The Mathematical Model of Space – Time and Gravity

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Abstract

This model predicts the details of Origination (the Big Bang), Expansion, Contraction, Termination (the Big Crunch) and Repetition (the Big Loop) of Space – Time.

It represents time as internally related to the system determined by the gravity.

It gives the relationship between the speed of light and Gravitational constant.

Further, Schwarzschild radius can be represented independently either of speed of light or Gravitational constant.

The Gravitational Constant is directly proportional to Planck's Length and inversely proportional to Planck's Mass.

It predicts the existence of the Multiverse or regions within the Universe.

Keywords

Space, Time, Gravity, Gravitational Constant, Speed of light, Planck's units

- I. Sohail's Hexagon
- II. The Origination, Expansion, Contraction, and Termination of Space - Time
- III. The Time
- IV. Relationship between Newton's Gravitational Constant and the Speed of Light
- V. Schwarzschild radius independent of:
 - a) Speed of Light
 - b) Gravitational Constant
- VI. Relationship between Planck's units and Gravitational Constant
- VII. Universe vs Multiverse

I. Sohail's Hexagon

Consider the Line of Reference (LOR)

Figure 1

Positive x-axis and negative x-axis of length n

Extend a ray of length n from 0 and join both x-axis and y-axis.

Figure 2

y-axis of length n perpendicular to origin 0 is extended from origin 0

Between negative n and positive n , there is zero. Zero is absent between any two positive n . If we see RAY 1, it is equal to Line of Reference (LOR). So, repeating the first step, we get back to same LOR.

Figure 3

RAY 1 as new Line of Reference

Figure 4

Half Phase Completion

Figure 5

When extending a ray, always negative n must be at left as it is defined at Line of Reference

Figure 6

Negative n is the point of rotation

Figure 7

Sohail's Hexagon

At last, we get a regular hexagon of side length n . I refer it to as Sohail's Hexagon.

Further, joining zeroes, we get:

Figure 8

Sohail's Hexagon with connected zeroes.

It looks like a galaxy is enclosed within a hexagon.

It has 6 positive n and only 1 negative n .

II. The Origination, Expansion, Contraction, Termination, and Repetition of Space - Time

Consider a Sohail's hexagon of unit side length.

Figure 9

Sohail's Hexagon of unit side length

Figure 10

Split - Collision Model

1st Split (Origination, commonly referred to as The Big Bang):

Particle of mass 1 splits at A at an angle of 120° . At B and C, mass is $\frac{1}{2}$.

2nd and 3rd Splits:

Further at B and C, particles split simultaneously at angles of 60° .

The Bounce:

At S, an ineffective collision occurs between half of B and half of C (or two $\frac{1}{4}$ of initial mass) at an angle of 120° . So, they bounce off one another.

1st and 2nd Collisions:

Half of 2nd Split collides with one of the bounced off particles at D. Half of 3rd Split collides with another bounced off particle at E.

3rd Collision (Termination, commonly referred to as The Big Crunch):

The final collision occurs at F at an angle of 120° . At F, mass of a particle is 1.

The Big Loop:

This model predicts the repetition of The Big Bang for at least once in the opposite arrow of time, so after the second Big Crunch, the particle is at the same place where it was at the first Big Bang.

III. The Time

Figure 11

The Time is related internally of the system.

Consider Sohail's Hexagon as the system.

The diagonal AF represents the arrow of time.

Since, Space - Time originated simultaneously, the time is related to space internally of the system. To an internal observer, time is related.

And time is equal to the gravitational interaction of the particles.

Considering the Big Loop, after the second Big Crunch, to an external observer, it is as nothing has happened.

IV. Relationship between Newton's Gravitational Constant and the Speed of Light

Consider Sohail's Hexagon of unit side length.

Length s from A (Origin) to F (End) is 2 units (length of diagonal of hexagon).

Rotation is anticlockwise. Angle between A and F is 0. Let m be the mass of a particle at A.

