The possibility of Flat Ads space evolving into ds space

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This article proposes a hypothesis. We connect the Klein-Gordon equation through the formula of Fermat's last theorem. The above procedure has an integer solution when n is less than or equal to 2. However, through domain expansion, when n is greater than 2, we connect the Klein-Gordon equation to Fermat. The last theorem, the Klein-Gordon equation has no integer solution; then it expands, forming the algebraic form of ds space-time.

Keywords:Ads space, Klein-Gordon equation, Fermat's last theorem

1. INTRODUCTION

In mathematics and physics, n-dimensional anti-de Sitter space (AdSn) is a maximally (having a left half that's a perfect mirror image of the right half) Lorentzian manifold with constant negative scalar curvature. Anti-de Sitter space and de Sitter space are named after Willem de Sitter (1872-1934), professor of (the study of outer space) at Leiden University and director of the Leiden (the building where you look at the stars, etc.). Willem de Sitter and Albert Einstein worked closely in Leiden in the 1920s on the spacetime structure of the universe.

Manifolds of constant curvature are most familiar in the case of two dimensions, where the surface of a world is a surface of constant positive curvature, a flat (Euclidean) plane is a surface of continuous zero curvature, and an exaggerated plane is a surface of constant negative curvature.

Einstein's general explanation of relativity places space and time on equal footing so that one thinks about/believes the geometry of a brought together (as one) spacetime instead of (thinking about) space and time separately. The cases of spacetime of constant curvature are de Sitter space (positive), Minkowski space (zero), and anti-de Sitter space (negative). So, they are exact solutions of Einstein's field equations for an empty universe with a positive, zero, or negative (related to the stars and the universe) constant, (match up each pair of items in order).

Anti-de Sitter space generalizes to any number of space dimensions. In higher dimensions, it is best known for its role in the AdS/CFT back-and-forth writing, which hints that it is possible to describe a force in (related to tiny, weird movements of atoms) mechanics (like electromagnetism, the weak force or the vital force) in a certain number of dimensions (for example four) with a string explanation (of why something works or happens the way it does) where the strings exist in an anti-de Sitter space, with one added (non-compact) dimension. De Sitter space in general relativity de Sitter space involves a difference of general relativity in which spacetime is (a) a little curved without matter or energy. This is the same as the relationship between Euclidean geometry and non-Euclidean geometry.

A built-in curvature of spacetime without matter or energy is modeled by the (related to the stars and the universe) constant in general relativity. This goes along with the vacuum having an energy density and pressure. This spacetime geometry results in, at first parallel timelike (shaped like a soccer ball)s separating, with spacelike sections having positive curvature.

Anti-de Sitter space (told apart from) de Sitter space An anti-de Sitter space in general relativity is just like a de Sitter space, except with the sign of the spacetime curvature changed. In anti-de Sitter space, without matter or energy, the curvature of spacelike sections is negative, going along with an exaggerated geometry, and at first parallel timelike (shaped like a soccer ball)s eventually intersects. This goes along with a negative (related to the stars and the universe) constant, where empty space itself has negative energy density but positive pressure, unlike the standard model of our own galaxy for which (instances of watching, noticing, or making statements) of distant supernovae point to a positive (related to the stars and the universe) constant going along with/matching up to (asymptotic) de Sitter space.

In an anti-de Sitter space, as in a de Sitter space, the built-in spacetime curvature goes along with the (related to the stars and the universe) constant.

De Sitter and anti-de Sitter spaces are viewed as deeply set within and part of five dimensions. As noted above, the comparison used above describes the curvature of a two-dimensional space caused by gravity in general relativity in a (having height, width, and depth) flat embedding space, like the Minkowski space of special relativity. Embedding de

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Sitter and anti-de Sitter spaces of five flat dimensions allow the properties of the embedded spaces to be severe and stubborn. Distances and angles within the embedded area may be directly decided from the more specific properties of the five-dimensional flat space.

While anti-de Sitter space does not go along with gravity in general relativity with the watched(related to the stars and the universe) constant, an anti-de Sitter space is believed to go along with other forces in (about tiny, weird movements of atoms) mechanics (like electromagnetism, the weak nuclear energy, and the reliable nuclear power). This is called the AdS/CFT back-and-forth writing.

Fermat's Last Theorem (also known as Fermat's Last Theorem, its summary is: Indefinite equations for x, y, z for integers $n > 2$[1]

$$x^n + y^n = z^n \tag{1}$$

There are no positive integer solutions.

This article proposes a hypothesis. We connect the Klein-Gordon equation through the formula of Fermat's last theorem. The above procedure has an integer solution when n is less than or equal to 2. However, through domain expansion, when n is greater than 2, we connect the Klein-Gordon equation to Fermat. The last theorem, the Klein-Gordon equation has no integer solution; then it expands, forming the algebraic form of ds space-time.

