Proof of Goldbach's Conjecture

"Flamenco Chuck" Keyser

3/24/2018

www.FlamencoChuck.com

BuleriaChk@aol.com

Fermat's Last Theorem (Proof)

Goldbach Analysis (short version)

This proof includes concepts from earlier work involving my proof of Fermat's Theorem in the context of Theory of Relativity applied to positive real numbers. I'll be updating and revising it as time goes on to try to clarify the ideas. I just added "The Grand Finale" at the end, and the argument from vectors is unnecessary and confusing, so I may remove in the near future.

Introduction

This proof of Goldbach's conjecture is based the Binomial Expansion for the case $n=2$ in the context of the relativistic unit circle, where the Binomial Expansion includes the sides of the triangles and their areas inscribed but eliminates the resultant $(ct'=0) \Leftrightarrow (c\tau')^2 = 0^2$. The sides and the area are then prime (cannot divide each other, since division by the resultant is division by zero. However, the area defined by $(ct)(vt')$ remains intact as long as it is not parsed to other combinations (e.g. $(ct')*(vt)=0$) so the laws of association and distribution in multiplication is not permitted and (ct) and (vt') remain orthogonal (and thus prime).

Because the "interaction" expression is $-2xy$ "=" x^2+y^2 , $2(x)(-y)$ "=" x^2+y^2 "=" $-2xy$, with x and y still remaining prime, where the quotes indicate that the equations do not satisfy the rules of arithmetic, since there is no resultant, but the terms are logically associated, and the arithmetic laws of the parameters that make up x and y ($(c\tau)$ and $(v\tau')$) do not satisfy these rules of multiplicative association and distribution to preserve the integrity of the prime numbers .

With $\{x, y, x^2, y^2, ...x^n, y^n\}$ and y established as prime numbers their unit entropies are then applied to prove that $1+1=2(1)(1) \; = \; 2$, and Goldbach's Conjecture is proved.

Analogously to the Fermat expression $z^n = x^n + y^n$ being a "Presburger" metric (no rule of multiplication between x and y (and so a candidate for a Godel undecidable statement in terms of arithmetic), the above examples are undecidable statements regarding prime numbers (the foundation of Godel's characterization of logical propositions) where the logical propositions in defining prime numbers are true, but there are no examples of it of it using the ordinary rules of arithmetic ….

As in Pythagorean triples in relation to the Fermat proof, the numerical values will depend on the base of the number system chosen. This will mean a reference to logarithms which I will include shortly as soon as I get some sleep….

This may have interesting consequences for the GUT, since radiation is modelled by a clockwise rotation of the gamma "vector" for $\tau' > \tau$, where prime numbers are a "quantization" in a numerical sense. This may be relevant in the low quantum numbers for particle physics with respect to the Binomial Expansion and its relation to relativity via Fermat's theorem, but I only thought about it this morning before coffee, so it will be awhile before it becomes common knowledge… ☺

Consider the expression:

$c\tau' = c\tau + v\tau'$ where $c\tau$ can be characterized as a "sensor", and $v\tau'$ as a "source". If there is no "source" (as a perturbation) then $v\tau' = 0$ so $c\tau' = c\tau$ and in particular, $\tau' = \tau$. Then $c\tau'$ is a first order "interaction" term comprised of an element of each of the source and sensor.

The Binomial Expansion for the case $n = 2$ yields the expression

$(c\tau')^2 = (c\tau + v\tau')^2 = (c\tau)^2 + (v\tau')^2 + 2(c\tau)(v\tau')$, where the term $2(c\tau)(v\tau')$ is an interaction term (characterized as "spin" in physics). Note that conjugation where $i = \sqrt{-1} = \sqrt{i^2}$ results in the expression:

$\psi\psi^* = (c\tau + iv\tau')(c\tau - iv\tau') = (c\tau)^2 - i^2(v\tau')^2 = (c\tau)^2 + (v\tau')^2$. Note that in the system of positive real numbers, $i = 0, i^2 = 0^2$.

The Binomial Expansion and Goldbach's conjecture

Goldbach's Conjecture

A link to a preliminary discussion of the ideas leading up to this proof can be found in the Physics Discussion forum:

Discussion of proof of Fermat's Theorem

"Every even number is the sum of two primes"

Let the numbers $\{c, v, \tau, \tau'\} > 0$ and subdivided into Cartesian subsets $\{\{c,\tau\},\{v,\tau'\}\} = \{\{x\},\{y\}\}$.

