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Elementary Proof Of The Twin Prime Conjecture, Polygnac Conjecture, Goldbach Conjecture And The Fermar's Last Theorem And How To Solve The Complex Power Of Any Complex Number

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ABSTRACT:- In order to strictly prove from the point of view of pure mathematics Goldbach's 1742 Goldbach conjecture and Hilbert's twinned prime conjecture in question 8 of his report to the International Congress of Mathematicians in 1900, and the French scholar Alfond de Polignac's 1849 Polignac conjecture, By using Euclid's principle of infinite primes, equivalent transformation principle, and the idea of normalization of set element operation, this paper proves that Goldbach's conjecture, twin primes conjecture and Polignac conjecture are completely correct. In order to strictly prove a conjecture about the solution of positive integers of indefinite equations proposed by French scholar Ferma around 1637 (usually called Ferma's last theorem) from the perspective of pure mathematics, this paper uses the general solution principle of functional equations and the idea of symmetric substitution, as well as the inverse method. It proves that Fermar's last theorem is completely correct.

Key words:- Twin prime conjecture, Polignac conjecture, Goldbach conjecture, the infinitude of prime numbers, the principle of equivalent transformations, the idea of normalization of set element operations, Fermat indefinite equation, functional equation decomposition, symmetric substitution, prime number principle, proof by contradiction.

I.INTRODUCTION

In a 1742 letter to Euler, Goldbach proposed the following conjecture: any integer greater than 2 can be written as the sum of three prime numbers. But Goldbach himself could not prove it, so he wrote to ask the famous mathematician Euler to help prove it, but until his death, Euler could not prove it.The convention "1 is also prime" is no longer used in the mathematical community, but this paper needs to restore the convention "1 is also prime". The modern statement of the original conjecture is that any integer greater than 5 can be written as the sum of three prime numbers. (n > 5: When n is even, n=2+(n-2), n-2 is also even and can be decomposed into the sum of two prime numbers; When n is odd, n=3+(n-3), which is also an even number, can be decomposed into the sum of two primes.) Euler also proposed an equivalent version in his reply, that any even number greater than 2 can be written as the sum of two primes. The common conjecture is expressed as Euler's version. The statement "Any sufficiently large even number can be represented as the sum of a number of prime factors not more than a and another number of prime factors not more than b" is written as "a+b". A common conjecture statement is Euler's version that any even number greater than 2 can be written as the sum of two prime numbers, also known as the "strong Goldbach conjecture" or "Goldbach conjecture about even numbers". From Goldbach's conjecture about even numbers, it follows that any odd number greater than 7 can be represented as the sum of three odd primes. The latter is called the "weak Goldbach conjecture" or "Goldbach conjecture about odd numbers". If Goldbach's conjecture is true about even numbers, then Goldbach's conjecture about odd numbers will also be true.Twin primes are pairs of prime numbers that differ by 2, such as 3 and 5,5 and 7,11 and 13. . This conjecture, formally proposed by Hilbert in Question 8 of his report to the International Congress of Mathematicians in 1900, can be described as follows:There are infinitely many prime numbers p such that p + 2 is prime.Prime pairs (p, p + 2) are called twin primes.In 1849, Alphonse de Polignac made the general conjecture that for all natural numbers k, there are infinitely many prime pairs (p, p + 2k). The case of k = 1 is the twin prime conjecture. Around 1637, the French scholar Fermat, while reading the Latin translation of Diophatus' Arithmetics, wrote next to proposition 8 of Book 11: "It is impossible to divide a cubic number into the sum of two cubic numbers, or a fourth power into the sum of two fourth powers, or in general to divide a power higher than the second into the sum of two powers of the same power. I am sure I have found a wonderful proof of this, but the blank space here is too small to write."Around 1637, the French scholar Fermat, while reading the Latin translation of Diophatus' Arithmetics, wrote next to proposition 8 of Book 11: "It is impossible to divide a cubic number into the sum of two cubic numbers, or a fourth power into the sum of two fourth powers, or in general to divide a power higher than the second into the sum of two powers of the same power. I am sure I have found a wonderful proof of this, but the blank space here is too small to write."Since Fermat did not write down the proof, and his other conjectures contributed a lot to mathematics, many mathematicians were interested in this conjecture. The work of mathematicians has enriched the content of number theory, involved many mathematical means, and promoted the development of number theory.

