The continuity of prime numbers can lead to even continuity(Goldbach conjecture)

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Research Article

Keywords: prime even continuity, Bertrand Chebyshev theorem, Ascending and descending, Extreme law, Mathematical complete induction

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Research ideas:
If the prime number is continuous, and any pairwise addition can obtain even number continuity, then Goldbach's conjecture is true.
Human even number experiments all get (prime number + prime number).
I propose a new topic: the continuity of prime numbers can lead to even continuity.
I designed a continuous combination of prime numbers and got even continuity.
If the prime numbers are combined continuously and the even numbers are forced to be discontinuous, a breakpoint occurs.
It violates Bertrand Chebyshev's theorem.
It is proved that prime numbers are continuous and even numbers are continuous.
The logic is: if Goldbach conjecture holds, it must be that the continuity of prime numbers can lead to the continuity of even numbers.

Image interpretation: turn Goldbach's conjecture into a ball, and I kick the ball into Goldbach's conjecture channel.
There are several paths in this channel, and the ball is not allowed to meet Goldbach's conjecture conclusion in each path.
This makes the ball crazy, and the crazy ball must violate Bertrand Chebyshev's theorem.

Absrtact : Two prime numbers{3,5}.
{3,5}→{3+3= 6，3+5=8，5+5=10} →{6,8,10}.
{{10}→(5+5=10 = 3 + 7) → 7}Increased by 7 →{3, 5, 7}.
{3,5,7}→{ 3+3= 6, 3+5=8, 5+5=10, 5+7=12, 7+7=14}→{ 6,8,10,12,14}.
{{14}→(7+7=14 = 3 + 11) → 11} Increased by 11 →{3, 5, 7, 11}.
Note changes: {3,5,7}→{ 6,8,10,12,14}→ {3, 5, 7,11}.
The same logic would be:{3,5,7,11}→{ 6,8,10,12,14,16}→ {3, 5, 7,11,13}.
The same logic would be:
{3,5,7,11,13}→{ 6,8,10,12,14,16,18,20}→ {3, 5, 7,11,13,17}.
If you expand infinitely in the above specified mode: {3, 5, 7, 11, 13, 17 ,...
Get: { 6,8,10,12,14,16,18,20,22,...
The above is: the continuity of prime numbers can lead to even continuity.
Get: Goldbach conjecture holds.
If it is mandatory: Authenticity stops at an even number 2n.
{{3, 5, 7, 11 ,...,p_1}→{ 6,8,10,12,...,2n}.

{3, 5, 7, 11, ...,p_1} $\nrightarrow$ (2n+2).

$\forall p+\forall p \neq 2n+2$ } It can be proved that: It violates the "Bertrand Chebyshev" theorem.
∴ {3, 5, 7, 11, 13, ...
→{ 6,8,10,12,14,...
Get: Goldbach conjecture holds.

Key words: prime even continuity; Bertrand Chebyshev theorem; Ascending and descending; Extreme law; Mathematical complete induction

0 introduction

Background of the study

Goldbach conjecture[1]: Euler's version, that is, any even number greater than 2 can be written as the sum of two prime numbers, also known as "strong Goldbach conjecture" or "Goldbach conjecture about even numbers".

It was put forward in 1742, and today it has trapped excellent mathematicians of mankind.
Is this Goldbach conjecture correct? Or wrong?
Why can't humans find a way to prove or falsify?
It is because human beings do not find the right path by definition, and human beings have gone astray.

Purpose of the study

Starting with the definition, find out the internal relationship between Goldbach conjecture and mathematical logic,
Confirm Goldbach conjecture or deny Goldbach conjecture.

Prove the distribution law of prime numbers.

The summary of the existing literature proves that the study of Goldbach conjecture is correct.

1 Text: introduction

1.1 Research skills: The whole proof begins with the ascent

1.1.1 Even number generation provisions in this paper

Rule ①: the minimum odd prime number is **3**

Rule ②: add two odd prime numbers.(any combination of two odd primes).

Rule ③: odd prime number can be quoted repeatedly.

Rule ④:meet the previous provisions, and all prime combination to the maximum(for example, 10 = 5 + 5 must be: 10 = 5 + 5 = 3 + 7,

For another example, the combination of 90 must be: 90 = 43 + 47 = 37 + 53 = 31 + 59 = 29 + 61 = 23 + 67 = 19 + 71 = 17 + 73 = 11 + 79 = 7 + 83)..

Rule ⑤: $P_a + P_b = 2S$, and $P_b + P_a = 2S$, Delete one and leave only one.