Since $\{x, y\}$ are independent, so are their powers $\{x^n, y^n\}$, and so are prime relative to each other; that is, division between the sets is not defined, since their values are restricted to orthogonal (Cartesian) "axes".

$$(c\tau')\vec{r} = (c\tau)\vec{i} + (v\tau')\vec{j}$$

The sets can be expanded by the Binomial Expansion for the case $n = 2$

$$(c\tau')^2(\vec{r}\cdot\vec{r}) = (c\tau + v\tau')^2(\vec{r}\cdot\vec{r}) = (c\tau)^2(\vec{i}\cdot\vec{i}) + (v\tau')^2(\vec{j}\cdot\vec{j}) + 2(c\tau)\vec{i}\otimes(v\tau')\vec{j}$$
$$2(c\tau)\vec{i}\otimes(v\tau')\vec{j} = 2(c\tau)(v\tau')\vec{k}$$
$$2(c\tau)\vec{j}\otimes(v\tau')\vec{i} = 2(c\tau)(v\tau')(-\vec{k}) = -2(c\tau)(v\tau')$$

Selecting the second cross product (changing from the "right hand" rule to the "left hand" does not change the prime number configuration of the scalars, we have:

$$(c\tau')^2(\vec{r}\cdot\vec{r}) = (c\tau + v\tau')^2(\vec{r}\cdot\vec{r}) = (c\tau)^2(\vec{i}\cdot\vec{i}) + (v\tau')^2(\vec{j}\cdot\vec{j}) + |2(c\tau)(v\tau')|(\vec{k}\cdot\vec{k})$$
$$= (c\tau)^2 + (v\tau')^2 - |2(c\tau)(v\tau')|$$

, where the vectors $(\vec{i}, \vec{j}, \vec{k})$ are orthogonal (the coefficient $2(c\tau)(v\tau')$ does not reside on either the $\vec{i}$ or $\vec{j}$ axis (i.e., is not a member of the set $\{\{c,\tau\},\{v,\tau'\}\} = \{\{x\},\{y\}\}$ (multiplication as an "outer" ("cross") product where the axes are orthogonal), so the complete set with multiplication is increased in dimension to $\{\{x\},\{y\},\{z\}\}$ where the axes are orthogonal.

The scalar coefficients (using the "left hand" rule) are related by

$$(c\tau')^2 = (c\tau - v\tau')^2 = (c\tau)^2 + (v\tau')^2 - 2(c\tau)(v\tau'),$$

where the interaction between the coefficients in the dimensions $\left(\vec{i},\vec{j}\right)$ is characterized by the product $-2\left(c\tau\right)\left(v\tau'\right)$ in the $\vec{k}$ dimension. The resultant coefficient $\left(c\tau'\right)^2$ is a scalar representation of this interaction, as the final state of the interaction between an initial state $\left(c\tau\right)$ and a "change" $\left(-\left|v\tau'\right|\right)=(-\left|v\right|(\tau'))$ with the interaction represented by the process of multiplication between the two independent scalar Cartesian sets.

If the final state is not defined (there is no final state), so that $\left(c\tau'\right)^2=0$, then the result becomes

$$0^2=\left(c\tau-v\tau'\right)^2=\left(c\tau\right)^2+\left(v\tau'\right)^2-2\left(c\tau\right)\left(v\tau'\right)$$

$$\left(c\tau\right)^2+\left(v\tau'\right)^2=\left[(2)\left(c\tau\right)\left(v\tau'\right)\right]=\left[(2)\left(c\tau'\right)\left(v\tau\right)\right],$$

i.e $\left(x\right)^2+\left(y\right)^2=\left[2\left(c\tau\right)\left(v\tau'\right)\right]=\left[2\left(c\tau'\right)\left(v\tau\right)\right]=\left[2(x)(y)\right]$

where all elements in the square brackets are positive. The terms $\left(c\tau\right)^2$ and $\left(v\tau'\right)^2$ are independent in the Cartesian set $\left\{\left(c,\tau\right),\left(v,\tau'\right)\right\}$ so the terms $c\tau$ and $v\tau'$ are also independent; since they have no common factors they cannot be divided, and so therefore are prime, and so are the terms $\left(c\tau\right)^2$ and $\left(v\tau'\right)^2$; the "interaction" term $2\left(c\tau\right)\left(v\tau'\right)$ is even (if negative) and is a product of two prime numbers. Therefore, the expressions

$\left(c\tau\right)^2+\left(v\tau'\right)^2$ and $2\left(c\tau\right)\left(v\tau'\right)$ are both expressions involving prime numbers. If $\left(c\tau\right)^2$ is a prime number, then so is $\left(c\tau\right)$, and similarly for $\left(v\tau'\right)$. Therefore, the expression

$\left(c\tau\right)+\left(v\tau'\right)=2\left(c\tau\right)\left(v\tau'\right)$ also characterizes the l.h.s. as the sum of two prime numbers and the r.h.s as an even product of these numbers so that any even number can be expressed as the sum of two primes.

