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“Proposed proof of Goldbach’s Conjecture”

Contents:

I-Introduction:

This is a work I did within the framework of the famous Goldbach conjecture proof, which states that every even natural integer greater than 3 can be written in the form of the sum of two prime numbers. I hope this proof is sufficient and helpful for all concerned.

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II- Formula for a prime number greater than 3:

●Every prime number greater than 2 is an odd number.

●2 and 3 are consecutive and primary.

●$3+2\times b$ odd (equal to $2\times(b+1)+1$).

● I'm going to suggest the sequence <u>S0</u> where every number in parentheses is prime.

● This sequence starts from the first prime number greater than (2), which is of course (3).

● The increment factor of this sequence in each part is 2*.

<u>S0</u> = (3), (5), (7), 9, (11), (13),15, (17), (19), 21…

●You can notice here that starting from the number 3, when every addition to the number 2 is arranged in a multiple of 3 (In the form: $3q\times2$), the number is not prime (if it's greater than 3), because it's multiple of 3.

● EX: 9 (not prime) = $3 + 2 \times 3$.

● So, any prime number can be written in the form: $3 + 2q$ where "q" is natural integer not a multiple of 3 ("q" must be natural integer, because otherwise, it be in the form: $n/2$, with n an odd number, so in this case the formula will be: $3 + 2$

$\times$ n/2 = 3 + n and become an even number which can't be a prime number.)

●Returning to our sequence, we can notice the emergence of non-prime odd numbers that respond to the previously suggested formula:

<u>So</u> = (3), (5), (7), 9, (11), (13),15, (17), (19), 21…25,27, (29) …

⇨ $25 = 3 + 2 \times 11$

●That because they are multiples of prime numbers, where:

●If b is odd; b >1 and not a multiple of 3, then:

$$b \times (3 + 2k) = 3b + 2kb = 3 + 3b - 3 + 2kb$$

$$= 3 + 3(b-1) + 2\ kb$$

And we have an odd b, so, b-1 is even, so, b-1/2 is natural, so the equation is completed through: $3 + 2((b-1/2) + 1{,}5 + kb)$

$$= 3+2(1{,}5bk + 1{,}5)$$

And (1,5bk + 1,5) is a natural integer because b and k are odd, so bk is odd, and therefore 1,5bk will remain in the form of an integer, then a separator, then the number 5, meaning that the number 2 in the denominator will not be reduced, and therefore adding 1,5 at the end will make the number also integer, besides, the number is not a multiple of 3 because b is not a multiple of 3 (as we said previously), mean that (1,5b + 1,5) cannot be written in the form $(1.5 \times 3h + 3 \text{ x } 0{,}5)$ then 3m
.

● Therefore, we need to change the formula of the prime number that we are working on, and we note in this context:

● 3 + 2y in this case can be decomposed into a combination of factors, where: $3 + 2y = i - 2f + 2y = i + 2(y-f)$ with y, i, and f are natural integers and i and 2(y-f) have a common factor in some cases, meaning that i and (y-f) have a common factor in some cases, because i is equal to $3 + 2y$, and therefore i is odd and has no common factor with 2.

● So according to the above, any prime number greater than 3 can be written in the form:

$3+2x$

If x is a natural number that does not belong to the set of multiples of 3.

and $\gcd(p,2(x-z)) = 1$

whatever p, x and y are if $3 = p - 2z$

III-The sum of two prime numbers greater than 3:

● According to the second part, any prime number greater than 3 is written in the form of $3 + 2x$ with some conditions that do not prejudice the formula, so the sum of two prime numbers greater than 3 can be written in the following form:

$(3 + 2x) + (3 + 2w) = 6 + 2x + 2w = 2(3+x+w)$ **

●More precise, the sum of two primes is written -according to the second part- in this form:

$p - 2z + 2x + (m - 2q + 2h)$ with p, z, x, m, q, and h natural numbers , $p - 2z = 3$, and $m - 2q = 3$, so it's equal to :

$p + 2(x - z) + m + 2(h - q) = p + m + 2(x + h - z - q)$ and p is odd (since it's equal to $3 + 2z$) also m is odd (since it's equal to $3 + 2q$) so $p + m$ is even, so $p + m + 2(x + h - z - q)$ is even too .

● Therefore, the sum of two primes greater than 3 is an even number great than 8, since the smallest value for x and w is 1 (from **), so the smallest sum in this case: $2(3+1+1) = 10$

● And since prime numbers are infinite -according to Euclid- any even number greater than 10 can be written in the form of the sum of two prime numbers, no matter how large it is, because if g is even, then g/2 is even or odd, as well as writing: 2(3+x+w) has the same property in the case of (3+x+w) is even, it equals: $3+3l+1+3j+2$

$$=3+3l+3j+3$$

$$=6+3j+3l$$

(Where j is even and l is even or j is odd and l is odd)

Or it equals: $3+3j+2+3l+2$

$$=3+3j+3l+4$$

$$=7+3j+3l$$

(Where j is even and l is odd, or j is odd and l is even)

And if (3+x+w) is odd, it equals: $6+3j+3l$

(Where j is even and l is odd, or j is odd and l is even)

Or it equals: $7+3j+3l$

(Where j is even and l is even or j is odd and l is odd).

IV-Exceptions:

● The formula for the prime numbers mentioned above is for prime numbers greater than 3, which makes the prime numbers 2 and 3 exceptional, and this is expected because these two numbers are the basic stones for the rest of the prime numbers, and they are the only two consecutive prime numbers. It is also obvious that the rest of the even numbers less than 10 are formed by these two exceptions.

● The number 2 is the only even prime number, so it cannot form - when combined with an opposing prime number - an even number, because all prime numbers other than 2 are odd, and the sum of an even number with an odd number is an odd number, so 2 constitutes an even number in one case:

$2+2 = 2 \times 2 = 4$.

● As for the number 3, it can be combined with any other prime number greater than it, because it is odd, so it is present in the prime sum of the rest of the even numbers, which are 6 and 8, as: $6 = 3+3$ and $8 = 3+5$.

V- Conclusion:

● According to the above, any even number greater than 3 (i.e. greater than 2) can be written in the form of the sum of two prime numbers, no matter how large the even number is. This is what Goldbach's conjecture states.

VI- Notes:

*I determined the increase factor due to the logical relationship that links it to the number 3, and prime numbers cannot appear confined between two elements of the series because they will be in the form ($3 + 2 \times b-1 = 2 + 2 \times b$) and therefore the result is an even number that is not prime.

●If you have any comments or notes regarding the work, you can contact me via my e-mail:
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