Twin prime numbers, Goldbach's proof of conjecture

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abstract
Twin prime numbers, Goldbach's proof of conjecture

Twin prime numbers are infinitely large.

All even numbers greater than 2 may be expressed as the sum of two prime numbers.
5 10 15 20 25 30 …

Except for the case where synthetic water is included,

Consider that there is an N-length equivalent sequence as above. For example
If there is a 7-length equivalent sequence as above,

Teeth

\[
\begin{array}{cccccc}
\times & \times & \circ & \times & \times & \circ \\
\end{array}
\]

You can think of it as filling in the blank X here

\[
\begin{array}{ccccccccc}
\circ & \circ & \circ & \circ & \circ & \circ & \circ & \circ & \circ \\
\end{array}
\]

\[
\begin{array}{cccc}
\circ & \times & \circ \\
\end{array}
\]
As above, there is a multiple of 3 every third time (red circle)

Let's say this pushes the black circle to the right

The $N$ th black circle here is the

$$\frac{p+1}{p-1} \cdot N$$ th circle or to the left
About $\rho$ who is satisfied with $\rho \leq N$

$$\frac{\rho + 1}{\rho - 1} \cdot N$$
continuous series of equivalent series is minimum
Include more than $N$ terms that are not divided by $\rho$
as to $\rho_1, \rho_2$ satisfying $\rho_1, \rho_2 \leq N$
\[
\frac{p_1 + 1}{p_1 - 1} \cdot \frac{p_2 + 1}{p_2 - 1} \cdot N \text{ series of equivalent sequences are}
\]

It includes at least \( N \) terms that are not divided into \( p_1, p_2 \)

N-length equivalent series
For each $p_1$, fill in $\times$ that cannot be filled with $\circ$

Let's do this again

You can think of it as filling $\circ$ with $\times$
that cannot be filled for each $\hat{p}_2$.

In the same way, when there are two equivalent sequences,

○ ○ ○ ○ ○ ○ ○ ○

If there is a 7-length equivalent sequence as above,

× × ○ × × ○ × × ○ × × ○
For each $p_1$ in the first order of magnitude, $\times$ cannot be filled

$\times \circ \times \circ \times \circ \times \circ \times \circ \times \circ \times \circ \times$  

For each $p_1$ in the second order, $\times$ cannot be filled

If you think about filling in $\bigcirc$,  

$\times \bigcirc \times \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \times \bigcirc \bigcirc \bigcirc$
It is the same as filling $\times$ in $\circ$, where 2 spaces are empty for each $p_1$. Therefore

About $p$ who is satisfied with $p \leq N$

$$\frac{p + 2}{p - 2} \cdot N$$

series of two equal order sequences are at least

contains terms that are not divided
into $N$ or more,
as to $p_1, p_2$ satisfying $p_1, p_2 \leq N$
The two consecutive series of
\[
\frac{p_1 + 2}{p_1 - 2} \cdot \frac{p_2 + 2}{p_2 - 2} \cdot N \text{ contain at least } N
\]
terms that are not divided by $p_1, p_2$.
Thus, the two consecutive
\[ \prod_{p < x} \left( \frac{x + 2}{x - 2} \right) \cdot x-\text{sequence sequences} \]
both contain at least \( x \) terms that are not divided by a decimal fraction of \( x \) or less.

For \( 3 \leq x \), \[ \frac{x + 2}{x - 2} < \left( \frac{x}{x - 1} \right)^4 \]
For $x \geq 10^4$,

$$\prod_{p \leq x} \frac{p}{p-1} \leq e^\gamma \ln x \left(1 + \frac{1}{2\ln^2 x}\right)$$

(Kevin Broughan, Equivalents of the Riemann hypothesis (2017), 188)

$$\left(e^\gamma \ln x \left(1 + \frac{1}{2\ln^2 x}\right)\right)^4 x$$ series of two consecutive equivalent sequences are:
Include at least $x$ terms that are not divided into decimal places below $x$.

Therefore, it has a value of $x^2$ or less when there are two consecutive equal sequences of \[ \left( e^{\gamma \ln x} \left( 1 + \frac{1}{2 \ln^2 x} \right) \right)^4 x, \]

If you do not include any arguments
below \( x \), they are prime,

Two consecutive \( \left( e^{\gamma \ln x} (1 + \frac{1}{2 \ln^2 x}) \right)^4 x \)

-sequences with values equal to or less than \( x^2 \) contain terms that are prime on at least both sides.

1. Proof of twin prime conjecture
12345⋯n
34567⋯n + 2

As shown above, it can be shown that there are cases where two equal order sequences are prime numbers at the same time.

For the maximum prime \( p \) below \( n \), \( p^2 < n \) is satisfied, and the length of
the above equivalent sequence pair is $n$

Since when $10^4 < p$ satisfies

$$\left(e^{\gamma \ln p \left(1 + \frac{1}{2 \ln^2 p}\right)}\right)^4 p < p^2$$

at least $p$ pairs of equivalent sequences are prime at the same time.
2. Proof of Goldbach's conjecture

\[ 1 \ 2 \ 3 \ 4 \ 5 \ \cdots \ (n-1) \]
\[ (n-1) \ (n-2) \ (n-3) \ \cdots \ 1 \]

As shown above, it can be shown that there are cases where two equal order sequences are prime numbers at the same time.

For the maximum prime \( p \) below \( n-1 \),
\( p^2 < n - 1 \) is satisfied, and the length of the above equivalent sequence pair is \( n - 1 \)

Since when \( 10^4 < p \) satisfies

\[
\left( e^{\gamma \ln p (1 + \frac{1}{2 \ln^2 p})} \right)^4 p < p^2,
\]

at least \( p \) pairs of equivalent sequences are prime at
the same time.