Work done is directly proportional to Energy.

$$\text{Work} \propto \text{Energy}$$

$$\text{Energy} \propto \text{Work}$$

By mass – energy equivalence, Energy $E = mc^2$

$$\text{Work done } W = F s \cos \theta$$

$$\text{Force } F = ma$$

$$\text{Acceleration } a = \frac{s}{t^2}$$

This Model defines time as defined by the Gravity.

$$\text{Time } t = \text{Gravity } G$$

$$E \propto W$$

$$mc^2 \propto F s \cos \theta$$

$$mc^2 \propto ma s (\cos 0)$$

$$mc^2 \propto ma s (1)$$

$$mc^2 \propto m \left(\frac{s}{t^2} \right) s (1)$$

Mass m on both sides gets cancelled

$$c^2 \propto \frac{s^2}{t^2}$$

$$c \propto \frac{s}{t}$$

Since s = 2, t = G, equation becomes

$$c \propto \frac{2}{G}$$

$$c = \frac{2}{G} K_S \quad \dots \text{Equation 1}$$

Where:

- c = Speed of Light

$$c = 299792458 \frac{m}{s}$$

- G = Gravitational Constant

$$G = 6.67430 \times 10^{-11} \frac{m^3}{kg s^2}$$

- K_S = Sohail's Constant

$$\text{Sohail's Constant, } K_S = 1.0004524012147 \times 10^{-2} S$$

$$S = \frac{\text{Jerk}}{\text{Density}} = \frac{j}{\rho} = \frac{\frac{m}{s^3}}{\frac{kg}{m^3}} = \frac{m^4}{kg s^3}$$

$$\text{Dimensional Formula of S: } [L^4 M^{-1} T^{-3}]$$

Final equation:

$$c = \frac{2}{G} \times (1.0004524012147 \times 10^{-2} S) \quad \dots \text{Equation 2}$$

Result:

- $\frac{cG}{K_S} = 2 \rightarrow$ A dimensionless quantity

V. Schwarzschild radius independent of:

a) Speed of Light

$$\text{Schwarzschild radius, } r_s = \frac{2GM}{c^2}$$

$$c^2 = \frac{4}{G^2} \times K_S^2 \rightarrow \text{from equation 1}$$

$$r_s = \frac{2GM}{\frac{4}{G^2} \times K_S^2}$$

$$r_s = \frac{G^3 M}{2 K_S^2}$$

b) Gravitational Constant

$$c = \frac{2}{G} \times K_S \rightarrow \text{from equation 1}$$

$$G = \frac{2}{c} \times K_S$$

$$r_s = \frac{2 \frac{2}{c} K_S M}{c^2}$$

$$r_s = \frac{4 K_S M}{C^3}$$

$$r_s = 1.4852320538237331 \dots \times 10^{-27} \times M$$

Where:

- M is mass of object
- G is Newton's Gravitational Constant
- C is the Speed of Light
- K_S is Sohail's Constant

$$K_S = 1.0004524012147 \times 10^{-2} S$$

$$(1 S = 1 \frac{Jerk}{Density} = 1 \frac{m^4}{kgs^3})$$

VI. Relationship between Planck's units and Gravitational Constant

Planck's length is given by

$$l_p = \sqrt{\frac{\hbar G}{c^3}} = 1.616255 \times 10^{-35} \text{ m}$$

Planck's time is given by

$$t_p = \sqrt{\frac{\hbar G}{c^5}} = 5.391247 \times 10^{-44} \text{ s}$$

The ratio of Planck's length square to Planck's time square is

$$\frac{l_p^2}{t_p^2} = \frac{\frac{\hbar G}{c^3}}{\frac{\hbar G}{c^5}} = c^2$$

$$c = \frac{l_p}{t_p}$$

$$c = \frac{2}{G} K_S \rightarrow \text{from equation 1}$$

$$G = \frac{2}{c} K_S$$

$$G = \frac{2}{\frac{l_p}{t_p}} K_S$$

$$G = 2K_S \frac{t_p}{l_p}$$

Where:

- G is Newton's Gravitational Constant
- K_S is Sohail's Constant

$$K_S = 1.0004524012147 \times 10^{-2} \text{ S}$$

$$(1 \text{ S} = 1 \frac{\text{Jerk}}{\text{Density}} = 1 \frac{\text{m}^4}{\text{kg s}^3})$$

VII. Universe vs Multiverse

Consider Sohail's Hexagon with shaded regions

Figure 12 Sohail's Hexagon

There are 6 positive regions and 1 negative region.

Area of negative region is equal to all 6 positive regions.

Figure 13

Black color represents positive regions from 0 to n .

White color represents negative region from 0 to $-n$.

Predictions:

Either:

Our Universe has 7 regions with 6 positive regions revolving around 1 negative central region.

Considering position from centre, each region has variant physical laws with variant constants.

Or:

Our Universe is one of the seven universes in a multiverse.

Considering position from centre, each universe has variant physical laws with variant constants.