Cousin Primes Conjecture

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Abstract

Cousin Primes Conjecture were performed using Wolfram Cloud from the beginning this time, as in the case of Twin Primes that we did the other day.

Cousin Primes and Twin Primes have exactly the same dynamics.

All Cousin Primes are executed in hexagonal circulation. It does not change in a huge number (forever huge number).
In the hexagon, Cousin Primes are generated only at (6n+1)(6n+5).[n is a positive integer]

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

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

If Cousin Primes is finite, the Primes is finite.
The probability of Cousin Primes 4/3 times the square of the probability of the appearance of the Prime.
This is contradictory. Because there are an infinite of Primes.

That is, Cousin Primes exist forever.

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

Introduction

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

Also, as I say first, Cousin Primes and Twin Primes have almost the same frequency of appearance, so it can be said that they are the same.

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

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

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

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

The Cousin Primes are (6n+1) and (6n -1).
The following is a Cousin Primes.
There are no prime numbers that are not (6n -1) or (6n+1).
7 ———— 6n+1 (Cousin primes)
11 ——— 6n -1
13 ——— 6n+1 (Cousin primes
17 ——— 6n -1
19 ——— 6n+1 (Cousin primes
23 ——— 6n -1
....
....
Bellow are Cousin Primes.
(3, 7), (7, 11), (13, 17), (19, 23), (37, 41), (43, 47), (67, 71), (79, 83), (97, 101), (103, 107),
(109, 113), (127, 131), (163, 167), (193, 197), (223, 227), (229, 233), (277, 281), (307, 311),
(313, 317), (349, 353), (379, 383), (397, 401), (439, 443), (457, 461), (463,467), (487, 491),
(499, 503), (613, 617), (643, 647), (673, 677), (739, 743), (757, 761), (769, 773), (823, 827),
(853, 857), (859, 863), (877, 881), (883, 887), (907, 911), (937, 941), (967, 971)......
....
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I wrote bellow the distribution of Cousin Primes.
The following was calculated by Wolfram Cloud.

(number)	(Sexy prime)	(Twin Prime)	(Cousin Primes)
100000	2447	1224	1216
200000	4295	2160	2136
300000	6003	2994	3975
400000	7650	3804	3817
500000	9184	4565	4559
600000	10688	5331	5334
700000	12138	6061	6085

800000	13587	6766	6798
900000	15000	7472	7471
1000000	16386	8169	8144
2000000	29419	14871	14742
3000000	41559	20932	20826
4000000	53224	26860	26629
5000000	64481	32463	32308
6000000	75417	37915	37787
7000000	86165	43258	43125
8000000	96705	48617	48288
9000000	107042	53866	53468
10000000	117207	58980	58622
90000000	801602	401089	401025
$100000000 = 1 \times 10^8$	879908	430311	440258

There are 9592 Primes to $1 \times 10^5 = 100000$.
Probability is $\frac{9592}{100000}$.
In this, there are 1216 Cousin Primes. Probability is $\frac{1216}{100000} = 0.01216$
and $\left[\frac{9592}{100000}\right]^2 \times \frac{4}{3} = 0.01226752853...$

and
There are 78498 Primes to $1 \times 10^6 = 1000000$.
Probability is $\frac{78498}{1000000}$.
In this, there are 8144 Cousin Primes. Probability is $\frac{8144}{1000000} = 0.008144...$
and $\left[\frac{78498}{1000000}\right]^2 \times \frac{4}{3} = 0.008215914672$