1.1.2 I can quote the minimum odd prime number **3**

The results are as follows

3+3=6

5 + 1 = 6 (it is stipulated that **1** is not a prime number, which is deleted because it violates regulation 2)

∴ The unique formula: **3 + 3 = 6** .(comply with Rule ④: all prime numbers are quoted to the maximum). **3 → 6**

1.1.3 Even number generation provisions in this paper: Get the following

{3} → (3+3)=6

{**3,5**}→ (3+**5**)=8

{**3,5**}→ (5+5)=10 →(3+7) →{7} ∴{**3,5,7**}

{**3,5,7**}→ (5+7)=12

{**3,5,7**}→ (7+7)=14 →(3+**11**) →{**11**} ∴{**3,5,7,11**}

{**3,5,7,11**}→ (11+5)=16 →(3+**13**) →{**13**} ∴{**3,5,7,11,13**}

Look: prime continuous **3→5→7→11→13**

Look: you get "even numbers are also continuous" **6→8→10→12→14→16**

If you let the prime number be infinitely continuous: **3→5→7→11→13→17→...**

"Even numbers are also infinitely continuous": **6→8→10→12→14→16→18→...**

A new theorem is obtained: The continuity of prime numbers can lead to even continuity。

If this theorem is proved, Goldbach's conjecture is correct.

1.2 The proof process uses the known prime number,

Continuity of prime numbers:
∵ The theorem of infinite number of primes[3] :
①There is no maximum prime;
②After each prime, you can always find an adjacent prime.
∴ Prime numbers have continuity.

Prime number theorem[3] and Bertrand Chebyshev[2] theorem.
By quoting the prime theorem（Each prime has a subsequent adjacent prime.）, we obtain the unrestricted continuity of prime numbers， and then generate even numbers according to the requirements of this paper，If the generated even number is infinitely continuous, Goldbach's conjecture is correct.

Use the limit rule to force the even number to terminate at $2n$=(Prime) + (prime), and the even number $2n + 2$=(Prime) +(prime) cannot occur.
Conclusion:
If it conforms to mathematical logic, then: Goldbach conjecture is wrong.
If it does not conform to mathematical logic, then Goldbach's conjecture is correct.

2 Text: nouns and definitions

2.1 { Definition of prime number: prime number refers to the natural number with no other factors except 1 and itself in the natural number greater than **1**.}record: (2.1)

2.2 {Extreme law : A may or may not be true. What conclusion can we get if we only prove that A is not true.
$\{A \mid A=x, A=y\}, (A=x) \Rightarrow$ (QED). Take: $A \neq x$, only prove the $A=y$ conclusion.} record: (2.2)

2.3 { [**References cited** [2]] Bertrand Chebyshev theorem: if the integer $\mathbf{n > 3}$, then there is at least one prime **p**, which conforms to $\mathbf{n < p < 2n-2}$. Another slightly weaker argument is: for all integers n greater than **1**, there is at least one prime p, which conforms to $\mathbf{n < p < 2n}$.} record: (2.3)

2.4 {The generation of even and prime numbers in this paper is specified as follows:

In this paper, the even number generation rules: the following five rules are met at the same time.

① Only odd primes are allowed as elements.

② Only two prime numbers can be added.(any combination of two odd primes).

③ Two prime numbers can be used repeatedly: **(3 + 3)**, or **(3 + 5)**, or **(p + p)**.

④ meet the previous provisions, and all prime combination to the maximum(for example, 10 = 5 + 5 must be: 10 = 5 + 5 = 3 + 7,

For another example, the combination of 90 must be: 90 = 43 + 47 = 37 + 53 = 31 + 59 = 29 + 61 = 23 + 67 = 19 + 71 = 17 + 73 = 11 + 79 = 7 + 83)..

⑤ Take only one of($\mathbf{p_a+p_b}$)and($\mathbf{p_b+p_a}$) .

In this paper, the generation rules of prime numbers: the following three rules are met at the same time.

① The first odd prime number is 3.

② Get the prime number from the even number. For example, 3 + 5 = 8. Prime numbers 3 and 5 are the materials I can cite.

③ Get the prime number from the even number. It must be two prime numbers. For example, 3 + 5 = 8. In the combination of even number 8, the prime numbers 3 and 5 are the materials I can cite.

For example, 1 + 7 = 8. In the combination of even number 8, I cannot quote prime number 7.} record: (2.4)

A pseudo stop property is obtained in (2.4):

2.41 {Pseudo stop: Explain first. the first prime number 3, according to the even number generation regulations, gets 3 + 3 = 6. Even number 6, according to the prime generation regulations, cannot generate 5, because (1 + 5) does not meet the even number 6 in this paper, cannot generate quality 5. So there is a false stop: only 3, no 5, only 6, no 8. But you can artificially increase prime number 5, and you can also get 8 (3 + 5). So it is a false stop.

