ISSN: 2834-7706

Research Article

Journal of Mathematical Techniques and Computational Mathematics

Infinite Pair, The Twin Prime Number

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Submitted: 24 Oct 2022; **Accepted:** 02 Nov 2022; **Published:** 23 Nov 2022

Citation: Yin, W. Y. T., Tao, W. Y. (2022). Infinite pair, The twin prime number. *J Math Techniques Comput Math*, 1(2), 145-150.

Abstract
Infinite hypothesis and infinite reasoning. Reverse calculation of prime number, Key integer condition

Key Words: Assuming That, Prime Number, Composite Number, Integer, Fraction.

Introduction

A prime number is a natural number greater than 1 and it is not divisible by natural numbers other than 1 and itself. In other words, a prime number has factors of 1 and itself only. All other numbers are called composite numbers. According to the fundamental theorem of arithmetic, any integer greater than 1 is either a prime number itself or can be written as the product of a series of prime numbers. If the order of these prime numbers in the product is disregarded, the written form will be unique. The smallest prime number is 2.

Mathematical classification number:

03Axx

Assume that: finite pair, twin prime.

Assume that： , P_n , and ， （ $P_n - 2$) They are the largest the twin prime number.

set up: They are permuted in the ascending order as. P_0 ， P_a ， P_b ， P_c ， P_d ， P_e ， P_f.........P_n

as: $N = P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times$..............× P_n They are permuted in the ascending order as，

multiplication in ascending order. N does not contain prime number 2.

Let, $N = 3 \times 5 \times 7 \times 11 \times 13 \times 17 \times$ ....× P_n, multiplication in ascending order. N does not contain prime number 2.

$(N-2) and (N-4)$，Yes, or, no，The twin prime number。

$(N-2) and (N-4)$。Yes, or, no，The twin prime number。

Assume that: N + 2=Composite number，N + 4=prime numbers.

N - 2=Composite number，N - 4=prime numbers.

∴ None of them，twin prime number.

$N \pm 2 -$ （ P_0~~~P_n ，A prime number, or its product. ）.

It also has prime numbers factors > P_n

1,3 （ $N \pm 2$ ） − （ P_0~~~P_n ，A prime number, or its product. ）. It also has prime

number factors> P_n

2,4, （ $N \pm 4$ ） − （ P_0~~~P_n ，A prime number, or its product. ）. It also has prime

number factors> P_n

1, （ $P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times$ . . . . $\times P_n \pm 2$ ） $- 2^n = S_1$

2, （ $P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \quad \times P_n \pm 4$ ） $- 2^n = S_2$

3, $(P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 2) - P_a^n P_b^n = W_1$

4, $(P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 4) - P_a^n P_b^n = W_2$

5，What is twin prime number.

6, Arbitrary odd prime number P， $P + 2$ = Composite number， $P - 2$ =Composite number. It is not a twin prime number Reverse the calculation of prime

numbers and convert them into polynomial equations. Polynomials have different prime numbers. 7, Assume that： P_n , and ， （ $P_n - 2$ ）, They are the largest the twin prime number.

7. （ N + 2 ） = Composite number. Reverse computing simulation reasoning.

According to the basic calculation theorem：We have, 1, 3, simulation equations. Reverse calculation It also has prime numbers> P_n

8，Assume that: Pn and，（ $P_n - 2$ ）, They are a pair, the largest twin prime number.

（ N + 2 ）= Composite number. Infinite reverse computing simulation reasoning.

Assume that: P_n, and，（ $P_n - 2$ ） They are a pair, the largest twin prime number. Its assumption is untenable.