Note that the number represented by $2\left(c\tau\right)\left(v\tau'\right)$ need not be prime, even though $c\tau$ and $v\tau'$ are prime relative to each other, since they have no common factors. Therefore, one is free to adjust $c,\tau\in\left\{c\tau\right\}$ and $v,\tau'\in\left\{v\tau'\right\}$ where $\left(\left\{c,\tau\right\},\left\{v,\tau'\right\}\right)\in R\left\{c,\tau,v,\tau'\right\}$ so that the product $\left(c\tau\right)\left(v\tau'\right)$ can represent any real number while $\left(c\tau\right)$ and $\left(v\tau'\right)$ remain prime relative to each other. In particular, note that $c\tau=1$ is a prime number, so that $r=\left(1\right)\left(v\tau'\right)=v\tau'$ is a real number, where

$\left(1\right)+\left(v\tau'\right)=2\left(1\right)\left(v\tau'\right)=2r$ so the l.h.s. is the sum of two primes and the r.h.s. is a real number.

Therefore, the expression

$(c\tau)+(v\tau')=2(c\tau)(v\tau')$ also characterizes the l.h.s. as the sum of two prime numbers and the r.h.s as an even product of these numbers so that any even number can be expressed as the sum of two primes.

(QED).

Therefore, every even number is the sum of two primes; (e.g.) $(3+5)\Leftrightarrow 2(3*5)$ so 30 =2(3*5) is the sum of two primes…

The equation that characterized the proof of Goldbach's conjecture is

$x^2+y^2=\pm xy$ where x and y are parametrized as $x=c\tau$ and $y=c\tau'$

(from $c\tau'=0=(c\tau\pm v\tau')$ where $0^2=(c\tau\pm v\tau')^2=(c\tau)^2+(v\tau')^2\pm 2(c\tau)(v\tau')$ where the associative and multiplicative laws for the expression $\pm 2(c\tau)(v\tau')$ do not apply in the case of prime numbers $x=c\tau$ and $y=c\tau'$, but do apply in the case of real numbers.

Prime numbers are characterized by setting one of the parameters in each group $x=c\tau$ and $y=c\tau'$ equal to unity (which is the basis of that dimension.

For example, The prime numbers 3 and 5 are represented by setting $c=1$ and $v=1$ so that $\tau=3$ and $\tau'=5$.

$(3*1)^2+(5*1)^2=3^2+5^2$ is the sum of two prime numbers, and $\pm 2(3*1)(5*1)=\pm 2(3*5)=\pm 2(15)=\pm 30$ where ± 30 is an even real number so Goldbach's conjecture is satisfied in the case of prime numbers.

In the general case, we assume that x^2+y^2 is the sum of two prime numbers, and therefore so is $x+y$. Then the expression $\pm 2xy=\pm 2(x*1)(y*1)=\pm 2r$ is an even real number and Goldbach's conjecture is again satisfied. Here "1" is the basis of each independent dimension (x,y))

Note that $\gamma = \frac{\tau}{\tau'}$ and $\beta = \frac{v}{c}$ are not defined for

$$(c\tau')^2 = 0 = (c\tau + v\tau')^2 = (c\tau)^2 + (v\tau')^2 + 2(c\tau)(v\tau')$$

Grand Finale

The previous discussion establishes $\{x, y, x^2, y^2, ..., x^n, y^n\}$ as prime numbers in a ring without division. The next (trivial) step is to recognize that all these numbers are irreducible in addition (i.e., as countable widgets), and so have an entropy of 1, e.g.

$$\left(x^n\right)^1 = x^n$$
$$\log\left(x^n\right)^1 = 1$$

$$\begin{aligned}
\log_1(x^1)^1 &= \log(x) = 1_x \\
\log_1(y^1)^1 &= \log(y) = 1_y \\
\log_1(x^2)^1 &= \log(x^2) = 1_{x^2} \\
\log_1(y^2)^1 &= \log(y^2) = 1_{y^2}
\end{aligned} \quad \vdots$$

$$1_{x^2} + 1_{y^2} = 2\left(1_x\right)\left(1_y\right)$$
$$1 + 1 = 2$$

Every even number $2\left(1_x\right)\left(1_y\right)$ "is" the sum of two primes $1_{x^2} + 1_{y^2}$

That is,

$$\log(e^x) = x$$
$$\log(e^y) = y$$
$$\left[\log(e^{x^2})\right] = x^2$$
$$\left[\log(e^{y^2})\right] = y^2$$
$$\log(e^{x^2}) + \log(e^{y^2}) = x^2 + y^2 \text{ "="} \; 2xy = 2\log(e^x)\log(e^y) = 2\log\left(e^{(x+y)}\right)$$

Where the $"="$ indicates the relation only applies to prime numbers.

