Proof of Goldbach’s conjecture

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Abstract: I prove Goldbach’s conjecture, ‘Every even integer greater than 2 can be expressed as the sum of two primes.’. And I used “Generalization of mathematical induction”.

Let’s suppose there are ’p’(prime), ‘q’(twin prime, the first twin prime is q1 and the second twin prime is q2) and ‘a’(odd number not prime).

First, I prove “Every even integer greater than 4 can be expressed as the sum of prime and twin prime”.

About P(n) (2n = p + q)

When n is 3,
6 = 3 + 3 is true.

When n is k,
suppose 2k = p + q is true.

[1] When q is q1

2k = p + q1
2k + 2 = p + (q1 + 2)
2k + 2 = p + q2
So, [1] is true
[2] When \( q \) is \( q_2 \) (when \( q \) can’t be \( q_1 \))

\[
2k = p + q_2
\]

can be expressed in

\[
2k = a + q_1
\]

\[
2k + 2 = a + (q_1 + 2)
\]

\[
2k + 2 = a + q_2
\]

And when \( n \) is \( k + 1 \),
suppose \( 2k + 2 = p + q \) is true.
Then it can be

\[
2k + 2 = p + q_1
\]

\[
2k + 4 = p + (q_1 + 2)
\]

\[
2k + 4 = p + q_2
\]

So, [2] is true.

Adding [1] and [2],

\[
2n = p + q \ (n \geq 3) \text{ is true.}
\]

And because \( p + q \subset p + p \) is true,

\[
2n = p + p \ (n \geq 3) \text{ is also true.}
\]

\[
4 = 2 + 2 \text{ is true.}
\]

Thus, Goldbach’s conjecture is true.