Twin Prime Conjecture

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Abstract

I proved the Twin Prime Conjecture.

The probability that (6n -1) is a prime and (6n+1) is also a prime approximately is 4/3 times the square of the probability that a prime will appear in.

I investigated up to 5×10^{12}.

All Twin Primes are executed in hexagonal circulation. It does not change in a huge number (forever huge number).

When the number grows to the limit, the primes occur rarely, but since Twin Primes are 4/3 times the square of the distribution of primes, the frequency of occurrence of Twin Primes is very equal to 0.

However, it is not 0. Because, primes continue to be generated. Therefore, Twin Primes continue to be generated.

If the Twin Primes is finite, the primes is finite.
This is because 4/3 times the square of the probability of primes is the probability of Twin Primes. This is contradiction. Because there are an infinite of primes.

and
(probability of the occurrence of the Primes)=
$\sqrt{(probability\ of\ the\ occurrence\ of\ the\ Twin\ Primes) \times\ (3/4)}$

That is, Twin Primes exist forever.

key words
Hexagonal circulation, Twin Primes, 4/3 times the square of the probability of primes

Introduction

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In this paper, it is written in advance that 2 and 3 are omitted from primes.

The prime number is represented as (6n -1) or (6n+1). And, n is positive integer.

All Twin Primes are combination of (6n -1) and (6n+1).
That is, all Twin Primes are a combination of 5th-angle and 1th-angle.

[n is positive integer]

5th-angle is (6n -1).
1th-angle is (6n+1).

(6n -2), (6n), (6n+2) in are even numbers.
(6n -1), (6n+1), (6n+3) are odd numbers.

Primes are (6n -1) or (6n+1).
The following is a prime number.
There are no primes that are not (6n -1) or (6n+1).
5 ——— 6n -1 (Twin prime)
7 ——— 6n+1
11 ——— 6n -1 (Twin prime)
13 ——— 6n+1
17 ——— 6n -1 (Twin prime)
19 ——— 6n+1
23 ——— 6n -1
29 ——— 6n -1 (Twin prime)
31 ——— 6n+1
....
....

Part 1

There are 164 primes from 5 to 1000.
Probability is $\frac{164}{996}$.
In this, there are 34 Twin Primes. Probability is $\frac{34}{996}$ =0.034136546...
and $[\frac{164}{996}]^2 \times \frac{5}{4}$=0.0338905824...
$[\frac{164}{996}]^2 \times \frac{4}{3}$=0.0361499546...

There are 455052507 primes from 5 to 10000000000=1×10^{10}.
Probability is $\frac{455052507}{9999999996}$.
In this, there are 27412678 Twin Primes. Probability is $\frac{27412678}{9999999996}$=0.0027412678...
and $[\frac{455052507}{9999999996}]^2 \times \frac{4}{3}$=0.0027609704572...

There are 37607912014 primes from 5 to
1×10^{12}.
Probability is $\frac{37607912014}{99999999996}$.
In this, there are 1870585218 Twin Primes. Probability is $\frac{1870585218}{999999999996} = 0.001870585218007...$
and $[\frac{37607912014}{99999999996}]^2 \times \frac{4}{3} = 0.00188580672808544...$

There are 177291661645 primes from 5 to
$5000000000000 = 5 \times 10^{12}$.
Probability is $\frac{177291661645}{4999999999996}$.
In this, there are 8312493001 Twin Primes. Probability is
$\frac{8312493001}{4999999999996} = 0.00166249860020133....$
and
$[\frac{177291661645}{4999999999996}]^2 \times \frac{4}{3} = 0.00167639110874109...$

Part 2

There are 455052507-50847530=404204977 primes from 1×10^9 to $1 \times 10^{10} = 9 \times 10^9$.
Probability is $\frac{404204977}{9000000000}$=0.04491166411...
In this, there are 27412678-3424505=23988173 Twin Primes. Probability is
$\frac{23988173}{9000000000}$=0.00266535255...
and
$[\frac{404204977}{9000000000}]^2 \times \frac{4}{3}$=0.00268941009764...

There are 4118054809-455052507=3663002302 primes from 1×10^{10} to $1 \times 10^{11} = 9 \times 10^{10}$.
Probability is $\frac{3663002302}{90000000000}$=0.0407000255777....
In this, there are 224376047-27412678=196963369 Twin Primes. Probability is
$\frac{196963369}{90000000000}$=0.0021884818777...
and
$[\frac{3663002302}{90000000000}]^2 \times \frac{4}{3}$=0.00220865610937....