Pseudo stop definition:

① the maximum even number among the continuous even numbers composed of k consecutive prime numbers {3,5,7,11,..., p_1} is 2n

② {3,5,7,11,..., p_1} can meet: {6, 8, 10, 12, 14, 16, 18, 20,..., 2n}

③ {3,5,7,11,..., p_1} not satisfied: {2n + 2}

④ Odd prime p_0 : $p_0 \notin \{3,5,7,11, \cdots, p_1\}$, satisfying: $2n + 2=p_0+p_y$.} record: (2.41)

2.42 {True stop: two prime numbers p_1 and p_2, satisfying: $p_1 + p_2 = 2n$. Any two prime numbers p_X and p_y cannot satisfy: $p_X + p_y = 2n + 2$.} record: (2.42)

【Friendly tip: if you prove the real stop ($p_x+p_y \neq 2n+2$), you prove that the

"Goldbach conjecture" is not tenable.】

2.5 { [**References cited** [3]] The theorem of infinite number of primes:

the n bit after each prime can always find another prime.
For example, **3** is followed by **5** and **13** is followed by **17**; There must be an adjacent prime $\mathbf{p_i}$ after the prime **p**.} record: (2.5)

2.6 { Here we only discuss the following cases: prime number sequence and even number sequence
((2.5)) ⇒ Prime number sequence: **3, 5, 7, 11, 13, 17, 19, 23，…**
Even number sequence: **6, 8, 10, 12, 14, 16, 18, 20，…**
Explain (2.5) in today's words: the prime number in the prime number sequence discussed in this paper is adjacent and continuous, and the first number is **3**.
An even number in an even number sequence is contiguous and the first number is **6**.}
record: (2.6)

2.7 {Remember: all the primes I'll talk about below refer to odd primes (excluding **2**).

Prime symbol **p**, different primes use $\mathbf{p_1, p_2, p_3,..., p_x}$} record: (2.7)

3 Text: Logical discussion (argument) and results

3.1 { Goldbach conjecture[1]:$3\leqslant\forall n\in N, 2n=p_x+p_y$. set up$\triangle_1$:$p_x\geqslant p_y$}record: (3.1)

3.2 { Theorem: the continuity of prime numbers leads to the continuity of even numbers.
In mathematical language ：
Known: {**3，5，7，11，13，…，p_2，p_1，p_0**}∈(prime)，The next neighbor of $\mathbf{p_1}$ is $\mathbf{p_0}$ ，
$\mathbf{3<5<7<11<13<\ldots\ p_2<p_1<p_0}$ ，
{ **6，8，10，12，14，16，…..，2n**}∈(continuous even number).
If : {**3，5，7，11，13，… ，p_2，p_1**}⇒{ **6，8，10，12，14，16，…，2n**}.
inevitable: {**3，5，7，11，13，… ，p_2，p_1，p_0**}⇒{ **6，8，10，12，14，16，…，2n，2(n+1)**}.}record: (3.2)

3.2.1 prove:

Humans use computers to calculate a finite number of even numbers: **{6, 8, 10, 12, 14,..., 2n}** every even number satisfies (3.1).

The computer process is finite **{6, 8, 10, 12, 14,..., 2n}**

It is not logically proved that any even number greater than **4** satisfies (3.1).

((2.5)+(2.6))Take odd prime sequence: **3, 5, 7, 11, 13, 17, 19, 23,...**

Take the minimum prime number 3 from the front of the prime sequence,

A_1: {(2.1)+(2.4)+{**3**}}⇒

{**3+3=6**} It is recorded as **A_1**

→**6**

According to the rule, **3** can only get {**3+3=6**}

Nonexistence: **5+p=6**

【Because **1** in **5+1=6** is not defined as a prime number. If **1** is defined as a prime number, this paper will come to the same conclusion】

Note: **5**∉**{3}**.

Prime number 3, limit is used according to (2.4), cannot be: **6→8**.

{(2.1)+(2.4)+{**3**}}⇒ ∶ Quoting prime number **3** can only get even number **6.**

A pseudo stop occurred (2.41).

If you want to: **6→8**, you must add an adjacent prime number **5**.

∴ {**3,5**}

⇒ **3→5**

A_2: {(2.1)+(2.4)+{**3,5**}}⇒

3+3=6

3+5=8

5+5=3+7=10 .∵ (2.4) ⇒ {**(5+5),(3+7)**}∈**10**. ∴ {(2.1)+(2.4)+{**3,5,7**}}⇒

7+5=12

7+7=11+3=14. ∵ (2.4) ⇒ {**(7+7),(3+11)**}∈**14**. ∴ {(2.1)+(2.4)+{**3,5,7,11**}}⇒

11+5=13+3=16 ∵ (2.4)⇒ {**(11+5),(13+3)**}∈**16**. ∴ {(2.1)+(2.4)+{**3,5,7,11,13**}}⇒

11+7=13+5=18.

13+7=17+3=20. There is a new prime number **17** in continuity.

Note: {**(13+7),(17+3)**}∈**20**. even numbers ⇒ **:6,8,10,12,14,16,18,20.**

Prime numbers are continuous, and there is a new prime number **17**.

3→5→7→11→13→17.

even numbers ⇒ **:6→8→10→12→14→16→18→20**.

Wonderful continuity:

$\{$ {{3, 5}→{ 6, 8, 10}.

{10 } → (10 = 3 + 7) → 7} →{3, 5, 7}}.

{{3, 5, 7}→{ 6, 8, 10, 12, 14}.

{14 } → (14 = 3 + 11) → 11} →{3, 5, 7, 11}}.

{{3, 5, 7, 11}→{ 6, 8, 10, 12, 14, 16}.

{16 } →(16 = 3 + 13) → 13} → {3, 5, 7, 11, 13}}.