and
There are 664579 Primes to $1 \times 10^7 = 10000000$.
Probability is $\frac{664579}{10000000}$.
In this, there are 58622 Cousin Primes. Probability is $\frac{58622}{10000000} = 0.0058622$
and
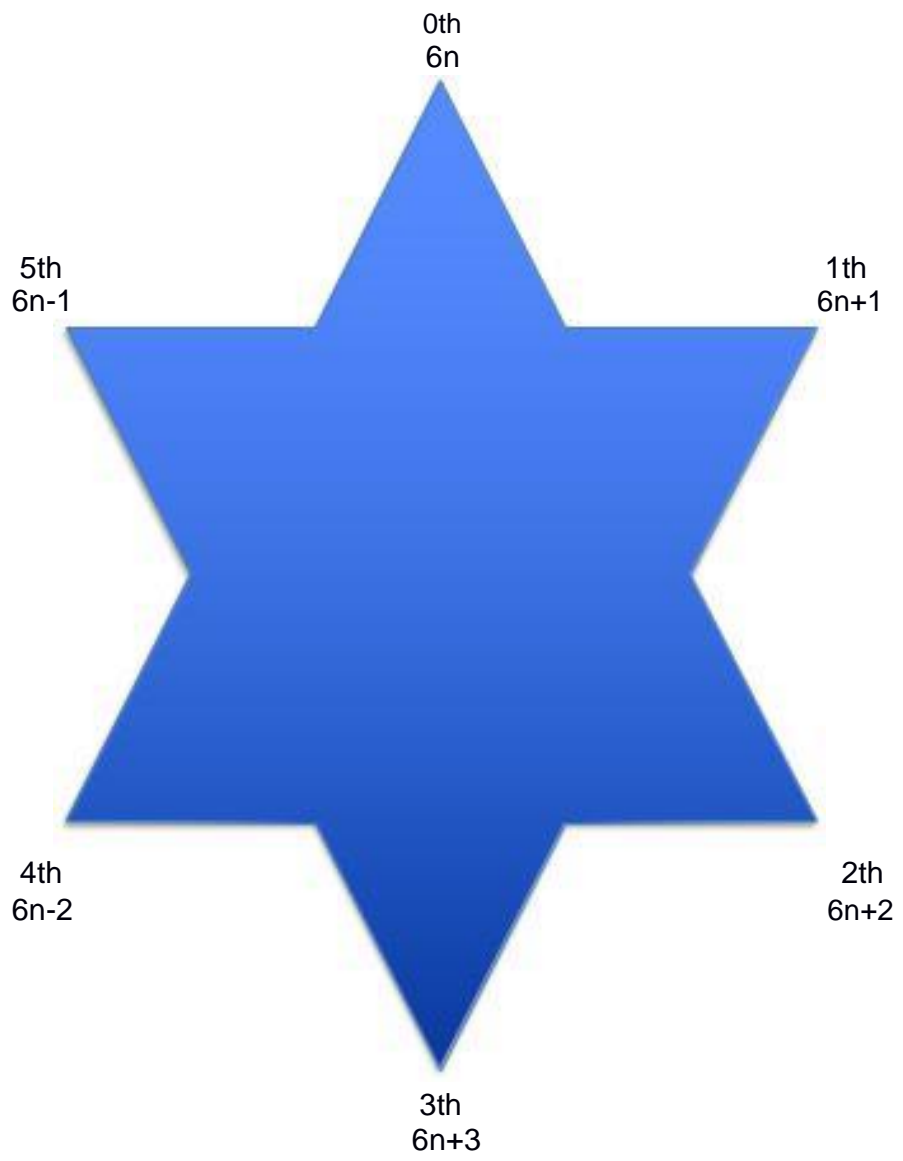$\left[\frac{664579}{10000000}\right]^2 \times \frac{4}{3} = 0.0058888699632133...$

There are 5761455 Primes to $1 \times 10^8 = 100000000$.
Probability is $\frac{5761455}{10000000}$.
In this, there are 440258 Cousin Primes. Probability is $\frac{440258}{10000000} = 0.00440258$
and $\left[\frac{5761455}{10000000}\right]^2 \times \frac{4}{3} = 0.004425909052127...$

As in the case of Twin Primes, constant $= 4/3$ even in Cousin Primes.

0th
$6n$

5th
$6n-1$

1th
$6n+1$

4th
$6n-2$

2th
$6n+2$

3th
$6n+3$

Discussion

Although not found in the literature, Cousin Primes and Twin Primes have exactly the same dynamics.
This means that if Twin Primes are infinite, Cousin Primes are infinite.

The probability that Cousin Primes 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 Primes is generated, Cousin 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.

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

$\log(10^{20}) = 20 \log(10) \approx 46.0517018$
$\log(10^{200}) = 200 \log(10) \approx 460.517018$
$\log(10^{2000}) = 2000 \log(10) \approx 4605.17018$
$\log(10^{20000}) = 20000 \; \log(10) \approx 46051.7018$
$\log(10^{200000}) = 200000 \log(10) \approx 460517.018$
$\log(10^{2000000}) = 2000000 \log(10) \approx 4605170.18$
$\log(10^{20000000}) = 20000000 \log(10) \approx 46051701.8$
$\log(10^{200000000}) = 200000000 \log(10) \approx 460517018$

(Expected to be larger than $\log(10^{200000})$)

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 Cousin 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, Cousin 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 Cousin Primes are 4/3 times the square of the distribution of Primes, the frequency of occurrence of Cousin Primes is very equal to 0.

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

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

Use a contradiction method.
If Cousin Primes is finite, the Primes is finite.
The probability of Cousin Primes 4/3 times the square of the probability of the appearance of the Primes.
This is contradictory. Because there are an infinite of Primes.

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

That is, Cousin Primes exist forever.

Proof end.

References

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