응용미약에너지학회지, 2015, 제13권, 제1호, pp. 31-35
Journal of Applied Subtle Energy,
2015. Vol. 13, No. 1, pp. 31-35

Origin of Numbers

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Abstract: This Fermat Last Theorem was published at 1637 and then proved at 1993 by Andrew Wiles, who is the professor in Prinston USA.

Fermat Last Theorem is composed of Pythagoras Theorem and Rieman Hypothesis.

Its verification is possible after the proof of Rieman Hypothesis.

Numbers are originated from Rieman Hypothesis of the jeta function, that is to say, space structure.

It is a meeting between physics and mathematics. They have the same origin.

1. Special Relativity and Energy Vectors

The kinetic energy of an object is equal to the increase in its mass due to its relative motion multiplied by the square of the speed of light(c).

It may be written

$$mc^2 = m_0c^2 + k \qquad \cdots\cdots(1)$$

Where m is the total mass, m0 is the rest mass, and k is the kinetic energy of the object (ref.1).

The equation is integrated along the momentum direction.

We can derive from the relativistic formulas for the total energy(mc^2) and the linear momentum(p)

$$m^2c^4 = m_0^2c^4 + p^2c^2 \qquad \cdots\cdots(2)$$

If we let

$$\left(\begin{array}{l} \vec{E} = e_1\vec{ii} + e_2\vec{ij} \\ \vec{P} = p_1\vec{ii} + p_2\vec{ij} \\ \vec{K} = k_1\vec{ii} + k_2\vec{ij} \end{array}\right) \qquad \cdots\cdots(3)$$

$$\vec{E} = \vec{P} + \vec{K} \qquad \cdots\cdots(4)$$

$$\vec{P} \circ \vec{K} = 0 \qquad \cdots\cdots(5)$$

The equation (1) is

$$\left(\begin{array}{l} \vec{E} = mc^2\vec{ii} + \left(mc^2 - 2m_0c^2\right)\vec{ij} \\ \vec{P} = m_0c^2\vec{ii} + \left(-m_0c^2\right)\vec{ij} \\ \vec{K} = k\vec{ii} + k\vec{ij} \end{array}\right) \qquad \cdots(6)$$

The equation (2) is

$$\left(\begin{array}{l} \vec{E} = (\pm)m_0c^2\vec{ii} + pc\vec{ij} \\ \vec{P} = (\pm)m_0c^2\vec{ii} + 0\vec{ij} \\ \vec{K} = 0\vec{ii} + pc\vec{ij} \end{array}\right) \qquad \cdots\cdots(7)$$

We can seek for life energies as follows (ref.2) rotational electromagnetic waves.

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From equation (6),
leftwise positive + rightwise positive,
leftwise negative + rightwise negative,
leftwise positive + leftwise negative,
rightwise positive + rightwise negative.
From equation (7),
leftwise positive, rightwise positive,
leftwise negative, rightwise negative.

2. Zero Point Energy

Zero-point energy is the lowest possible energy that a quantum mechanical physical system may have and it is energy of its ground state.

All quantum mechanical systems undergo fluctuations even in their ground state and have an associated zero-point energy, a consequence of the Heisenberg cencertainty principle.

Albert Einstein and Otto Stern(1913) published a paper of great significance in which they suggested for the first time the existence of a residual energy that all oscillators have at absolute zero. They called this residual energy as zero-point energy. They carried out an analysis of the specific heat of hydrogen gas at low temperature, and concluded that the data are best represented if the vibrational energy is (ref.2)

$$E = \frac{hv}{e^{hv/k_bT} - 1} + \frac{hv}{2} \qquad \text{.......(8)}$$

According to this expression, an atom system at absolute zero retains an energy of $\frac{1}{2}h\nu$. An energy vector is organized for equation(8) as follows

$$\left(\begin{array}{c} \vec{E} = \varepsilon ii + \left(-\frac{1}{2}hv \right) ij \\ \vec{P} = \left(\frac{1}{2}hv + \frac{1}{2}\frac{hv}{e^{hv/k_bT} - 1} \right) ii + \left(-\frac{1}{2}hv - \frac{1}{2}\frac{hv}{e^{hv/k_bT} - 1} \right) ij \\ \vec{K} = \frac{1}{2}\frac{hv}{e^{hv/k_bT} - 1} ii + \frac{1}{2}\frac{hv}{e^{hv/k_bT} - 1} ij \end{array} \right) \qquad \text{.......(9)}$$

where $\vec{E}$:total energy vector
ii, ij: unit rectangular vectors
h : Plank constant
v: frequencies
r_0: $\lambda = 2\pi r_0$(wave length)
r: radial distance
k_b: Boltzman constant
T: absolute temperature

$\frac{1}{2}h\nu$ is derived from $h\nu\frac{r_0}{r}$ as follows

$$\int_0^1 hv\frac{r_0}{r} d\left(\frac{r_0}{r}\right) = \frac{1}{2}hv\left(\frac{r_0}{r}\right)^2 \Bigg|_0^1 = \frac{1}{2}hv \qquad \text{.......(10)}$$

where r change from ∞ to r0.

We knows that $h\nu\frac{r_0}{r}$ is a potential energy, which is converted from a kinetic energy.