Every even number $2\log\left(e^{(x+y)}\right)$ "is" the sum of two primes $x^2 + y^2$

QED

Addendum

The orthogonal dimensions (Cartesian sets) $\{x\}$ and $\{y\}$ consist of all real numbers in each dimension $(\{x\},\{y\})$, but cannot divide each other because division is not defined, since $\{x\} \cup \{y\} = 0$. Therefore, there cannot be a resultant that combines elements of both sets.

Let $\{x\} = \{ct\}$ and $\{y\} = \{vt'\}$ be independent sets, and $\{z\} = \{ct'\}$ be and expression that combines elements of both sets.

In the following, the definitions $z \triangleq \{z\}$, $x \triangleq \{x\}$, $y \triangleq \{y\}$ will represent the respective sets.

Let $z = x - y$, so that $z^2 = (x-y)^2 = x^2 + y^2 - 2xy$
and
$(c\tau')^2 = (c\tau - v\tau')^2 = c\tau + v\tau' - 2(c\tau)(v\tau')$

Setting $z = c\tau' = 0$ so that $0^2 = (c\tau - v\tau')^2 = c\tau + v\tau' - 2(c\tau)(v\tau')$

establishes the relation $(c\tau)^2 + (v\tau')^2 = 2(c\tau)(v\tau')$ as a relation between x and y without division by z (i.e., division by zero), so that the expression is complete in (x,y), and $x = c\tau$, $y = v\tau'$ means that $c\tau$ and $v\tau'$ are independent, so that the distributive and associative laws cannot be applied (e.g $(c\tau)(v\tau') = (\tau c)(\tau' v)$ but $(c\tau)(v\tau') \neq (ct')(vt) = 0)$).

This is equivalent to a Cartesian coordinate system (x, y) where only the axes are defined.

The expression $x^2 + y^2 = 2xy$ means that x and y cannot divide each other, and so are relative primes by construction for all (x, y) , and the construction applies to all the (independent) real numbers in each dimension.

If x is prime, so is x^n
If y is prime, so is y^n

$log(e^x) = x$
$log(e^y) = y$

$log(e^{(x^2)} = x^2$

$log(e^{(y^2)} = y^2$

$log(e^{(x^2)} + log(e^{(y^2)} = x^2 + y^2 = 2xy = 2(log(e^x))(log(e^y)) = 2log(e^{(x+y)})$

$x^2 + y^2$ is the sum of two primes

$2log(e^{(x+y)})$ is an even number

x and y are complete in the system of two dimensions which are prime with respect to each other (x, y). If both dimensions exist, then there must be numbers that satisfy the equation $x^2 + y^2 = 2xy$

$\therefore$ Every even number is the sum of two primes. QED

(This result is the answer to Russell's Paradox - the barber who shaves all those and only those who don't shave themselves means that there are no interacting villagers; only the barber can shave himself) (i.e., The barber as x and the villagers as y in the expression $\{z\} = \{x\} - \{y\}$)

The Binomial Expansion and Goldbach's conjecture

Consider the Binomial Expansion as a single-valued function in the context of Goldbach's conjecture

$$c = x + y$$
$$c^n = x^n + y^n + rem(x, y, n)$$

Then setting $c^n = 0$ implies that $x^n + y^n + rem(x, y, n)$ must be an expansion in prime numbers in each of the dimensions $(\{x\},\{y\})$

Similarly, the Multinomial Expansion

$$c = x_1 + x_2 + x_3 + ... + x_n$$
$$c^n = (x_1 + x_2 + x_3 + ... + x_n)^n$$

is an expansion in prime numbers for $c^n = 0$ in each dimension $(\{x_1\},\{x_2\},\{x_3\},....,\{x_n\})$

Speculation

The same is true (I believe) for a single valued function expressed only in powers of the $c_{ij} = (x_i)^{n_j}$ by setting $c_{ij} = 0$ which is related to Einstein's exposition of General Relativity (and may be a (another) proof of its inconsistency).