II. REASONING

Suppose N=2p+3q(p, q, N are all any non-negative integers),then N=2(p+q)+q(p, q, N are all any non-negative integers), when q is any even number, then N=2(p+q)+q(p, q an N are all any non-negative integers, q is any even number) is any even number, when q is any odd number, then N=2(p+q)+q(p, N are any non-negative integers, q is any odd number) can represent any odd number, so N=2(p+q)+q(p, q, N are any non-negative integers) can represent any non-negative integer. Since N=2p+3q(p, q, and N are any non-negative integers), then N=2p+3(q-1)+3(p, q, and N are any non-negative integers), then N+1=(2p+1)+3(q-1)+3(p, q, and N are any non-negative integers), then N+1=(2p+1)+3(2q-1)+3-3q(p, q, N are any nonnegative integer), then N+(1+3q)=(2p+1)+3(2q-1)+3(p, q, N are any nonnegative integer), then N+(1+3q)-2(2q-1)=(2p+1)+(2q-1)+3(p, q, N are any one non-negative integer), that is, N+(3-q)=(2p+1)+(2q-1)+3(p, q, N are any nonnegative integer). Because (2p+1)(p is any non-negative integer), (2q-1)(q is any non-negative integer), and 3 are odd number, and because N is any non-negative integer an integer, (3-q)(q is any non-negative integer) is also any non-negative integer, then N+(3-q)(q and N are any non-negative integers) is still any non-negative integer, and N is any odd number, then N=(2p+1)+(2q-1)+3(p, q, N are any a non-negative integer) is true, and N is any odd number. Since p and q are any non-negative integers, so (2p+1)(p is any non-negative integer) and (2q-1)(q is any non-negative integer) must can both be prime numbers.Since prime numbers are odd, and there are infinitely many primes, it has been proved by Euclid , prime numbers can be infinite, or they can be small enough until they are 1,when an odd number is not prime, it can always be added to or subtracted from several times the value of 2, that is, it can always be added to or subtracted from 2k(k is any positive integer) to become prime. When (2p+1) and (2q-1) are odd and not prime, they become prime by adding or subtracting 2k(where k is any positive integer). At the same time (2p+1) and (2q-1) add or subtract 2k(k is any positive integer) to become prime numbers, if you think of them as smaller primes, you can also think of N as smaller non-negative integers, if you think of them as larger primes, you can also think of N as larger non-negative integers, Since the non-negative positive number N is still any non-negative integer after adding or subtracting the even number 2k(k is any positive integer), any odd number in any non-negative integer can always be written as the sum of three primes. There must be a prime number of 3, according to the equation N=(2p+1)+(2q-1)+3(p, q, N are any non-negative integers), then N-3=(2p+1)+(2q-1)(p, q, N are any non-negative integers), Since (n-3)(N is any non-negative integer) is any odd number minus 3, so (N-3)(N is any non-negative integer) is any even number, so any even number in any non-negative integer can always be written as the sum of two prime numbers.When (2p+1) is prime, leave (2p+1) unchanged, or if you add or subtract 2k(k is any positive integer), then (2p+1) add or subtract 2k(k is any positive integer), it can always become another prime number. And when (2p+1) is not prime, add the value of p to k(k is any positive integer), such that 2(p+k)+1 can be a prime, or subtract the value of p from k(k is any positive integer), such that 2(p-k)+1 can also be a prime, Then the equation N=(2p+1)+(2q-1)+3(p, q, N are any nonnegative integer) becomes the N+2k=[2(p+k)+1]+(2q-1)+3(p, q, N are arbitrary a nonnegative integer), or equation N=(2p+1)+(2q-1)+3 (p, q, N are arbitrary a nonnegative integer) becomes N-2k=[2(p-k)+1]+(2q-1)+3(p, q, and N are all any non-negative integers, and k is any positive integer), because N is any non-negative integer, so N+2k(k is any positive integer) and N-2k(k is any positive integer) are both any non-negative integers,so N=[2(p(+/-)k)+1]+(2q-1)+3 (p, q, N are any nonnegative integer, k for any positive integer) was established. In the same way, since when (2q-1)(q is any non-negative integer) is prime, keep (2q-1)(q is any non-negative integer) unchanged, or if you add or subtract 2k(k is any positive integer), then (2q-1) add or subtract 2k(k is any positive integer), it can always become another prime number.. And when (2q-1)(q is any non-negative integer) is not prime, add the value of q to k(k is any positive integer), so that 2(q+k)-1 must be a prime number.,or the value of q minus k(k is any positive integer), such that 2(q-k)-1(q is any non-negative integer,k for any positive integer) must also be a prime number, I use the symbol (+/-) to mean adding or subtracting between two numbers, then the equation N=[2(p(+/-)k)+1]+(2q-1)+3(p, q, N are any non-negative integers, k for any positive integer) becomes the N+2k=[2(p(+/-)k)+1]+[2(q+k)-1]+3(p, q, N are any nonnegative integer, k for any positive integer), or the equation N=[2(p(+/-)k)+1]+(2q-1)+3(p, q, N are any nonnegative integer, k for any positive integer) becomes N-2k=[2(p(+/-)k)+1]+[2(q-k)-1]+3(p, q, N are any nonnegative integer, k for any positive integer), because the nonnegative integer N is arbitrary, So N+2k(k is any positive integer) and N-2k (k is any positive integer) are both arbitrary non-negative integers, which is odd, which means that any odd number can be written as the sum of three prime numbers, [2(p(+/-)k)+1] (p is any nonnegative integer, k for any positive integer), [2(q(+/-)k)-1] (q is any nonnegative integer, k for any positive integer), and 3 are all prime numbers. So we can make both (2p+1)(p being any non-negative integer) and (2q-1)(q being any non-negative integer) prime numbers, The variable N to the left of the equation N=(2p+1)+(2q-1)+3(p, q, N are all any non-negative integers) is an arbitrary non-negative integer, can not to tube, or equations [N(+/-)2k]=[2(p(+/-)k)+1]+[2(q(+/-)k)-1]+3(p, q, N are arbitrary a nonnegative integer, k for any positive integer) on the left side of the variable [N(+/-)2k] is an arbitrary nonnegative integers, can need not tube. So we can make both (2p+1)(p being any non-negative integer) and (2q-1)(q being any non-negative integer) prime numbers, equation N=(2p+1)+(2q-1)+3(p, q, N are any nonnegative integer) on the left side of the nonnegative integer variables N is an arbitrary, can need not tube, or can make both [2(p(+/-)k)+1](p for arbitrary a nonnegative integer, k for any positive intege) and [2(q(+/-)k)-1)](q for arbitrary a nonnegative integer, k for any positive intege) prime numbers, equation [N(+/-)2k]=[2(p(+/-)k)+1]+[2(q(+/-) k)–1]+3(p, q, N are any nonnegative integer) on the left side of the variable [N(+/-)2k] is an arbitrary nonnegative integers, can need not tube. The equation N=(2p+1)+(2q-1)+3(p, q, N are all any non-negative integer) is obtained again, which is true, where (2p+1)(p is any non-negative integer),(2q-1)(q is any non-negative integer), and 3 are all prime numbers. Since (2p+1)+(2q-1)+3(p, q, N are any non-negative integers) can not be any even number, the variable N to the left of the equation N=(2p+1)+(2q-1)+3(p, q, N are all any non-negative integers) is an arbitrary non-negative integer, which can be ignored, then N=(2p+1)+(2q-1)+3(p, q, N are any non-negative integers) means that there is the any odd number of the sum of three prime numbers , and N is any odd number, and N=(2p+1)+(2q-1)+1(p, q, N are any non-negative integers) can also be true, so any odd number must be written as the sum of three prime numbers, one of which must be 3, and any odd number can be written as the sum of three prime numbers, one of which must be 1. Because both N-3=(2p+1)+(2q-1)(p, q, and N are any non-negative integers) and N-1=(2p+1)+(2q-1)(p, q, and N are any non-negative integers) are true, and both N-3 and N-1 are any even number, and both (2p+1)(p being any non-negative integer) and (2q-1)(q being any non-negative integer) are prime numbers, then any even number can be written as the sum of any finite number of prime pairs, and then any even number can be written as the sum of two primes, so Goldbach's conjecture holds.

