Interpretation (Fermat's Theorem, Quantum Field Theory, Normalization)

"Flamenco Chuck" Keyser

BuleriaChk@aol.com

Latest Update 02/11/2017 12:58 PM

The Relativistic Unit Circle (foundation reference)

Interpretation of Proof of Fermat's Theorem

Fermat's Theorem (positive integers a,b,c,n) for case $n=2$

$$c^2 = a^2 + b^2$$
$$1^2 = \frac{a^2}{c^2} + \frac{b^2}{c^2} = \gamma^2 + \beta^2$$
$$n^2 = n^2\gamma^2 + n^2\beta^2$$

This equation cannot be correct unless either $\gamma = 1, \beta = 0$ or $\gamma = 0, \beta = 1$, in which case $n^2 = n^2$.

$$\gamma = 1, \beta = 0 \Leftrightarrow a^2 = c^2, b^2 = 0$$

$$\gamma = 0, \beta = 1 \Leftrightarrow b^2 = c^2, a^2 = 0$$

Pythagorean Triples

Since both a and b cannot be integers if both are non-zero, then $\left(c^2\right) = \left(a^2 + b^2\right)$ cannot be an integer unless a and b have a lowest common denominator so that $c^2 = \frac{(a')^2 + (b')^2}{d^2}$, where c,d,a',b' are integers. $(cd)^2 = (a')^2 + (b')^2$, which is the condition for a Pythagorean Triple, where there is no metric connecting (a,b,c) , but only a relation of counting (partitioning) in one dimension, where $\sqrt{cd}$ and $\sqrt{(a')^2 + (b')^2}$ refer to the same unique integer.

For Pythagorean Triples the relation between a^2 and b^2 must be in terms of the number bases which yield Pythagorean Triples (e.g. 3,4,5 right triangle) in the decimal system of base 10… a method of subdividing counts in metrically unrelated number systems.

Fermat's Theorem

Fermat's Theorem demands that (a,b) are independent, so that all possibilities of the relation between the sets $\{a\}$, $\{b\}$, and $\{c\}$ are included in the equation $c^n = a^n + b^n$

From the Binomial Theorem ($a>0, b>0$) for $n=2$, $c^2 = (a+b)^2 = a^2 + b^2 + 2ab = a^2 + b^2 + rem(a,b,2)$ where $rem(a,b,2)$is the resultant of that connection. If $\vec{a}$ and $\vec{b}$ in the same dimension, then $a\vec{i} \cdot b\vec{i} = ab\left(\vec{i} \cdot \vec{i}\right) = ba\left(\vec{i} \cdot \vec{i}\right) = ab\left(1^2\right) = ba\left(1^2\right)$ but $\vec{a} \otimes \vec{b} = \vec{0}$ so that there is no interaction, and $c^2 = a^2 + b^2$ refer to the same unique integer on either side of the equality.

If $\vec{a}$ and $\vec{b}$ are orthogonal, then the summed cross products of the transposed matrices yield $\begin{vmatrix} a & 0 \\ 0 & b \end{vmatrix} \rightarrow ab\left(\vec{0}\right)$ and $\begin{vmatrix} b & 0 \\ 0 & a \end{vmatrix} \rightarrow ab\left(\vec{0}\right)$ so added together (so they commute), the result is $2ab\left(\vec{0}\right) = 2ba\left(\vec{0}\right)$, which characterizes the interaction between $\vec{a}$ and $\vec{b}$ when they are not orthogonal. Since $2ab \neq 0$, $c^2 \neq a^2 + b^2$

This is then easily extended to the case $n > 2$, since $c^n = (a+b)^n = (a+b)^2 (a+b)^{n-2} = a^n + b^n + rem(a,b,n)$, and since

$rem(a,b,n)$>0 always, $c^n \neq (a+b)^n$ for positive integer, and for positive real numbers as well. Note that $c^n = a^n \Leftrightarrow b^n = 0$, and similarly $c^n = b^n \Leftrightarrow a^n = 0$ (i.e., the symbols on each side of the equality refer to the same unique integer as in one dimension.

Quantum Field Theory Interpretation

This corresponds to the quantum field theoretic interpretation of the relativistic unit circle, where $A = \gamma\beta$ corresponds to the "energy/area" contributions from the 1st and 3rd quadrants of the relativistic unit circle (each of which are $\frac{1}{2}\left(\sqrt{(\pm\gamma)(\pm\beta)}\right)^2 = \frac{1}{2}|\gamma\beta|$). The contribution from these two quadrants is $\gamma\beta$ (where $-\gamma\beta$ is the contribution from the 2nd and 4th quadrants).

Normalized Final State (relativistic unit circle)

Four all four quadrants, the total relativistic energy of equal and opposite contributions from the γ and β axes for two normalized identical particles is given by:

$\begin{vmatrix} \gamma_1^{\ 2} & 0 \\ 0 & \beta_1^{\ 2} \end{vmatrix} = \begin{vmatrix} 1^2 & 0 \\ 0 & 1^2 \end{vmatrix} \rightarrow \left(1^4\right)\left(\overleftrightarrow{0}\right)$, which is the normalized final condition for two identical particles, so the difference for as specific angle θ is given by $\left(\delta E\right)^2\left(\overleftrightarrow{0}\right) = 1^4 - \left(\gamma\beta\right)^2\left(\overleftrightarrow{0}\right)$ and $\psi^2 = \left(\delta E\right)^2 = 1^4 - \left(\gamma\beta\right)^2$, where

$$\begin{vmatrix} \gamma\beta & 0 \\ 0 & \gamma\beta \end{vmatrix} \rightarrow \left(\gamma\beta\right)^2 (\overleftrightarrow{0})$$

This difference corresponds to a radiation $\left(\gamma\beta\right)^2$ from a system with energy 1^4; if there is no radiation, $\beta = 0$, and there has been no change.

Normalized Initial State

Here the equation is given by $\psi^2 = \left(\delta E\right)^2 = 1^4 + \left(\gamma\beta\right)^2$, which corresponds to an absorption of energy to the normalized initial state. If $\beta = 0$, then $\psi^2 = 1^4$

(Note that the factor of 1^4 as opposed to 1^2 arises from the fact that we are considering two particles from equal but opposing quadrants, rather than just the contribution from the positive quadrant.)

Note that in the relativistic Binomial Expansion, negative values of β and γ may be included when modeling the interaction as "spin" provided that $\gamma^n + \beta^n > rem\left(\gamma, \beta, n\right)$ so that $c^n > 0 \Leftrightarrow c^n t_0^{\ n} = \left(ct_0\right)^n, m_0^{\ n} > 0,\ t_0^{\ n} = 1^n > 0$