2. CONNECT THE KLEIN-GORDON EQUATION THROUGH THE FORMULA OF FERMAT'S LAST THEOREM

Taking the simplest classical field as an example, assuming that each point in space has an actual number that can change with time, denoted as $\phi(\mathbf{x}, t)$, where $\mathbf{x}$ is the position vector, and t is the time. This is the fundamental scalar field. Also, assume that the Lagrangian of this field is

$$L = \int d^3x\mathcal{L} = \int d^3x \left[\frac{1}{2}\dot{\phi}^2 - \frac{1}{2}(\nabla\phi)^2 - \frac{1}{2}m^2\phi^2\right]. \tag{2}$$

Where $\dot{\phi}$ is the time derivative of the field, ∇ is the divergence operator, m is a parameter (which can be thought of as the "mass" of the field ".Apply the Euler-Lagrangian equations for field theory on this Lagrangian

$$\frac{\partial}{\partial t}[\frac{\partial\mathcal{L}}{\partial(\partial\phi/\partial t)}] + \sum_{i=1}^{3}\frac{\partial}{\partial x^i}[\frac{\partial\mathcal{L}}{\partial(\partial\phi/\partial x^i)}] - \frac{\partial\mathcal{L}}{\partial\phi} = 0, \tag{3}$$

The equation of motion of the field can be derived, describing its changes in time and space:

$$\left(\frac{\partial^2}{\partial t^2} - \nabla^2 + m^2\right)\phi = 0. \tag{4}$$

This is the Klein-Gordon equation.

We connect the Klein-Gordon equation through the formula of Fermat's last theorem[1]

$$\begin{aligned}
&(x^n - y^n) = \left[(x^n + y^n)^{\frac{1}{2}} - (2y^n)^{\frac{1}{2}}\right]\left[(x^n + y^n)^{\frac{1}{2}} + (2y^n)^{\frac{1}{2}}\right] \\
&= \left[(x^n + y^n)^{\frac{1}{4}} - (2y^n)^{\frac{1}{4}}\right]\left[(x^n + y^n)^{\frac{1}{4}} + (2y^n)^{\frac{1}{4}}\right]\left[(x^n + y^n)^{\frac{1}{2}} + (2y^n)^{\frac{1}{2}}\right] \\
&= \left[(x^n + y^n)^{\frac{1}{8}} - (2y^n)^{\frac{1}{8}}\right]\left[(x^n + y^n)^{\frac{1}{8}} + (2y^n)^{\frac{1}{8}}\right]\left[(x^n + y^n)^{\frac{1}{4}} + (2y^n)^{\frac{1}{4}}\right]\left[(x^n + y^n)^{\frac{1}{2}} + (2y^n)^{\frac{1}{2}}\right] \\
&= \left[(x^n + y^n)^{\frac{1}{m}} - (2y^n)^{\frac{1}{m}}\right]\left[(x^n + y^n)^{\frac{1}{m}} + (2y^n)^{\frac{1}{8}}\right]\ldots\left[(x^n + y^n)^{\frac{1}{2}} + (2y^n)^{\frac{1}{2}}\right].
\end{aligned} \tag{5}$$

We set $x = \frac{\partial}{\partial t}$,$y = \nabla$.

3. THE POSSIBILITY OF FLAT ADS SPACE EVOLVING INTO DS SPACE

We can pre-set the boundary conditions $eA_0(x) = -y\omega$(which can be $\mu = y\omega$)[2, 3].

The spherical quantum solution in a vacuum state.

The general relativity theory's field equation is written completely in this theory.

$$R_{\mu\nu} - \frac{1}{2}g_{\mu\nu}R = -\frac{8\pi G}{c^4}T_{\mu\nu} \tag{6}$$

The Ricci tensor is by $T_{\mu v} = 0$ in a vacuum state.

$$R_{\mu v} = 0 \tag{7}$$

The proper time of spherical coordinates is

$$d\tau^2 = A(t,r)dt^2 - \frac{1}{c^2}\left[B(t,r)dr^2 + r^2 d\theta^2 + r^2 \sin\theta d\phi^2\right] \tag{8}$$

We obtain the Ricci-tensor equations.