1. （ N ± 2 ） − （ P0~~~P_n ，A prime number, or its product. ） = S1。prime number、or，

Composite number. It has prime numbers> Pn, $2^n > 4$

Reasoning judgment：

$(P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 2) - 2^n = S_1$

$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 2(2^{n-1} - 1) = S^1$

assuming that: $: -2(2^{n-1} - 1) = -2P_a^n P_b^n$

$$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 2P_a^n P_b^n = S_1$$

$$P_a P_b (P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 2P_a^{n-1} P_b^{n-1}) = S_1$$

$$\because 2P_a^{n-1} P_b^{n-1} \div (P_c \sim\sim\sim P_n) = \text{fraction}$$

$$\because P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \div (2, P_a, P_b) = \text{fraction}$$

∵ The propositional condition is an integer (definition of a prime number)

∵ Its integer decomposition does not belong to $(2\sim\sim\sim P_n)$

∵ $P_c \times P_d \times P_e \times P_f \times \ldots\ldots, \times P_n \pm 2P_a^{n-1} P_b^{n-1})$, prime number, or , Composite number. It has prime numbers> P_n

∵ S_1 , Compound numbers, or prime numbers 。 It also has prime numbers> P_n

2. $(N \pm 4) \pm 2^n = S_2$, prime number, or, Composite number. It also has prime numbers factors> P_n。$(2^n > 4)$

Reasoning judgment：

$(P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 4) - 2^n = S_2$

$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 4(1 - 2^n - 2) = S_2$

Assume that：$4(1 \pm 2^{n-2}) = -4P_a^n P_b^n$

$$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 4P_a^n P_b^n = S_2$$

$$P_a P_b (P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 4P_a^{n-2} P_b^{n-2}) = S_2$$

$$\because 4P_a^{n-2} P_b^{n-2} \div (P_c \sim\sim\sim P_n) = \text{fraction}$$

$$\because P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \div (2, P_a, P_b) = \text{fraction}$$

∵ The propositional condition is an integer (definition of a prime number)

∴ $(P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 4P_n - 2P_n - 2)$ prime number、or Composite number.

It also has prime numbers factors> P_n。,

∴ ($(N \pm 4) \pm 2^n = S_2$, is either a composite number or a prime number. 。 It has prime numbers> Pn

3. $(N \pm 4) \pm (P_0 \sim\sim\sim P_n$, A prime number, or its product. $) = W_1$, Compound numbers, or prime numbers 。 Integer Decomposition ，It also has prime numbers factors> P_n

Reasoning judgment:

$$(P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 2) - P_a^n P_b^n = W_1$$

assuming that: $: \pm 2 - P_a^n P_b^n = \pm P_c^n P_d^n$

$$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm P_c^n P_d^n = W_1$$

$$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm P_c^n P_d^n = W_1$$

$$(P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 2^n) \div (2\sim\sim\sim P_n) = \text{fraction}$$

∵ The propositional condition is an integer (definition of a prime number)

$$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm P_c^n P_d^n \neq 2^n$$

$(P_a \times P_b \times P_e \times P_f \times \ldots\ldots \times P_n \pm P_c^{n-1} 1 P_d^{n-1}$) Integer Decomposition without 2 It also has prime numbers factors> P_n

∴W_1, Compound numbers, or prime numbers 。 It also has prime numbers> P_n

4，$(N \pm 4) \pm (P_0 \sim\sim\sim P_n)$ ，A prime number, or its product. Compound numbers, or prime numbers. It also has prime numbers> P_n

Reasoning judgment:

$$(P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 4) - P_a^n P_b^n = W_2$$

Assume that：$\pm 4 - P_a^n P_b^n = \pm P_c^n P_d^n$

$$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm P_c^n P_d^n = W_2$$

$$P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm P_c^n P_d^n = W_2$$

$$\because (P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots \times P_n \pm 2^n) \div (2\sim\sim\sim P_n) = \text{fraction}$$

∵ The propositional condition is an integer (definition of a prime number)

$$\therefore P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots\ldots. \times P_n \pm P_c^n P_d^n \neq 2^n$$

$$\therefore (P_a \times P_b \times P_e \times P_f \times \ldots\ldots. \times P_n \pm P_c^{n-1} 1 P_d^{n-1}$$) Compound numbers, or prime numbers， Not

included 2 , It also has prime numbers> P_n

∴W_2, Compound numbers, or prime numbers. It also has prime numbers> P_n

5 , What is twin prime numbers. Arbitrary odd prime numbers P

Assume that : P + 2=prime numbers、or、P - 2=prime numbers.

