

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 q_1 and the second twin prime is q_2) 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 q_1

$$2k = p + q_1$$
$$2k + 2 = p + (q_1 + 2)$$
$$2k + 2 = p + q_2$$

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],

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

And because $p + q \subset p + p$ is true,

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

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$$4 = 2 + 2 \text{ is true.}$$

Thus, Goldbach's conjecture is true.