$$R_{tt} = -\frac{A''}{2B} + \frac{A'B'}{4B^2} - \frac{A'}{Br} + \frac{A'^2}{4AB} + \frac{\ddot{B}}{2B} - \frac{\dot{B}^2}{4B^2} - \frac{\dot{A}\dot{B}}{4AB} = 0 \tag{9}$$

$$R_{rr} = \frac{A''}{2A} - \frac{A'^2}{4A^2} - \frac{A'B'}{4AB} - \frac{B'}{Br} - \frac{\ddot{B}}{2A} + \frac{\dot{A}\dot{B}}{4A^2} + \frac{\dot{B}^2}{4AB} = 0, \tag{10}$$

$$R_{\theta\theta} = -1 + \frac{1}{B} - \frac{rB'}{2B^2} + \frac{rA'}{2AB} = 0, R_{\phi\phi} = R_{\theta\theta}\sin^2\theta = 0, R_{tr} = -\frac{\dot{B}}{Br} = 0, R_{t\theta} = R_{t\phi} = R_{r\theta} = R_{r\phi} = R_{\theta\phi} = 0 \tag{11}$$

In this time, $' = \frac{\partial}{\partial r}$ $, \cdot = \frac{1}{c}\frac{\partial}{\partial t}$,

$$\dot{B} = 0 \tag{12}$$

We see that,

$$\frac{R_{tt}}{A} + \frac{R_{rr}}{B} = -\frac{1}{Br}\left(\frac{A'}{A} + \frac{B'}{B}\right) = -\frac{(AB)'}{rAB^2} = 0 \tag{13}$$

Hence, we obtain this result.

$$A = \frac{1}{B} \tag{14}$$

If,

$$R_{\theta\theta} = -1 + \frac{1}{B} - \frac{rB'}{2B^2} + \frac{rA'}{2AB} = -1 + \left(\frac{r}{B}\right)' = 0 \tag{15}$$

If we solve Eq,

$$\frac{r}{B} = r + C \to \frac{1}{B} = 1 + \frac{C}{r} \tag{16}$$

When r tends to infinity, and we set C=$-ye^y$, Therefore,

$$A = \frac{1}{B} = 1 + \frac{y}{r}\Sigma, \Sigma = e^y \tag{17}$$

$$d\tau^2 = \left(1 + \frac{y}{r}\sum\right)dt^2 \tag{18}$$

In this time, if particles' mass are m_i, the fusion energy is e,

$$E = Mc^2 = m_1c^2 + m_2c^2 + \ldots + m_nc^2 + e \tag{19}$$

The effect after the preset boundary is similar to that of Ads cosmological constant.

But $\boldsymbol{b}=\boldsymbol{t}\times\boldsymbol{n}$ and $\boldsymbol{t}=\frac{\partial \boldsymbol{X}}{\partial s}=\boldsymbol{X}_s$. By the Frenet-Serret (FS) formula, we have:[4]

$$\boldsymbol{t}_s=\kappa\boldsymbol{n} \quad \boldsymbol{n}_s=-\kappa\boldsymbol{t}+\tau\boldsymbol{b} \quad \boldsymbol{b}_s=-\tau\boldsymbol{n} \tag{20}$$

Where τ is the torsion of the curve. We find:

$$\boldsymbol{X}_t=\boldsymbol{X}_s\times\boldsymbol{X}_{SS} \tag{21}$$

This is the differential evolution equation of the filament. Following Hashimoto, we combine the second and third FS formulas to obtain the following:

$$(\boldsymbol{n}+i\boldsymbol{b})_s=-\kappa\boldsymbol{t}-i\tau(\boldsymbol{n}+i\boldsymbol{b}) \tag{22}$$

This suggests introducing the complex vector

$$\boldsymbol{N}=(\boldsymbol{n}+i\boldsymbol{b})e^{i\phi} \tag{23}$$

The complex phase $\phi(s,t)$ is such that its derivative concerning s should give $\tau(s,t)$. This will be the case if $\phi(s,t)=\int_0^s\tau\left(s',t\right)ds'$. We find this from

$$\boldsymbol{N}_S=-\kappa e^{i\phi}\boldsymbol{t} \tag{24}$$

Let us set

$$\psi=\kappa e^{i\phi}=\kappa(s,t)e^{i\int_0^s\tau\left(s',t\right)ds'} \tag{25}$$

This complex function replaces two scalar functions $\kappa(s,t)$ and $\tau(s,t)$. It drives the evolution of the filament. Equation thus becomes

$$\boldsymbol{N}_s=-\psi\boldsymbol{t} \tag{26}$$

This is as a new complex FS equation where the variables $\boldsymbol{n}(s,t)$ and $\boldsymbol{b}(s,t)$ have been replaced by the complex ψ. This is called the Hashimoto transformation. Still following Hashimoto, we search for an equation to replace $\boldsymbol{X}_t=\boldsymbol{X}_s\times\boldsymbol{X}_{ss}$. We first notice that

$$\boldsymbol{t}\cdot\boldsymbol{t}=1 \quad \boldsymbol{N}\cdot\boldsymbol{N}^*=2 \quad \boldsymbol{N}\cdot\boldsymbol{N}=\boldsymbol{N}^*\cdot\boldsymbol{N}^*=0 \tag{27}$$