P, and, P + 2=prime number The twin prime number.

or, and, P - 2=prime number , The twin prime number。P + 2=-Composite number, and ,

P - 2=Composite number.

P Not a twin prime number, one of them.

6 , Arbitrary odd prime number P ,

P + 2 = Composite number , P − 2 = Composite number. It is not a twin prime number Reverse the calculation of prime numbers and convert them into polynomial equations. Polynomials have different prime numbers.

Arbitrary odd prime number P.

Assume that: P + 2 = Composite number = A^nB^n

Odd prime numbers P, reverse calculation.P.

$P = A^nB^n - 2$

Assume that: P − 2 = Composite number = A^nB^n

Odd prime numbers P, reverse calculation.

$P = A^nB^n + 2$

Inverse calculation of any odd prime number p , It's a polynomial equation.

$\because A^nB^n \neq 2$

∴Polynomials, they have different primes numbers

7, Assume that : P_n , and , ($P_n - 2$) , They are the largest The twin prime number.

(N + 2) = Composite number. Reverse computing simulation reasoning. According to the basic calculation theorem : We have, 1, 3, simulation equations. Reverse calculation ,

It also has prime numbers> P_n

Assume that : , P_n , 和 , ($P_n - 2$) They are the largest The twin prime number.

set up : They are permuted in the ascending order as。P_0 , P_a , P_b , P_c , P_d , P_e , P_f........... P_n

As: $N = P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times ....\times P_n$ They are permuted in the ascending order as ,

multiplication in ascending order。N does not contain prime number 2..

let, $N = 3 \times 5 \times 7 \times 11 \times 13 \times 17 \times \ \times P_n$, multiplication in ascending order. N does not

contain prime number 2.

N + 2=Compound numbers, N + 4=Compound numbers,

N - 2=Compound numbers, , N - 4=Compound numbers,

Suppose: it is not a twin prime. Then there must be a composite number。N + 2 , N - 2 , N + 4 , N - 4 , Their prime number factors> P_n

Assume that : N + 2=Composite number=Bn , and , N + 4=-Composite number=Bn.

Assume that :

B − 2 = Composite number = P^nP^n , B + 2 = Composite number ≠

$$P_a, P_b = P_e^n$$

$$\therefore\ B = P_a^n P_b^n + 2$$
$$N + 2 = (P_a^n P_b^n + 2)^n$$
$$N + 2 = (P_a^n P_b^n + 2)B^{n-1}$$
$$N + 2 = P_a^n P_b^n B^{n-1} + 2B^{n-1}$$

∵Here, the prime number B can be calculated in reverse.

∴Simulation hypothesis abstract calculation can be carried out

Assume that : $N + 2 = P_a^n P_b^n (P_a^n P_b^n + 2)^{n-1} + 2(P_a^n P_b^n + 2)^{n-1} = M + 2^n$

$$N + 2 - 2^n = M$$

Assume that : $2 - 2^n = -2P_c^n P_d^n$

$$N - P_c^n P_d^n = M$$

∴We can get the same logic as equation 1.

∴Reverse calculation, it also has prime numbers factors> P_n

$$N + 2 = (P_a^n P_b^n + 2)^n$$

Assume that :

$$\begin{cases} N + 2 = P_a^n P_b^n (P_a^n P_b^n + 2)^{n-1} + 4P_a^n P_b^n (P_a^n P_b^n + 2)^{n-1} + 2^2\,(P_a^n P_b^n + 2)^{n-1} = P_a^{n+n} P_b^{n+n} + K \\ N + 2 = P_a^n P_b^n (P_a^n P_b^n + 2)^{n-1} + 4P_a^n P_b^n (P_a^n P_b^n + 2)^{n-1} + 2^2\,(P_a^n P_b^n + 2)^{n-1} = 4P_a^{n+n} P_b^{n+n} + K \end{cases}$$

$$\begin{cases} N + 2 - 4P_a^{n+n} P_b^{n+n} = K \\ N + 2 - P_a^{n+n} P_b^{n+n} = K \end{cases}$$

