Prime Conjecture

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Abstract— *Ever thought that what if you have a progression or sequence for Prime number?
As you know that there are many works regarding Prime Numbers and always found some groundbreaking results at end.
Some of them are: bounded prime gaps, various conjectures, Ramanujan Primes, Riemann's hypothesis, Riemann's zeta function, and many others too. This document is giving you the most important theory on primes, which is Prime number's progression and a function for it.*

Index Terms— *Prime numbers, progression and sequences, function, number theory.*

1 Introduction

Let's assume that number to be 11 which is prime gap 2 and prime gap 4.

- 2(11) – 7 which is not equal to prime.
- 2(11) – 5 which is equal to prime.

Let's assume another prime number 19

- 2(19) -17 which is not equal to prime
- 2(19) – 13 which is also not equal to prime
- 2(19) – 1 where (1) is the pole point

I have given you above examples to make you have some clarity about my intension in this further theory for prime numbers.

- P: 2, 3, 5, 7, 11…. All primes
- Let "f" be the function whose domain is P and whose Co- domain is P.
- f : P→ P
- Let "p" be a prime number from "P".
- Now,

$$\boldsymbol{f} = \begin{cases} \boldsymbol{2n' - t_{n-1}} \ \dots (\boldsymbol{i}) \\ \boldsymbol{2n' - \ t_{n-2}} \dots (\boldsymbol{ii}) \\ \boldsymbol{2n' - Pole\ point} \dots (\boldsymbol{iii}) \end{cases}$$

a = 1st prime gap
b= 2nd prime gap
n = prime number belonging to a
n′ = prime number belonging to a and b both

Suppose we are considering (i) and if result is not a prime then move on to (ii) and if this time also you don't get a prime then use the pole point. The word "pole point" which is used in above function will be discussed further.

2 Pole point

The pole point is like our last weapon to use.
If two prime numbers are occurring for both gap (i.e. "a" and "b") then our pole point will be "x" and "1" such that

x – 1 = a …(iii)

x + 1 = b …(iv)

"a" and "b" are positive difference gap.

For example: Suppose 2 and 4 is the prime gap, then 1 and 3 will be point because (1 + 3 = 4) and (3 – 1 = 2).

You may be thinking that this is not logical that much mathematically and you may be wondering that if this happened actually, why does this happen?
The answer to this question is below:
Let us consider numbers with prime gap 2 and 4 then:

2 , 3 , (1+3+1), (1+3+3), (1+3+3+3+1), … ,(1+3+3+3+3+3+3), (1+3+3+3+3+3+3+3+1), but on 29 this gets break.

To generalize it we can say that, earlier mentioned pole point satisfies prime numbers. Now does this work for more prime gaps?

The answer is Yes! . If prime number is with gap 4 and 6 the pole point will be 1 and 5. Now, you may
be having no issue with the pole point logic, and this logic you can apply to each and every prime.
Let k be the prime number,
Then pole point will be go like this

(1 + k + 1), (1 + k + k), (1 + k + k + k + 1)…

Here 'k' is the previous 'x'.

NOTE: This is not an important thing to decide pole point, you can decide them by before discussed logic but if you want to apply above equation then the equation itself is dependent on the prime gaps, so firstly define your prime gap and then and only then use the above equation.

Rare Example which you may face while using the conjecture:
Suppose you are selecting prime number 29 from domain ℙ and now using the conjecture.
The problem you will face will be that equation (i) and equation (ii) both fails and you have to compulsorily use the pole point.
But as the gap of 29 with previous prime number is (6) and

that of with next prime number is (2), thus while using equation (iii) you get answer (3) and while using equation (iv) you get answer (5), so in this case both values are different. In such case add (3) to 2x(29) or subtract (5) to 2x(29) then the answer you get will be prime number.

NOTE: You can follow the method shown in above example whenever you face such case.
NOTE: Do above process only is conjecture function fails.

$$T_n = k(2n-1) + 2 \quad (\text{if } k \text{ is odd times})$$
$$= 2nk + 1 \quad (\text{if } k \text{ is even times})$$
$$S_n = kn^2 + 2n \quad (\text{if } k \text{ is odd times})$$
$$= kn + kn^2 + n \quad (\text{if } k \text{ is even times})$$

NOTE: On combining above two results you can find sum of prime numbers and its nth term.

NOTE: Use above method only when you know that 'k' is occurring how much times.

3 PRIME DETERMINANT

In this theory we are also providing a determinant, which always gives prime number as its value. The determinant in form of linear equation is as follows:

$$3b - 2a$$

a = chosen prime number
b = number next the chosen prime number

Now there are some rules to make this determinant always give prime number values. Conditions are:

- "a" and "b" belongs to P.
- Number of prime numbers between "3" and "a" is always even number of prime numbers.
- Suppose a is of digit 'x' and 'y'. Then (x + y) is always even.

CODE

You can find code on below link
https://gist.github.com/azizl/5f8857de67051e948f664b4da2165f4d

If you run the code you will observe that some values are not prime, this is because in code there is no condition, which is mentioned in Prime Determinant section.

4 CONCLUSIONS

The conclusion of this theory is that by help of this theory you will now be able to have a function and progression for prime numbers and now you can predict the next prime number like Arithmetic Progression and other too. You will be able to reveal many physical phenomena in physics by help of this theory. Some of physical phenomena are forces and motion study for free falling leaf, also motion of tides in seas, a further more explanation for the hypothetical particle like Graviton can be given by help of this theory, and many other phenomena too. With help of this conjecture Riemann's hypothesis, Riemann zeta function and various other mathematical questions can be solved with help of this conjecture various particle physics theory(graviton, …) can be explained further. Also by this theory more solutions can be found out by great field medalists for most puzzling problems. The main use of this theory is that it is a solution to the most known GOLDBACH's Conjecture.

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REFRENCES

[1] Ramanujan Prime and Bertnard's Postulate: https://arxiv.org/pdf/0907.5232.pdf
[2] Ramanujan Primes, Bounds and Gaps: https://arxiv.org/pdf/1105.2249.pdf
[3] GoldBachConjecture : https://www.imsc.res.in/~sitabhra/meetings/school10/Balasubramanian_Chennai2010_special_lecture.pdf
[4] *Riemann's Hypothesis*
[5] Newman's short proof of prime number theory
[6] The zeta function and its relation to prime number theorem
[7] Holger Bech Nielsen(Particle Physicist): Importance of prime number for proving hypothetical particle graviton