{{3, 5, 7, 11, 13}→{ 6, 8, 10, 12, 14, 16, 18, 20}.

{20 } →(20 = 3 + 17) → 17 } → {3, 5, 7, 11, 13, 17}}.

{{3, 5, 7, 11, 13, 17}→{ 6, 8, 10, 12, 14, 16, 18, 20, 22}.

{22 } → (22 = 3 + 19) → 19 } →{3, 5, 7, 11, 13, 17, 19}}.

{{3, 5, 7, 11, 13, 17, 19}→{ 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26}.

{26 } →(26 = 3 + 23) → 23 } →{3, 5, 7, 11, 13, 17, 19, 23}}. $\}$ .Wonderful continuity is obtained: prime continuity, resulting in a new even continuity, and a new even number results in a new prime continuity.

According to the rule (2.4) and the existing computer capabilities, the prime number 23 should be continuous to the subsequent prime number,
According to the rule (2.4) and the existing computer capacity, the even number 26 should be continuous to the following even number,
A_2 has not stopped at this time.

Note the key point:
A_1 pseudo stop, increase the adjacent prime number 5 to have A_2.
From A_1 →A_2→ is it always infinite? Or will it stop?

Here's the wonderful thing:
(analysis Ⅰ) :
Always Unlimited: A_1 →A_2→ ...

There are:((2.5)+(2.6) ⇒ { 3, 5, 7, 11, 13, 17, 19, 23, ...

Get: 6, 8, 10, 12, 14, 16, 20, 22, ...

Conclusion : (3.2) (QED).

(2.2) $\Rightarrow$ Stop at A_n, cannot continue.
(analysis Ⅱ): Stop at A_n, not to be continued.
Stop at A_n : $A_1 \rightarrow A_2 \rightarrow \ldots \rightarrow A_n$
κ-line with continuous Prime: **3, 5, 7, 11, 13, 17, 19, 23, … , p_2, p_1**
Get : **6, 8, 10, 12, 14, 16, 20, 22, ….., 2(n-1), 2n**

Terminate at A_n to obtain::

$\{\{ \{(2.1)+(2.4)+\{3,5,7,11, \ldots ,p_2, p_1\} \Rightarrow \{6, 8, 10, 12, \ldots , 2(n-1), 2n\}$

$\Rightarrow \{6, 8, 10, 12, \ldots , 2(n-1), 2n\} \in A_n\}\}$ record: (3.3)

Terminate at A_n to obtain::

$\{\{ \{(2.1)+(2.4)+\{3,5,7,11, \ldots ,p_2, p_1\} \not\Rightarrow 2(n+1) \Rightarrow \{2(n+1)\} \notin A_n\}\}$ record: (3.4)

{ Let: prime **p** satisfy: $p \notin \{3,5,7,11, \ldots ,p_2, p_1\}$, (3.3) ,(3.4) .

$\therefore \{ \ p_1 < p, (p+\forall p) \notin \{6, 8, 10, 12, \ldots , 2(n-1), 2n\}, (p+\forall p) \notin A_n\}\}$ (1)

Take the prime number that is greater than p_1 and adjacent to p_1 as p_0,
$\because$ **(1)** $\Rightarrow \{ p_0+3 \neq 2n \ , \ p_0+3 \not< 2n \}$
$\therefore$ $p_0+3 > 2n$
$\therefore$ $p_0+2 \geqslant 2n$ $\because$ **(odd) ≠ (even)**
$\therefore$ $p_0+2 > 2n$ $\Rightarrow$ $p_0+1 \geqslant 2n$ Record as **(W)**

Starting from (Analysis Ⅱ)
The principle of mathematical complete induction:
it is correct in the front, until A_n.

Take the continuous prime number $(3,5,7,11,\ldots,p_2,p_1)$ from small to large.

A_n : $\{(2.1)+(2.4)+\{3,5,7,11,\ldots,p_2,p_1\}\} \Rightarrow$

{**3+3=6**
5+3=8
7+3=5+5=10. set up: (7+3=5+5) sequence: 7>5

7+5=12
11+3=7+7=14. **set up△2: (11+3=7+7) sequence: 11>7**
13+3=11+5=16. **set up△2: (13+3=11+5) sequence: 13>11**
13+5=11+7=18. **set up△2: (13+5=11+7) sequence: 13>11**
17+3=13+7=20. **set up△2:(17+3=13+7) sequence: 17>13**
19+3=17+5=11+11=22. **set up△2: (19+3=17+5=11+11) sequence: 19>17>11**
19+5=17+7=13+11=24. **set up△2:(19+5=17+7=13+11) sequence: 19>17>13**
....
$p_{c1}+p_{c2}=p_{c3}+p_{c4}=...=2(n-2)$
$p_{b1}+p_{b2}=p_{b3}+p_{b4}=...=2(n-1)$
$p_{a1}+p_{a2}=p_{a3}+p_{a4}=...=2n\}$ It is recorded as: A_n
$\Rightarrow$ **:6,8,10,12,14,16,18, ... , 2(n-1),2n.**

