 * 10^{24}$	$3.676.10^{-7}$ x 4/3. π. 6051 = 9.317m/s^2
Mars	$6.42 * 10^{23}$	$3.676.10^{-7}$ x 4/3. π. 3393=
Jupiter	$1.90 * 10^{27}$	$3.676.10^{-7}$ x 4/3. π. 71492=
Saturn	$5.69 * 10^{26}$	$3.676.10^{-7}$ x 4/3. π. 60268=
Uranus	$8.68 * 10^{25}$	$3.676.10^{-7}$ x 4/3. π. 25559=
Neptune	$1.02 * 10^{26}$	$3.676.10^{-7}$ x 4/3. π. 24764 =
Pluto	$1.29 * 10^{22}$	$3.676.10^{-7}$ x 4/3. π. 1150=
Moon	$7.35 * 10^{22}$	$3.676.10^{-7}$ x 4/3. π. 1738 = 2.676m/s^2
Ganymede	$1.48 * 10^{23}$	$3.676.10^{-7}$ x 4/3. π. 2631=
Titan	$1.35 * 10^{23}$	$3.676.10^{-7}$ x 4/3. π. 2575 =

Sun	$1.99 * 10^{30}$	$3.676.10^{-7}$ x 4/3. π. 696,000 = 1071.7m/s^2

SUN CENTRIPETAL VALUES – (Earth Radius, Kepler value only)

1) SUN at distance to Earth ‘a’ = V^2_{EARTH} / R = $29{,}888^2$ / $149.6x10^9$ = **0.006m/s^2** [Newton]
2) SUN 274m/s^2; at Earth ‘a’ = 274/214^2 = **0.006m/s^2** [standard model]
   Value specific for only 0.008,53% of total orbit!

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