Assume that：

$$\begin{cases} 2-4P_a^{n+n}P_b^{n+n}=-2P_c^nP_d^n \\ 2-P_a^{n+n}P_b^{n+n}=-P_c^nP_d^n \end{cases}$$

∴We can get the same logic as equation 3.
∴Reverse calculation, it also has prime numbers factors> P_n
Assume that：$2-2^n=$
Assume that：$2-2^n=-2P_c^nP_d^n$，Assume that：$2-(P_a^nP_b^n+2)^{n-1}=-P_c^nP_d^n$

$$N-2P_c^nP_d^n=W_1$$
$$P_a\times P_b\times P_c\times P_d\times P_e\times P_f\times\ldots\ldots\times P_n-2P_c^nP_d^n=W_1$$
$$P_c\times P_d（P_a\times P_b\times P_e\times P_f\times\ldots\ldots\times P_n-2P_c^{n-1}-P_d^{n-1}=W_1$$
$$\because（P_a\times P_b\times P_c\times P_d\times P_e\times P_f\times\ldots\ldots\times P_n-2P_c^nP_d^n）\div（2\sim\sim\sim P_n）=\text{fraction}$$
$$\therefore（P_a\times P_b\times P_e\times P_f\times\ldots\ldots\times P_n-2P_c^{n-1}P_d^{n-1})\ \text{prime number、or ,Composite number。}$$

It also has prime numbers factors> P_n。
∴Reverse calculation, it also has prime numbers factors> P_n
8, Arbitrary prime number> P_n
Reverse calculation, there are at least 2 primes number > P_n
Notes: Composite number = （P_1~~~P_n, product），
（Y1~~~Y_n）> P_n，

$$（P_a\times P_b\times P_e\times P_f\times\ldots\ldots\times P_n-2P_c^{n-1}P_d^{n-1})=Y_1^2$$
$$\therefore Y_1>P_n$$

(A)suppose that：

$$（P_a\times P_b\times P_e\times P_f\times\ldots\ldots\times P_n-2P_c^{n-1}P_d^{n-1})=Y_1^2$$
$$\therefore Y_1>P_n$$

Reverse calculation:
Use: Y_1-2 = Composite number = （P_1~~~P_n, product）.
∴Y_1 = Composite number + 2

$$\therefore N-2P_c^nP_d^n=P_c\times P_d\times（\text{Composite number}+2）^2$$

suppose that：$Y_1-2=\text{Composite number}=（P_1\sim\sim\sim P_n,\text{product}）=P_m^n$

$$Y_1=P_m^n+2$$
$$N-2P_c^nP_d^n=P_c\times P_d\times（P_m^n+2）^2$$
$$N-2P_c^nP_d^n=P_c\times P_d\times P_m^{n+2}+4P_c\times P_d\times P_m^n+P_c\times P_d\times 2^2$$
$$\begin{cases} N-2P_c^nP_d^n-4P_c\times P_d\times P_m^n=P_c\times P_d\times P_m^{n+2}+P_c\times P_d\times 2^2 \\ \text{or ,} \\ N-2P_c^nP_d^n-P_c\times P_d\times P_m^{n+2}=4P_c\times P_d\times P_m^n+P_c\times P_d\times 2^2 \end{cases}$$

suppose that：$-2P_c^nP_d^n-4P_c\times P_d\times P_m^n=-2P_c\times P_d\times P_e^n$

suppose that：$-2P_c^nP_d^n-P_c\times P_d\times P_m^{n+2}=-P_c\times P_d\times P_e^e$