$(\boldsymbol{t},\boldsymbol{N},\boldsymbol{N}^*)$ is a new basis replacing the FS basis $(\boldsymbol{t},\boldsymbol{n},\boldsymbol{b})$

Hence, we obtain the first FS equation in the new variables as

$$\boldsymbol{t}_s=\frac{1}{2}\left(\psi^*\boldsymbol{N}+\psi\boldsymbol{N}^*\right)=\kappa\boldsymbol{n} \tag{28}$$

Let us now derive the induction equation concerning s. We find

$$\frac{\partial}{\partial s}\left(\frac{\partial X}{\partial t}\right)=\frac{\partial}{\partial t}\left(\frac{\partial X}{\partial s}\right)=\frac{\partial}{\partial t}\boldsymbol{t}=\kappa_s\boldsymbol{b}+\kappa\boldsymbol{b}_s=\kappa_s\boldsymbol{b}-\kappa\tau\boldsymbol{n} \tag{29}$$

let us express this in terms of the new variables $\psi,\boldsymbol{N}$. We form

$$\psi_s\boldsymbol{N}^*-\psi_s^*\boldsymbol{N}=-2i\boldsymbol{t}_t \tag{30}$$

Now let us express this in terms of the new variables $\psi,\boldsymbol{N}$. We form

$$\psi_s\boldsymbol{N}^*-\psi_s^*\boldsymbol{N}=-2i\boldsymbol{t}_t \tag{31}$$

For expressing $\boldsymbol{N}_t$ in the new variables, we set

$$\boldsymbol{N}_t=\alpha\boldsymbol{N}+\beta\boldsymbol{N}^*+\gamma\boldsymbol{t} \tag{32}$$

Using the orthogonality relations, we find

$$\boldsymbol{N}\cdot\boldsymbol{N}_t^*+\boldsymbol{N}_t\cdot\boldsymbol{N}^*=2\left(\alpha+\alpha^*\right)=4\,\mathrm{Re}(\alpha)=0 \tag{33}$$

Similarly, we have

$$(\boldsymbol{N}\cdot\boldsymbol{N})_t = 4\beta = 0 \tag{34}$$

And finally

$$\boldsymbol{t}\cdot\boldsymbol{N}_t = \gamma = -i\psi_s \tag{35}$$

Thus, it comes

$$\boldsymbol{N}_t = \mathrm{Im}(\alpha)\boldsymbol{N} - i\psi_s\boldsymbol{t} \tag{36}$$

Let us set $\alpha = iR$ where R is real. We have:

$$\boldsymbol{N}_t = i\left(R\boldsymbol{N} - \psi_s\boldsymbol{t}\right) \tag{37}$$

We now combine with $\boldsymbol{t}_s$ and $\boldsymbol{t}_t$ to compute $\boldsymbol{N}_{st}$ and $\boldsymbol{N}_{ts}$ by two different ways. This will allow us to find the last unknown R and, in turn, to find the equation for ψ. Since $\boldsymbol{N}_{st} = \boldsymbol{N}_{ts}$, we can equate the components in the basis $(\boldsymbol{t}, \boldsymbol{N}, \boldsymbol{N}^*)$. This yields

$$\begin{aligned} i\partial_t\psi &= -\psi_{ss} - R\psi \\ \frac{i}{2}\psi\psi_s^* &= iR_s - \frac{i}{2}\psi_s\psi^* \end{aligned} \tag{38}$$

The equation gives

$$R_s = \frac{1}{2}\left(\psi\psi_s^* + \psi_s\psi^*\right) = \frac{1}{2}|\psi|_s^2 \tag{39}$$

We get that

$$R(s,t) = \frac{1}{2}|\psi|^2 + A(t) \tag{40}$$

If ψ becomes a function of x, y, z, t this generalizes to

$$i\hbar\frac{\partial\psi(x,y,z,t)}{\partial t} + \left(\frac{\hbar}{4m}|\psi|^2 + A(t)\right)\psi(x,y,z,t) = -\frac{\hbar^2}{2m}\Delta\psi(x,y,z,t) \tag{41}$$

We tie together equation (5). The above procedure has an integer solution when n is less than or equal to 2. However, through domain expansion, when n is greater than 2, we connect the Klein-Gordon equation to Fermat. The last theorem, the Klein-Gordon equation has no integer solution; then it expands, forming the algebraic form of ds spacetime.

4. SUMMARY

This article puts forward a hypothesis. It will happen spontaneously. We assume that both the macro system and the microsystem are closed systems. We know that Ads space can constitute Ads/CFT theory, but ds space has serious difficulties (experiments prove that the universe is ds spacetime). Assuming a spontaneous entropy reduction process in the microscopic system, the Ads space can evolve into the ds space.

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