Proof of Goldbach's Conjecture

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Discussion/example

05/04/2018 Added note clarifying role of metric L/L=1

05/05/2018 Added clarifying comments regarding nomials, added examples

Basic Proof

Consider the relation $(c\tau') = (c\tau) - (v\tau') = (c\tau, v\tau')$ where $c\tau \in \mathbb{R}_1$ and $v\tau' \in \mathbb{R}_2$ have no common factors $\mathbb{R}_1 \cup \mathbb{R}_2 = \{0\}$, and so are prime numbers relative to each other, and the product $(c\tau')$ is a multiplicative relation between $\mathbb{R}_1$ and $\mathbb{R}_2$. (Or one can say that $x = (c\tau)$ and $x' = (v\tau')$ are independent variables in the same set where $\{x, x'\} \in \mathbb{R}$). These factors are nomials in the Binomial expansion for $n = 2$.

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

Setting $(c\tau')^2 = 0$ eliminates the multiplicative factor having common elements from each nomial, so that in

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

the nomials are relatively prime numbers except for common multiplicative factors on each side of the equation.

(Note that if the $(c\tau)^2 + (v\tau')^2$ and $2(c\tau)(v\tau')$ have common factors (e.g. $v = c$ and $\tau' = \tau$), the factor $k = c\tau = v\tau'$ can be divided out, so that the nomials on both sides of the equation will be relatively prime:

$k\left[(c\tau)^2 + (v\tau')^2\right] = k\left[2(c\tau)(v\tau')\right] \Leftrightarrow (c\tau)^2 + (v\tau')^2 = \left[2(c\tau)(v\tau')\right]$, where $(c\tau)^2 + (v\tau')^2$ is an expression of prime numbers under addition, and $2(c\tau)(v\tau)$ is an expression of an even product of prime numbers and so must be different, since $a + b = 2ab \Leftrightarrow a = b = 1$ for a and b prime numbers where $a+b=1^1=1^1=2$is a sum, but $2(ab)=2(1^2)$ is a product of different powers of 1. (1 is not a prime number if it applies to all variables).

Note that $1_\tau=\log_\tau(\tau)$, $\tau\neq 1$, so that $p_1=c\tau_c$, $p_2=v\tau_v$, $p_1=c\tau_c$, $p_2=v\tau_v$ are also prime numbers with no common factors.

Then the expression $(c\tau_c)^2+(v\tau_v)^2=2(c\tau_c)(v\tau_v)$ can be represented by the expression

$(p_1)^2+(p_2)^2=2(p_1)(p_2)=L$ for some common number L (a "length" or "metric" in the prime space defined by the operations of addition and multiplication).

$(p_1)^2$ and $(p_2)^2$ are prime numbers and $2(p_1p_2)=L$ is an even number.

Then any number $m=nL$ will also be an even number.

Therefore, every even number is equal to the sum of two primes.

QED

Note: The length $L(p_1, p_2, p_1, p_2)$ is a general relation characterizing addition and subtraction in terms of a specific set of prime numbers. This is a metric for the set of real numbers, since $1_{(p_1,p_2,p_1,p_2)}=\frac{L(p_1,p_2,p_1,p_2)}{L(p_1,p_2,p_1,p_2)}$ becomes the unit basis for $r=r*1_{(p_1,p_2,p_1,p_2)}$ for any real number system; that is, it is basis for the Relativistic Unit Circle as the foundation for the complete system of real numbers in one dimension in terms of the power of 2 and the addition and multiplication operators, and is the foundation of mathematics (which can then be extended to $n>2$ to prove Fermat's Last Theorem.

Examples

Example 1

$$(c\tau_c)^2+(v\tau_v)^2=2(c\tau_c)(v\tau_v)=30$$
$$c=\sqrt{23},\ v=\sqrt{7},\ c=\sqrt{5},\ v=\sqrt{3}$$
$$(c\tau_c)=\left(\sqrt{23\tau_c}\right),\ (v\tau_v)=\left(\sqrt{7\tau_v}\right),\ (c\tau_c)=(5)\tau_c,\ (v\tau_v)=(3)\tau_v$$
$$(c\tau_c)^2=23,\ (v\tau_v)^2=7,\ (c\tau_c)=5,(v\tau_v)=3$$
$$23+7=2(3*5)=30$$

Example 2

There can be more than one partition of $L=p_1+p_2$, the set of additive primes is not unique, and this is not a requirement of Goldbach's conjecture. Similarly, the multiplicative nomials need not be distinct, since the only requirement is that $L=2(p_1p_2)=2(p^2)$ be an even number.

For example, in the expression $L=16=(8+8)=2(4*4)$, 8 is not a prime number, but $L=16=(2^3+2^3)=2(2^2)(2^2)=(8+8)=(11+5)=(13+3)=(3^2+7)$where the sums consist of prime numbers. Since 2 is a prime number, then so is $2^2=4$ but the Goldbach conjecture does not say that the nomials in the product $(4*4)$ have to be distinct; the only requirement is that $L=2(p_1p_2)=2(p^2)$ be an even number.

Note that $L=16=[15(1_{15})+1(1_1)]=2(4*4),\ (1_{15})=\log_{15}(15),\ (1_1)=\log_1(1)$, and

$15(1_1)=15*\log_1(1)=15.$

Therefore $15(1_{15})$ and $1(1_1)$ are not relatively prime since (1_{15}) can be divided by (1_1) so 1_τ to any base τ is not a prime number.