In A_n, it is specified that : $p_{a1} \geqslant p_{a2}$
In A_n it is specified that :$p_{a1} > p_{a3}$【Reason: $p_{a1}+p_{a2}=2n$ must exist.
$p_{a3}+p_{a4}=2n$, not necessarily. If $p_{a3}+p_{a4}=2n$, exists p_{a1} and p_{a3} if one of them is big, put the big one in the first place according to the regulations.
If: $(p_{a1} = p_{a3}) \Rightarrow (p_{a1}+p_{a2}=2n) \subsetneqq (p_{a3}+p_{a4}=2n)$
(2.4)$\Rightarrow$ Delete duplicate formula $p_{a3}+p_{a4}=2n$ 】 $\therefore p_{a1} > p_{a3}$

A_n is simplified as B_n.
{**3+3=6**
5+3=8
7+3=5+5=10.
7+5=12
11+3=7+7=14.
13+3=11+5=16.
13+5=11+7=18.
17+3=13+7=20.
19+3=17+5=11+11=22.
19+5=17+7=13+11=24.
....
$p_{c1}+p_{c2}=p_{c3}+p_{c4}=...=2(n-2)$
$p_{b1}+p_{b2}=p_{b3}+p_{b4}=...=2(n-1)$
$p_{a1}+p_{a2}=p_{a3}+p_{a4}=...=2n\}$ It is recorded as: B_n

Change B_n to C_n.
{ **Level 2(n-2):3+2(n-2)+3=2(n+1)**
Level 2(n-3): 5+2(n-3)+3=2(n+1)
Level 2(n-4): 7+2(n-4)+3=5+2(n-4)+5=2(n+1)
Level 2(n-5): 7+2(n-5)+5=2(n+1)

Level 2(n-6): $11+2(n-6)+3=7+2(n-6)+7=2(n+1)$
Level 2(n-7): $13+2(n-7)+3=11+2(n-7)+5=2(n+1)$
Level 2(n-8): $13+2(n-8)+5=11+2(n-8)+7=2(n+1)$
Level 2(n-9): $17+2(n-9)+3=13+2(n-9)+7=2(n+1)$
Level 2(n-10): $19+2(n-10)+3=17+2(n-10)+5=11+2(n-10)+11=2(n+1)$
Level 2(n-11): $19+2(n-11)+5=17+2(n-11)+7=13+2(n-11)+11=2(n+1)$
....
Level 6: $p_{c1}+6+p_{c2}=p_{c3}+6+p_{c4}=...=2(n+1)$
Level 4: $p_{b1}+4+p_{b2}=p_{b3}+4+p_{b4}=...=2(n+1)$
Level 2: $p_{a1}+2+p_{a2}=p_{a3}+2+p_{a4}=...=2(n+1)\}$ It is recorded as : C_n
【friendly note: C_n is Goldbach's conjecture channel. The branches of this channel are: **Level 2, level 4, level 6,... Level 2 (n-3), level 2 (n-2)**】

"Line β " in C_n,: $2\to4\to6\to8\to....\to2(n-5)\to2(n-4)\to2(n-3)\to2(n-2)$

In C_n. (Level 2): $\{p_{a1},p_{a2},p_{a3},p_{a4},...,p_{an}\}$, any element is modeled as p_a, and each prime is abbreviated as p_a.
In C_n. (Level 4): $\{p_{b1},p_{b2},p_{b3},p_{b4},...,p_{bn}\}$, any element is modeled as p_b, and each prime is abbreviated as p_b,
The same analogy follows (at each level).
Important note: in C_n, I didn't specify $p_{a1}>p_{b1}$, I didn't specify their size relationship.

3.2.1.1 Theorem(ω_1) :
$\{p_1$ and p_0 are adjacent prime numbers. $p_0>p_1\}$ $\Rightarrow$ $p_0\ngtr 2p_1$.
Proof:
Assumptions: $p_0>2p_1$.
$\Rightarrow$: $p_0>2p_1.>p_1.$
(2.3)+$\{p_0>2p_1.>p_1.\}\Rightarrow$ $p_0>2p_1.>p_g>p_1.$

$\Rightarrow$ { $p_0.>p_g>p_1.$ }contradiction. $\because$ (p_1 and p_0 are adjacent prime numbers.)

$\therefore p_0\ngtr 2p_1.$

Theorem(ω_1) (QED).