We can conclude from equation(9) that space is composed of 4 kinds of rotational electromagnetic waves (leftwise positive, leftwise negative, rightwise positive and right negative).

3. Electromagnetic waves

Electromagnetic wave is a motion of a harmonic free particle.

It retains conservations of momentum and energy. It shows that the electromagnetic wave can convert the kinetic energy into a potential energy by energy vector each other. The potential energy propagates from rightwise to leftwise or from leftwise to rightwise as in Fig.1 (ref.6).

The energy vector for an electromagnetic wave is as follows

$$\begin{pmatrix} \vec{E} = h\nu ii + 0ij \\ \vec{P} = \frac{1}{2}h\nu\left(= h\nu\frac{r_0}{r}\right)ii + \left(-\frac{1}{2}\right)h\nu\left(= -h\nu\frac{r_0}{r}\right)ij \\ \vec{K} = \frac{1}{2}h\nu ii + \frac{1}{2}h\nu ij \end{pmatrix} \quad \cdots\cdots(9)$$

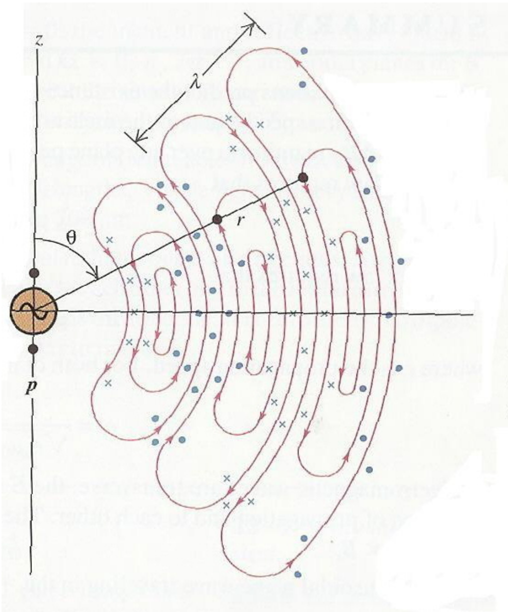

Fig. 1 Representation of the electric field (line) and the magnetic field (dots and crosses) in a plane containing and oscillating electric dipole. During one period the inner loop moves out and expands to become the outer loop.

The total energy of a electromagnetic energy is $h\nu$ only and also its static mass is zero, which is called a harmonic free particle motion.

4. Rieman Hypothesis

Space is composed of four rotational electro - magnetic waves and life energies is also composed of four rotational electromagnetic waves. Wave function (probability function in quantum mechanics) is given as follows.

$$\Psi = e^{(-\frac{i}{\hbar})(Et - px)} \quad \cdots\cdots(11)$$

Ψ : wave function(probability function)
$\hbar$: h/2π(Planck constant)
E : total energy
p : momentum
χ : position

The four rotational electro - magnetic waves have zero momentum.(P=0 or x=0)

$$\Psi = e^{-(\frac{i}{\hbar})(Et)} \quad \cdots\cdots(12)$$

The total energy(E) has complex quantity.

$$E = \frac{1}{2}hv + i\frac{hv}{e^{hv/k_b T} - 1} \quad \cdots\cdots(13)$$

Where k_b and T are Boltman constant and absolute temperature.

The $\frac{1}{2}h\nu$ in equ(13) is come from equation(10).

$$\Psi = e^{-(\frac{2\pi i}{h})(\frac{1}{2}hv + i\frac{hv}{e^{hv/k_b T - 1}})t} \quad \cdots\cdots(14)$$

$$\Psi = (\frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s} + \frac{1}{4^s} + \frac{1}{5^s} + \cdots) \quad \cdots\cdots(15)$$

Where $S = \frac{1}{2} + i\frac{1}{e^{hv/k_b T_{-1}}}$

The complex number(S) has always the real number ($\frac{1}{2}$) at ψ=0.

The time (t) in equation (14) is the inward time of the composed rotational electro - magnetic waves.

This is the origin of the third one in Newton's laws of motion, which is originated from the structure of space.

Numbers are originated from the space structure.

It is a meeting between physics and mathematics. They have the same origin.

5. Fermat's Last Theorem

From Pythagoras theorem

$$\cos^2\theta + \sin^2\theta = 1^2 \quad \cdots\cdots(16)$$

Multiplying ψ*ψ in both sides

$$(\Psi^*\Psi)^{-2}\cos^2\theta + (\Psi^*\Psi)^{-2}\sin^2\theta = (\Psi^*\Psi)^{-2}1^2 \quad \cdots\cdots(17)$$

Equation(17) becomes Fermat Last Theorem.

$$X^N + Y^N = Z^N \cdots \quad \cdots\cdots(18)$$

Assuming that N is greater than 3 equation(18) can not be exist, in case that X, Y, Z, N are all integers, as we see in equation(17).

6. Discussions

Pierre de Fermat was born 1601 at France and dead 1665.

Fermat Theorem was published at 1640. And then it was proved at 1736 by Euler.

This Fermat Last Theorem was published at 1637 and then proved at 1993 by Andrew Wiles, who is the professor in Prinston, USA.

Fermat Last Theorem is composed of Pythagoras Theorem and Rieman Hypothesis, as we see in the equation(17).

Its verification is possible after the proof of Rieman Hypothesis.

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