$$\begin{cases} P_a\times P_b\times P_c\times P_d\times P_e\times P_f\times\ldots\ldots\times P_n-2P_c\times P_d\times P_e^n=P_c\times P_d\times P_m^{n+2}+P_c\times P_d\times 2^2 \\ P_a\times P_b\times P_c\times P_d\times P_e\times P_f\times\ldots\ldots\times P_n-P_c\times P_d\times P_e^e=4P_c\times P_d\times P_m^n+P_c\times P_d\times 2^2 \end{cases}$$
$$\begin{cases} P_c\times P_d\times P_e(P_a\times P_b\times P_f\times\ldots\ldots\times P_n-2P_e^{n-1})=P_c\times P_d\times（P_m^{n+n}+2^2） \\ P_c\times P_d\times P_e\,(P_a\times P_b\times P_c\times\ldots\ldots\times P_n-P_e^{e-1})=4P_c\times P_d\,(P_m^n+1) \end{cases}$$

According to lemma1,2,3,4：

∴

$$\begin{cases}(P_a \times P_b \times P_f \times \ldots\ldots \times P_n - 2P_e^{n-1})\text{。Prime number factor} > P_n \\ (P_a \times P_b \times P_e \times \ldots\ldots \times P_n - P_e^{e-1})\text{。Not included 2，it also has prime numbers factors} > P_n\end{cases}$$

∴Reverse calculation,There are at least 2 primes number $> P_n$

(B)suppose that：$(P_a \times P_b \times P_e \times P_f \times \ldots\ldots \times P_n - 2P_c^{n-1}P_d^{n-1}) = Y_1$

$Y_1 - 2 =$ Composite number $=$（$P_1 \sim\sim\sim P_n$, product）$= P_m^n$

$\therefore Y_1 = P_m^n + 2$

$N - 2P_c^nP_d^n = P_c \times P_d \times (P_m^n + 2)$

$N - 2P_c^nP_d^n = P_c \times P_d \times P_m^n + P_c \times P_d \times 2$

$$\begin{cases}N - 2P_c^nP_d^n - P_c \times P_d \times 2 = P_c \times P_d \times P_m^n \\ \text{Or} \\ N - 2P_c^nP_d^n - P_c \times P_d \times P_m^n = P_c \times P_d \times 2\end{cases}$$

$$\begin{cases}N - P_c \times P_d \times P_m^n = P_c \times P_d\ (P_c^nP_d^n + 1) \\ \text{or} \\ N - P_c \times P_d \times 2 = P_c \times P_d\ (2P_c^{n-1}P_d^{n-1} + P_m^n)\end{cases}$$，

According to lemma1,2,3,4：

∴（$P_c^nP_d^n + 1$），Not included 2，it also has prime numbers factors $> P_n$

（$2P_c^{n-1}P_d^{n-1} + P_m^n$），prime number、or，Composite number。It also has prime numbers factors $> P_n$。

∴Reverse calculation,There are at least 2 primes number $> P_n$

9，Infinite reverse computing simulation reasoning。suppose that：P_n，和，($P_n - 2$) They are the largest pair, twin prime numbers. Its assumption is untenable

Reverse calculation$(Y_1 \sim\sim\sim Y_n) > P_n$

According to lemma 8, reverse calculation: at least 2 prime numbers $> P_n$

Appear in turn：(notes：$Y_1 \sim\sim\sim Y_n$，$W_2 \sim\sim\sim\sim W_n$，they are prime numbers) Reverse calculation use，$(Y_1 \sim\sim\sim Y_n) - 2 =$ Compound number

Reverse calculationY_1，obtain prime numbersY_2，W_2

Reverse calculationY_2，obtain prime numbersY_3，W_3

Reverse calculationY_3，obtain prime numbersY_4，W_4

Reverse calculationY_4，obtain prime numbersY_5，W_5

。。。。。。。。

Reverse calculation，obtain prime numbers

$$\begin{cases}Y_1, Y_2, Y_3, Y_4, Y_5, Y_6, \ldots, Y_n \\ W_2, W_3, W_4, W_5, W_6, \ldots, W_n\end{cases}$$