3.2.1.2 Theorem(ω_2) :
A_n, B_n, C_n, If :{ $2n+2=p_x+p_y$. **set up** $\triangle_1$: $p_x \geqslant p_y$}
There must be: $p_x=p_0$
Proof:
If: $p_x+p_y=2(n+1)$ (2)
(w)+(2) : $p_0+3\geqslant p_x+p_y$ (3)

【(w): $p_0+1 \geqslant 2n \Rightarrow p_0+1+2 \geqslant 2n+2 = p_x+p_y \Rightarrow p_0+3 \geqslant p_x+p_y$ 】

∵ (the smallest prime in κ is 3)

∴ $p_y \geqslant 3$

∴ (3) ⇒ $p_0 \geqslant p_x$ (4)

∵ { (3.4) ⇒ {(2.4)+{3,5,7,11, … , p_2, p_1} ≠▷ $2(n+1) = p_i + p_{ii}$ } (5)

∴ { (1) + (5) ⇒ $p_x \notin$ {3,5,7,11, … , p_2, p_1} ⇒ $p_x > p_1$ } (6)

【**reason**: Hypothesis: $p_x \in$ {3,5,7,11, … , p_2, p_1}

∵ $p_x \geqslant p_y$ ⇒ {p_x, p_y } ∈ {3,5,7,11, … , p_2, p_1}

{3,5,7,11, … , p_2, p_1} ⇒ $p_x + p_y = 2(n+1)$ Contradiction with **(5).**

∴ $p_x \notin$ {3,5,7,11, … , p_2, p_1} ⇒ $p_x > p_1$】

{ (4) + (6) } ⇒ $p_0 \geqslant p_x > p_1$ **(7)**

Because $p_0 > p_1$, and the prime number: p_0 and p_1 adjacent.

{ p_0 and p_1 adjacent. + (7) } ⇒ ∴ $p_x = p_0$

(ω_2) (QED).

3.2.1.3 Theorem(ω_3) :

Known: { A_n, B_n, C_n, (2.2),(2.4), p_1 and p_0 are adjacent prime numbers , $p_0 > p_1$,

β line: 2→4→6→8→...→2(n-6)→2(n-5)→2(n-4)→2(n-3)→2(n-2)

κ line: 3→5→7→11→13→17→19→ … →p_2→p_1

(2.2) Extreme law : Not allowed: $2n+2 = p_x+p_y$ } There must be: $p_0 - p_1 > 2(n-2)$

Proof:

p_1 and p_0 are adjacent prime numbers , $p_0 > p_1$,

{∵ there is no prime number between p_1 and p_0 ∴ p_1 takes precedence over other prime numbers and approaches p_0 .

Application

If: $p_0 - p_x = 2$, There must be: $p_1 = p_x$

∵ there is no odd number between p_0 and p_x, ∵ $p_0 > p_1 \geqslant p_x$

If: $p_1 \neq p_x$ There must be: $p_0 > p_1 > p_x$ → p_1 is even → contradictory ∴ $p_1 = p_x$

If: $p_0 - p_x = 4$, $p_0 - p_1 \neq 2$. There must be: $p_1 = p_x$

∵The integer between p_0 and p_x has only an odd number t . ∵ $p_0 - 2 \neq p_1$ → $p_1 \neq t$

∵ $p_0 > p_1 \geqslant p_x$, If: $p_1 \neq p_x$ → $p_0 > p_1 > p_x$ → p_1 is even → contradictory. ∴ $p_1 = p_x$

If: $p_0 - p_x = 6$, $p_0 - p_1 \neq 2$, $p_0 - p_1 \neq 4$. There must be: $p_1 = p_x$

∵ The integer between p_0 and p_x has only two odd numbers **t,t₁**.

∵ $\{p_0-2\neq p_1, p_0-p_1\neq 4\} \rightarrow p_1 \neq \{t,t_1\}$

∵ $p_0>p_1\geqslant p_x$, If: $p_1\neq p_x \rightarrow p_0>p_1>p_x \rightarrow p_1$ is even → contradictory. ∴ $p_1 = p_x$

The same logic is extended (omitted).} Record as **(M)**

∵ Extreme law (2.2): not allowed: $2n+2=p_x+p_y$

∴ $2n+2\neq p_x+p_y$

Under what conditions does ($2n+2=p_x+p_y$) not exist?

Only if we find the condition that $2n+2=p_x+p_y$ holds,

To get: $2n+2\neq p_x+p_y$

What are the conditions for the establishment of ($2n+2=p_x+p_y$) ?

If: $2n+2=p_x+p_y$ holds.

$(\omega_2)+(2n+2=p_x+p_y) \Rightarrow 2n+2= p_0 +p_y$

Get: $p_x= p_0$

What is the value of prime p_y ?

∵ $2p_1\geqslant 2n \Rightarrow 2p_1+2\geqslant 2n+2$

∵ $p_0 >p_1 \Rightarrow p_0 \geqslant p_1+1$ ∵ (odd) $\neq$ (even)

∴ $p_0 >p_1 +1 \Rightarrow 2p_0 >2p_1 +2$

∵ $\{(2p_0 >2p_1 +2),(2p_1+2\geqslant 2n+2)\}$ ∴$\Rightarrow 2p_0 >2n+2$

∵ $\{(2p_0 >2n+2),(2n+2= p_0 +p_y)\}$ ∴$\Rightarrow p_0 > p_y$

∴ $p_y \in \{3,5,7,11,13,17,19, \ldots ,p_2,p_1 \}$

∵ $\{3,5,7,11,13,17,19, \ldots ,p_2,p_1 \}+ (2.4) \Rightarrow C_n$

∵ {**Level 2, level 4, level 6, ..., Level 2 (n-3), level 2 (n-2)**} ∈ C_n

∴ $\{3,5,7,11,13,17,19, \ldots ,p_2,p_1 \} \in$ {**Level 2, level 4, level 6, ..., Level 2 (n-3), level 2 (n-2)**}

