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Hiroshi Michiwaki

Study introducing parameters that connect physical equations and reducible set theoretical division by zero

I. Discussion of photon energy and reducible set theoretical division by zero

By using the Planck constant h, wave-particle photon energy E is expressed as a function of wavelength λ,

$$E(\lambda) = \frac{hc}{\lambda} \qquad (1)$$

Here, if we assume an arbitrary parameter κ as

$$1 = \frac{\kappa}{\kappa} \qquad (\kappa \neq 0) \qquad (2)$$

and substitute it in Equation (1), photon energy E can be expressed as

$$E(\lambda) = \frac{\kappa}{\kappa}\frac{hc}{\lambda} \qquad (\kappa \neq 0) \qquad (3)$$

Of course, when $\lambda \neq 0$, the dimensionless coefficient κ/κ is 1; therefore, $E(\lambda)$ in Equation (3) becomes equivalent to Equation (1). Here, if we assume $\lambda = 0$ in Equation (3),

$$E(0) = \frac{\kappa}{\kappa}\frac{hc}{0} = \frac{\kappa hc}{\kappa \cdot 0} = \frac{\kappa hc}{0} \qquad (\kappa \neq 0) \qquad (4)$$

is obtained. To the result of Equation (4), if we apply the reducible set theory (March 18, 2014: Reducible set theory), we obtain a quotient of 0 and a remainder of κhc, and energy E is not emitted. It[A1] also does not simply become 0, showing that for the whole system, the energy of κhc is conserved.

Here, we should note that κhc is in the original dimension of E. This is a natural interpretation because hc is divided by λ, and the dimension is the result of the division regardless of the value of λ. It would be natural to think that this would be applied the same way in the case of $\lambda = 0$.

II. Discussions of the Doppler effect and reducible set theoretical division by zero

Using the same method as the above section I, we will consider the Doppler effect. If we assume the frequency of the original sound waves as f, the sound velocity as v, the velocity at which the sound source is moving as v_s, and the velocity at which the observer is moving as v_o, the frequency of the sound waves f' for the observer becomes,

$$f' = \frac{v - v_o}{v - v_s} f \qquad (5)$$

If we assume the arbitrary parameter η as

$$1 = \frac{\eta}{\eta} \qquad (\eta \neq 0) \qquad (6)$$

and introduce it into Equation (5), then the observed frequency f' becomes

$$f' = \frac{\eta}{\eta} \frac{v - v_o}{v - v_s} f \qquad (\eta \neq 0) \qquad (7)$$

Of course, when $v - v_s \neq 0$, the dimensionless coefficient η/η is 1; thus, the f' of Equation (7) becomes equivalent to that of Equation (5). Here, in Equation (7), if the velocity at which the sound source is moving v_s becomes the same as the sound velocity v; in other words, $v - v_s = 0$,

$$f' = \frac{\eta}{\eta} \frac{v - v_o}{0} f = \frac{\eta(v - v_o)}{\eta \cdot 0} f = \frac{\eta(v - v_o) f}{0} \qquad (\eta \neq 0) \qquad (8)$$

is obtained. If we interpret the result of Equation (8) by applying reducible set theory (March 18, 2014, Reducible set theory), it shows that the quotient equals 0, and the remainder is equal to $\eta(v - v_o) f$. Of course, here, $\eta(v - v_o) f$ is in the dimension of f. In other words, the frequency perceived by the observer f' appears to be 0, but it shows that $\eta(v - v_o) f$ exists as the conserved amount.

III. Discussion of special relativity theory and reducible set theoretical division by zero

For the mass m in special relativity theory, if we define m_0 as the rest mass, and its movement velocity as v, it can be expressed as

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} \qquad (9)$$

Where c is the speed of light.

Here, the arbitrary parameter μ as

$$1 = \frac{\mu}{\mu} \qquad (\mu \neq 0) \qquad (10)$$

is introduced into Equation (9). Then, the theoretical mass m in special relativity is expressed as

$$m = \frac{\mu}{\mu}\frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}} \qquad (\mu \neq 0) \qquad (11)$$

Of course, when $v \neq c$, the dimensionless coefficient μ/μ is 1; thus, the m in Equation (11) becomes equivalent to that of Equation (9). Here, in Equation (11), if movement velocity v becomes the same as the speed of light c; in other words, if $v = c$,

$$m = \frac{\mu}{\mu}\frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}} = \frac{\mu}{\mu}\frac{m_0}{0} = \frac{\mu m_0}{\mu \cdot 0} = \frac{\mu m_0}{0} \qquad (\mu \neq 0) \qquad (12)$$

is obtained. If we interpret the result of Equation (12) by applying the reducible set theory (March 18, 2014, subtractable set theory), it shows that the quotient equals 0 and the remainder equals μm_0. Of course, μm_0 here is in the dimension of m. In other words, mass m appears to be 0 when the movement velocity v reaches the speed of light c, but μm_0 exists in the overall system.

Here, we assume mass m_0 as the rest mass of a neutrino, and the flight velocity of a neutrino as v. If we combine this with the observational results from the Super-Kamiokande, we almost obtain $v = c$; thus, the mass m of a neutrino in flight becomes infinitely large if calculated with Equation (9). This is inconsistent with empirical observation. This result shows that though a neutrino is extremely small, it has a finite mass that is larger than 0. This can be explained rationally by the reducible set theory and Equation (12).

For example, this means that if an elementary particle, etc., moves at the speed of light, mass is not discharged. It also means that there is no paradox as described above that would break the law of the conservation of energy. In other words, this theory shows that the problem of division by zero where the laws of physics are broken by an essential singularity is solved. It poses other problems, however. For example, what is light with wavelength zero?

Sound emitted from a sound source that reaches the speed of sound creates a shock wave in that instant, and subsequently, the wavelength of sound emitted from a sound source that maintains the speed of sound continues to be zero. At this time, what does the conserved remainder term refer to? From such questions, it proposes the problem of a possible relationship between unsolved dark matter and mass μm_0.