Suppose that：Calculate logical quantity cycle。$Y_1 > Y_X$ (notes：$Y_2 \sim\sim\sim Y_n$，$W_2 \sim\sim\sim\sim W_n$，they are quantities，) Reverse calculation

set up：$N - A = Y^1$

Reverse calculation use

$Y_1 =$ Compound number + 2

$N - A =$ Compound number + 2

$$\begin{cases}N - A - Y_2 = W_2 \\ N - A - W_2 = Y_2\end{cases}$$

set up：$N - B = Y_x$

set up：$N - B = Y_x$

Reverse calculation use，

$Y_x =$ Compound number + 2

$N - B =$ Compound number + 2

$N - B = C + D$

$$\begin{cases}N - C = B + D \\ N - D = B + C\end{cases}$$

suppose that:

$$\begin{cases}B + D = W_2 \\ B + C = Y_2\end{cases}$$

∴

$$\begin{cases}C = A + Y_2 \\ D = A + W_2\end{cases}$$

$B + A + Y_2 = Y_2$

$B + A = 0$

∴suppose that: Calculate the logical quantity cycle. The assumption is untenable

∵Infinite assumption, reverse calculation of logical quantity does not cycle.

$$\begin{cases} Y_1, Y_2, Y_3, Y_4, Y_5, Y_6, , , , , Y_n \\ W_2, W_3, W_4, W_5, W_6, , , , , W_n \end{cases}$$

It is an infinite number of primes.
∵N + 2 =Finite number ,
∵Infinite >finite
∴P_n , and , ($P_n - 2$) They are the largest pair, twin prime numbers. Its assumption is untenable

Infinite pair, distance 2a, bis prime number. A>1
Assumptions: finite, distance 2a, bis prime number.
set up: $2A = 2^n \times 3^n \times 5^n \times 11^n$
$N = P_a \times P_b \times P_c \times P_d \times P_e \times P_f \times \ldots \ldots . \times P_n$ They are permuted in the ascending order as ,
multiplication in ascending order. N Excluding, prime number 2,3,5.11
let , $N = 7 \times 13 \times 17 \times 19 \times 23. . . .. \times P_n$, they are permuted in the ascending order as ,
multiplication in ascending order. N does not contain prime number,2,3,5.11
N − 2A = Composite number , N − 4A = Composite number.
N + 2A = Composite number, N + 4A = Composite number
This is the same logical proof as above
References:
Euclid
Thesis *topic Abstract Hypothesis, Basic Analog Arithmetic Logic, Judgment Inference and Hypothesis Contradiction*
Philosophy, Proof by contradiction (its condition: integer) Proven by the contradiction that the number of primes is infinite
Abstract hypothesis:
Suppose that the number of primes is finite.
They are permuted in the ascending order as P1, P2, P3....Pn
Basic analog arithmetic logic: multiplication in ascending order

$$P_0 \times P_1 \times P_2 \times P_3 \times \ldots\ldots \times P_n = N$$
$$2 \times 3 \times 5 \times 7 \times \ldots\ldots \times P_n = N$$

Then, N+1 is either prime or not prime.

$$N + 1 > P_n$$

Judgment inference:
If N + 1 is a composite number,
suppose that N + 1 = W
Let $W = P_1, P_2, P_3 ....P_n$ (any prime number) (N + 1) ÷ W
∵ N ÷ W = Integer and 1 ÷ W = Fraction
∴ (N + 1) ÷ W = Fraction
∵ The propositional condition is an integer (definition of a prime number)
∴ N + 1 is either a composite or a prime number.
The prime factors obtained by the factorization of the integer N + 1 are definitely not within the
assumed $P_1, P_2, P_3 ...P_n ...$
There are other primes besides the finite number of primes assumed. Hence, the original hypothesis does not hold. In other words, there exist infinitely many prime numbers.
Hypothesizing that the infinite number of primes belongs to the unconditional mathematical theory.
Then, there is an equation $N + 1 = W \times Y^n$
Let $W< P_n$, $Y < P_n$
The equation $(N + 1) \div W = Y^n$ ($Y < P^n$) must be established.
∴ The theorem of infinite primes does not hold.
Any rigorous theory proves that one is tenable and the other is not tenable