∴ $p_y \in$ {**Level 2, level 4, level 6,... Level 2 (n-3), level 2 (n-2)**}

If: $p_y \in$ {**Level 2**}

$\Rightarrow \{p_y \in p_a\} \Rightarrow (p_y = p_{ai}) \Rightarrow 2n+2= p_0 +p_{ai}$

∵ **Level 2**: p_{ai} ∴ **Level 2:** $(p_{aii} +2+p_{ai} =2(n+1)) \in \{p_{a1}+2+p_{a2} =p_{a3}+2+p_{a4} =\ldots=2(n+1)\}$

$\{(2n+2= p_0 +p_{ai}),(p_{aii} +2+p_{ai} =2(n+1))\} \Rightarrow p_{aii} +2=p_0$

$(p_{aii} +2=p_0)+(M)\Rightarrow p_{aii} =p_1$

∴ $(p_{aii} +2=p_0) \Rightarrow (p_1+2=p_0) \Rightarrow (p_0-p_1 =2)$

∴**Level 2:** $\{2n+2=p_x+p_y\} \Rightarrow (p_0-p_1 =2)$ Record as **(i)**

If: **Level 2**: $p_a+2=p$

$(p_a+2=p)\Rightarrow$ (Level 2) $\Rightarrow p+p_{ai}=2n+2 \Rightarrow (p_x+p_y=2n+2)$

$\{(\omega_2) +(p+p_{ai}=2n+2)\}\Rightarrow p_0 \in \{p,p_{ai}\}$ ∵(1)$\Rightarrow p_0 \notin p_{ai}$ ∴ $p = p_0$

∴ $(p_a+2=p)\Rightarrow p_a+2= p_0$

$(M)+(p_a+2= p_0)\Rightarrow p_1+2= p_0$

∴ $(p_a+2= p) = (p_a+2= p_0) \trianglelefteq (p_1+2= p_0)$

$\therefore$ $(p_a+2=p_0)=(p_1+2=p_0)\Rightarrow(p_x+p_y=2n+2)$

Get: $(p_0-p_1=2)\Rightarrow(p_x+p_y=2n+2)$ Record as **(ii)**

(i)+(ii) Get: $\{(p_x+p_y=2n+2)\Leftrightarrow(p_0-p_1=2)\}$ Record as **(j)**

(j) The formula proves that the condition of ($2n+2=p_x+p_y$) in Level 2 **is:** $p_0-p_1=2$

(2.2)Extreme laws do not allow: $2n+2=p_x+p_y \Rightarrow 2n+2\neq p_x+p_y$

$\therefore$ { (j)+($2n+2\neq p_x+p_y$)} $\Rightarrow p_0-p_1\neq 2$ **(8)**

If: $p_y\in$ {**Level 4**}

$\Rightarrow$ $\{p_y\in p_b\}$ $\Rightarrow$ $(p_y=p_{bi})\Rightarrow$ $2n+2=p_0+p_{bi}$

$\because$ **Level 4**: p_{bi} $\therefore$ **Level 4:** $(p_{bii}+4+p_{bi}=2(n+1))$ $\in\{p_{b1}+4+p_{b2}=p_{b3}+4+p_{b4}=...=2(n+1)\}$

$\{(2n+2=p_0+p_{bi}),(p_{bii}+4+p_{bi}=2(n+1))\}$ $\Rightarrow$ $p_{bii}+4=p_0$

$(p_{bii}+4=p_0)$+(M)+(8) $\Rightarrow p_{bii}=p_1$

$\therefore$ $(p_{bii}+4=p_0)\Rightarrow(p_1+4=p_0)\Rightarrow(p_0-p_1=4)$

$\therefore$**Level 4:** $\{2n+2=p_x+p_y\}\Rightarrow(p_0-p_1=4)$

If: Level 4: $p_b+4=p$,

$(p_b+4=p)\Rightarrow$ (Level 4) $\Rightarrow p+p_{bi}=2n+2$ $\Rightarrow(p_x+p_y=2n+2)$

$(\omega_2)+(p+p_{bi}=2n+2)\Rightarrow$ $p=p_0$

$\therefore$ $(p_b+4=p)\Rightarrow p_b+4=p_0$

$(M)+(8)+(p_b+4=p_0)\Rightarrow p_1+4=p_0$

$\therefore$ $(p_b+4=p)=(p_b+4=p_0)\cong(p_1+4=p_0)$

$\therefore$ $(p_b+4=p_0)=(p_1+4=p_0)\Rightarrow(p_x+p_y=2n+2)$

Get: $(p_0-p_1=4)\Rightarrow(p_x+p_y=2n+2)$

The same logic leads to: $\{(p_x+p_y=2n+2)\Leftrightarrow(p_0-p_1=4)\}$ Record as **(jj)**

(jj) The formula proves that the condition of ($2n+2=p_x+p_y$) in Level 4 **is:** $p_0-p_1=4$