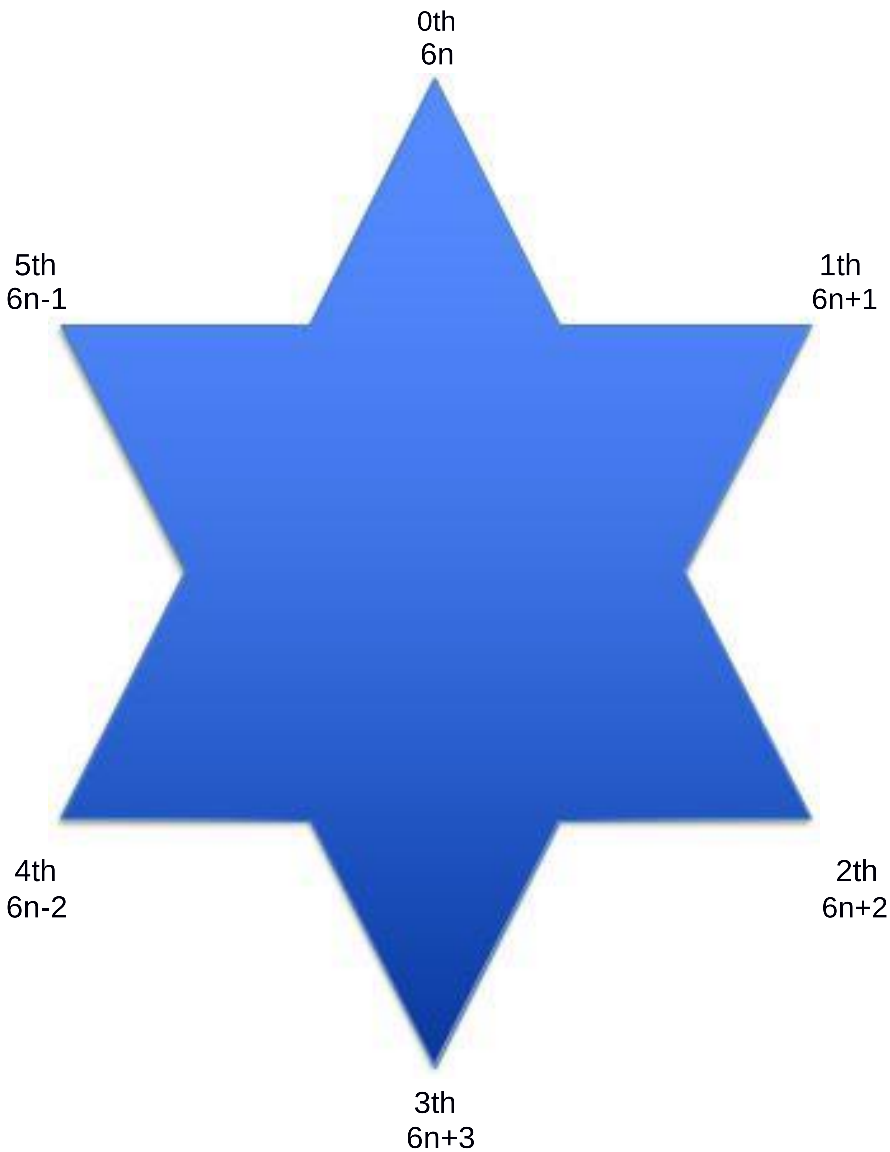
There are 37607912016-4118054809=33489857207 primes from 1×10^{11} to $1 \times 10^{12} = 9 \times 10^{11}$.
Probability is $\frac{33489857207}{900000000000}$=0.0372109524522...
In this, there are 1870585219-224376047=1646209172 Twin Primes. Probability is
$\frac{1646209172}{900000000000}$=0.00182912130222...
and
$[\frac{33489857207}{900000000000}]^2 \times \frac{4}{3}$=0.0018462066432020...

There are 17729166164-3760791201=13968374963 primes from 1×10^{12} to $5 \times 10^{12} = 4 \times 10^{12}$.

Probability is $\frac{13968374963}{400000000000}$=0.0349209374075
In this, there are 8312493001-1870585219=6441907782 Twin Primes. Probability is $\frac{6441907782}{400000000000}$=0.0016104769455
and
$[\frac{13968374963}{400000000000}]^2 \times \frac{4}{3}$=0.001625962492558...

At first, the correction value was set to 5/4.
And the correction value is 4/3.

Calculation depends on WolframAlpha and Wolfram Cloud.


0th
6n
5th
6n-1
1th
6n+1
4th
6n-2
2th
6n+2
3th
6n+3

Discussion

There are four possible primes combination: (6n -1)(6n -1), (6n -1)(6n+1), (6n+1)(6n -1), (6n+1)(6n+1), Each with the same probability.
At this time, Twin Prime is only (6n -1)(6n+1).
The probability of (6n -1)(6n+1) is [1/4].
That is, when Primes comes out, the probability that it is Twin Primes is 1/[1-(1/4)=3/4].
This is the reason for the constant [4/3].

