Twin prime numbers, Goldbach's proof of conjecture

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abstract

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Twin prime numbers are infinitely large.

All even numbers greater than 2 may be expressed as the sum of two prime numbers.

$5\ 10\ 15\ 20\ 25\ 30\ \cdots$

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

× × ○ × × ○ × × ○ × × ○

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

○ ○ ○ ○ ○ ○ ○ ○ ○ ○ × ○

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 p who is satisfied with $p \leq N$

$\frac{p+1}{p-1} \cdot N$continuous series of

equivalent series is minimum

Include more than N terms that are not divided by p

as to p_1,p_2 satisfying $p_1,p_2 \leq N$

$\frac{p_1+1}{p_1-1} \cdot \frac{p_2+1}{p_2-1} \cdot N$ 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 × that cannot be filled with ○

○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ×

Let's do this again

× × × × ○ × × × × ○ × × × × ○

You can think of it as filling ○ with ×

that cannot be filled for each 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, × cannot be filled

× ○ × × ○ × × ○ × × ○ ×

For each p_1 in the second order, × cannot be filled

If you think about filling in ○ ,

× ○ ○ × ○ ○ × ○ ○ × ○ ○ × ○ ○

It is the same as filling $\times$ in $\bigcirc$,

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

$\frac{p_1+2}{p_1-2} \cdot \frac{p_2+2}{p_2-2} \cdot N$ contain at least N

terms that are not divided by p_1, p_2.

Thus, the two consecutive

$$\prod_{p<x}\left(\frac{x+2}{x-2}\right)\cdot x$$–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 $x \geq 10^4$,

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

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

$\left(e^{\gamma} \ln x (1 + \frac{1}{2\ln^2 x})\right)^4 x$ 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 $\left(e^{\gamma}\ln x\,(1+\dfrac{1}{2\ln^2 x})\right)^4 x$,

If you do not include any arguments

below x, they are prime,

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

$1\,2\,3\,4\,5 \cdots n$

$3\,4\,5\,6\,7 \cdots n+2$

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 $\left(e^{\gamma}\ln p(1+\frac{1}{2\ln^2 p})\right)^4 p < p^2$, at least p pairs of equivalent sequences are prime at the same time.

2.Proof of Goldbach's conjecture

$1\,2\,3\,4\,5\cdots(n-1)$

$(n-1)\,(n-2)\,(n-3)\cdots1$

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.