(2.2)Extreme laws do not allow: $2n+2=p_x+p_y$ $\Rightarrow 2n+2\neq p_x+p_y$

$\therefore$\{(jj)+($2n+2\neq p_x+p_y$)} $\Rightarrow p_0-p_1\neq 4$ **(9)**

If: $p_y\in$ {**Level 6**}

The same logic leads to: { ($2n+2\neq p_x+p_y$)} $\Rightarrow p_0-p_1\neq 6$ **(10)**

...... Recursive derivation $\rightarrow$

β line: $2\rightarrow4\rightarrow6\rightarrow8\rightarrow$ ... $\rightarrow2(n-6)\rightarrow2(n-5)\rightarrow2(n-4)\rightarrow2(n-3)\rightarrow2(n-2)$

C_n: (Level 2 (n-2)) also follows the same principle: $p_0-p_1\neq 2(n-2)$

$\{p_0>p_1$

$p_0-p_1\neq 2$

$p_0-p_1\neq 4$

p_0-p_1 $\neq 6$
p_0-p_1 $\neq 8$
...
p_0-p_1 $\neq 2(n-3)$
p_0-p_1 $\neq 2(n-2)\}\Rightarrow$ p_0-p_1 $> 2(n-2)$
Theorem(ω 3) (QED).

【Friendly tip: Goldbach's conjecture ball, kick into each branch of Goldbach's conjecture C_n, and the ball is not allowed to encounter Goldbach's conjecture conclusion in each path. Then we get: p_0-p_1 $> 2(n-2)$.】

3.2.1.4 **Theorem(ω 4) :** p_0-p_1 $> 2(n-2)$ violates "Bertrand Chebyshev theorem".
Proof:
(ω 3) $\Rightarrow$ $p_0 - p_1 > 2(n-2)$ $\Rightarrow$ $p_0 - p_1 > 2n-4 \geqslant p_1 + p_i - 4$. 【∵ $2n \geqslant p_1 + p_i$ 】
∴ $p_0 > (2p_1 + p_i - 4)$ ∴ $p_0 \geqslant (2p_1 + p_i - 3)$
∵ (the smallest prime in κ is 3)$\Rightarrow$ $p_i \geqslant 3$ ∴ $(p_0 \geqslant 2p_1 + p_i - 3) \Rightarrow$ $p_0 \geqslant 2p_1$
∵. (odd) ≠ (even) ∴ $p_0 > 2p_1$
Theorem(ω 1) Get: $p_0 > 2p_1$ violates the "Bertrand Chebyshev theorem".
(ω 4) (QED).

3.2.1.5 **Summary:** Causes of contradictions
It is proved that it is wrong to quote "extreme law(2.2)" in this process.It leads to contradictions.
$A_2 \rightarrow A_n$ can only be a pseudo stop,There can be no true stop.
As long as one of them does not quote the "extreme law(2.2)", You get:
$p_x + p_y = 2(n+1)$ $\Rightarrow$ $p_0 + p_y = 2(n+1)$ 【Theorem(ω 2) : $p_0 = p_x$ 】
(ω 2) $\Rightarrow$ New (κ line): $3 \rightarrow 5 \rightarrow 7 \rightarrow 11 \rightarrow 13 \rightarrow 17 \rightarrow 19 \rightarrow .... \rightarrow p_1 \rightarrow p_0$

At this time, the complete proof A_n is followed by $p_0 + p_y = 2(n+1)$

(3.2) **(QED)**.

(3.1) and (3.2) are equivalent: (3.2) **(QED)** $\Rightarrow$ (3.1) **(QED)**.

4 Conclusion

(3.1) and (3.2) are equivalent: (3.2) **(QED)** $\Rightarrow$ (3.1) **(QED)**.
Complete the mathematical complete induction:
{A_1 (κ line:**3**) (3.1) **(QED)** ,
A_n (κ line:**3,5,7,...p_1**) (3.1) **(QED)**,

A_{n+1} (κ line:**3,5,7,...p_1,p_0**) (3.1) **(QED)**}.

"Authenticity stop" will not appear, so it is always infinite. $\Rightarrow$ (3.1) **(QED)**.

5 Statement:

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-The author has no conflict of interest related to the content of this article.
-All authors warrant that they have no relationship with any organization or entity or are involved in any subject or material of financial or non-financial interest discussed herein.
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7 References cited:

[1] Background of the study: Euler's version, that is, any even number greater than 2 can be written as the sum of two prime numbers, also known as "strong Goldbach conjecture" or "Goldbach conjecture about even numbers".
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[2] Bertrand Chebyshev theorem: if the integer $\mathbf{n} > \mathbf{3}$, then there is at least one prime $\mathbf{P}$, which conforms to $\mathbf{n} < \mathbf{p} < \mathbf{2n-2}$. Another slightly weaker argument is: for all integers n greater than $\mathbf{1}$, there is at least one prime P, which conforms to $\mathbf{n} < \mathbf{p} < \mathbf{2n}$.
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[3] The theorem of infinite number of primes: After each prime, you can always find an adjacent prime.
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