First, say 6n -1 = 6n+5

$(6n-1)\times 5$ =6(5n -1)+1= 1th-angle.
$(6n+1)\times 5$ =6(5n)+5= 5th-angle.
and
$(6n-1)\times 7$ =6(7n -2)+5= 5th-angle.
$(6n+1)\times 7$ =6(7n+1)+1= 1th-angle.
and
$(6n-1)\times 11$ =6(11n -2)+1= 1th-angle.
$(6n+1)\times 11$ =6(11n+1)+5= 5th-angle.
and
$(6n-1)\times 13$ =6(13n -3)+5= 5th-angle.
$(6n+1)\times 13$ =6(13n+2)+1= 1th-angle.
and
$(6n-1)\times 17$ =6(17n -3)+1= 1th-angle.
$(6n+1)\times 17$ =6(17n+2)+1= 5th-angle.
and
$(6n-1)\times 19$ =6(19n -4)+5= 5th-angle.
$(6n+1)\times 19$ =6(19n+3)+1= 1th-angle.
and
$(6n-1)\times(6n-1) = 6(6n^2-2n)+1=$ 1th-angle.
(6n -1)$\times(6n+1) = 6(6n^2)-1 = 6(6n^2-1)+5=$ 5th-angle.
and
$(6n+1)\times(6n-1) = 6(6n^2)-1 = 6(6n^2-1)+5=$ 5th-angle.
(6n+1)$\times(6n+1) = 6(6n^2$+2n)+1= 1th-angle.

In this way, prime multiples of (6n -1) or (6n+1) of primes fill 5th-angle, 1th-angle, and the location of primes becomes little by little narrower.

However, every time the hexagon is rotated once, the number of locations where the prime number exists increases by two.

The probability of a twin prime[(6n -1)(6n+1) combinations] is obtained by multiplying 4/3 times the square of the probability of a prime will occur.

The probability that a twin prime will occur 4/3 times the square of the probability that a prime will occur in a huge number, where the probability that a prime will occur is low from the equation (1).
While a prime number is generated, Twin Primes be generated.

And, as can be seen from the equation below, even if the number becomes large, the degree of occurrence of primes only decreases little by little.

$$\pi(x) \sim \frac{x}{\log x} \quad (x \to \infty) \tag{1}$$

$\log(10^{20}) = 20 \log(10) \approx 46.0517018$
$\log(10^{200}) = 200 \log(10) \approx 460.517018$
$\log(10^{2000}) = 2000 \log(10) \approx 4605.17018$
$\log(10^{20000}) = 20000 \log(10) \approx 46051.7018$
$\log(10^{200000}) = 200000 \log(10) \approx 460517.018$

As x in $\log(x)$ grows to the limit, the denominator of the equation also grows extremely large. Even if primes are generated, the frequency of occurrence is extremely low. The generation of Twin Primes is approximately the square of the generation frequency of primes, and the generation frequency is extremely low.

However, as long as primes are generated, Twin Primes are generated with a very low frequency.

When the number grows to the limit, the denominator of the expression becomes very large, and primes occur very rarely, but since twins are the square of the distribution of primes, the frequency of occurrence of twins is very equal to 0.

However, it is not 0. Therefore, Twin Primes continue to be generated.

However, when the number grows to the limit, the probability the twin prime appearing is almost 0 because it is of 4/3 times the square of the probability of the appearance of the primes.
It is a subtle place to say that almost 0 appears.

Use a contradiction method.
If the Twin Primes is finite, the primes is finite.
This is because 4/3 times the square of the probability of primes is the probability of Twin Primes.
This is contradiction. Because there are an infinite of primes.

and
(probability of the occurrence of the Primes)=
$\sqrt{(probability\ of\ the\ occurrence\ of\ the\ Twin\ Primes) \times\ (3/4)}$

That is, Twin Primes exist forever.

Proof end.

References

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Postscript

I thank Prof. S. Saitoh for his many advices.
And fried-turnip's Yahoo Answers, for a Wolfram Cloud program that you have me tell you, the last of the stuffing was able at once.
Thanks to fried-turnip, it was decided whether 4/3 would be a constant.

In the early days of manual calculations, the constant was 6/5.

There was a mistake in the hand calculation, and at the beginning it became such a stance.

After 200,000 by hand calculation, the constant changed to 4/3, and I was thinking what value this would change in the future. However, Wolfram Cloud can easily calculate the number of twin primes. Knew. This was taught by fried-turnip in Yahoo!