At the same time, according to the N-3=(2p+1)+(2q-1)(p, q, N are any nonnegative integer), get (N-3)-2(2q-1)=(2q-1)-2(2q-1)=(2p+1)-(2q-1)(p, q, N are all any non-negative integers), according to N-1=(2p+1)+(2q-1)(p, q, N are all any non-negative integers),

get (N-1)-2(2q-1)=(2p+1)+(2q-1)-2(2q-1)=(2p+1)-(2q-1)(p, q, N are any nonnegative integer), and N-3 and N-1 are any even number, So (N-3)-2(2q-1) and (N-1)-2(2q-1) both represent any even number, and (2p+1)(p is any non-negative integer) and (2q-1)(q is any non-negative integer) are both prime numbers, so any even number can be written as the difference of any infinite pair of prime numbers, so the twin prime conjecture and the Polignac conjecture are both correct.

At the same time, I discovered a prime number generation (or construction) mechanism,I first give a construction formula of prime numbers N=2p-q(p is any non-negative integer, q, N are any prime) or N=kp-q(p is any non-negative integer, k is any positive integer, q, N are any prime), and I prove this formula below. Based on myproof that N=(2p+1)+ (2q-1)+3 (p, q, and N are all arbitrary non-negative integers),we get N-2*(2q-1)-2*3=(2p+1)-(2q-1)-3(p, q, and N are all arbitrary non-negative integers), where *means multiplication, N-2*(2q-1)-2*3 is still any non-negative integer, then

N=(2p+1)-(2q-1)-3(p, q, N are all any non-negative integers) holds, then N+(2q-1)-1=2p-3(p, q, N are all any non-negative integers), Since N+(2q-1)-1 is still any non-negative integer, so N=2p-3(p and N are any non-negative integers) is true, then N-q=2p-q-3(p and N are non-negative integers, q is prime) is true, then N-q+3=2p-q(p and N are non-negative integers) is true, then N-q+3=2p-q(p and N are non-negative integers, q is any prime number) is true, because n-q+3 is still a non-negative integer, so N=2p-q(p and N are non-negative integers, q is any prime number) is true, and N=kp-q(p and N are non-negative integers, k is any positive integer, q is any prime number) is also true, because any non-negative integer must contain all prime numbers, Therefore, N=2p-q(p is any non-negative integer, q and N are any prime numbers) is true, and N=kp-q(p is any non-negative integer, k is any positive integer, q and N are any prime numbers) is also true. If N=2p-q(p being any non-negative integer, q and N being any prime) holds, we know that when q is equal to p, then there must be at least one prime between any prime q and 2q, and N=kp-q(p being any non-negative integer, k being any positive integer, q and N are all any prime numbers) shows that any prime number can be constructed by subtracting any prime number q(q is less than kp,k being any positive integer) from kp(k is any positive integer) .The formula N=kp-q(p is any non-negative integer, q and N are any prime numbers,k is any positive integer) can also be written as $N=2p+10^r-q$(p and r are any positive integers,k is any positive integer and N is any prime number, q is the numbers in the set {1, 3, 5, 7}).If q and p are mutually different primes, then for any two mutually different primes q and p,N=kp-q(p, N are any non-negative integers, k is any positive integer, q is any prime number), N+2q=kp+q(p, N are any non-negative integers, k is any positive integer, and q is any prime number) is obtained, N+2q= kp+q (p, N are any non-negative integers, k is any positive integer, q is any prime number), then N=kp+q(p, N is any non-negative integer, k is any positive integer, q is any prime number,), because the non-negative integer N must contain all prime numbers, then N=kp+q(q, p, N are all any prime numbers, and q is prime to p, k is any positive integer),so there are infinitely many prime numbers of the form q+kp, where k is a positive integer, i.e. in the arithmetic sequence q+p,q+2p,q+3p,..... ,There are infinitely many prime numbers, there are infinitely many prime moduli p congruence q, so we have proved Dirichlet's theorem.

If we only remember prime numbers, according to Euclid's theorem that there are infinitely many prime numbers, then,

1 plus x*2 ($x \in Z_+$ or $x = 0$) will always become an infinite number of prime numbers, represented by $\{P_i\}$(P_i is prime, $i \in Z_+$), is

1,3,5,7,11,13,17,... ,

3 plus (x-1)*2($x \in Z_+$ or $x = 0$) will always become an infinite number of prime numbers, expressed by $\{U_i\}$(U_i is prime, $i \in Z_+$), 1, 3, 5, 7, 11, 13, 17,... , $P_i=U_i$(P_i is prime, U_i is prime, $i \in Z_+$).3 plus x*2($x \in Z_+$ or $x = 0$) always becomes an infinite number of prime numbers, expressed by $\{Q_i\}$(Q_i is prime, $i \in Z_+$) as, 3,5,7,11,13,17,...

And 1 plus (x+1)∗ 2($x \in Z_+$ or $x = 0$) and 3 plus x($x \in Z_+$ or $x = 0$) 2 always become the same infinite number of prime numbers at the same time, 3, 5, 7, 11, 13, 17,... Is expressed by $\{Q_i\}$(Q_i is a prime number, $i \in Z_+$).

If we only remember the prime numbers, obviously (1+2) plus x∗ 2($x \in Z_+$ or $x = 0$) is the same as 3 plus x∗ 2($x \in Z_+$ or $x = 0$), which is equal to an infinite number of prime numbers Q_i, and the difference between 3 plus x∗ 2($x \in Z_+$ or $x = 0$) and 1 plus x∗ 2($x \in Z_+$ or $x = 0$) is 2, so the value of 1 plus x∗ 2 ($x \in Z_+$ or $x = 0$)is different by 2 from the value of 3 plus x∗ 2($x \in Z_+$ or $x = 0$).1 plus x∗ 2($x \in Z_+$ or $x = 0$) equals an infinite number of primes P_i(P_i is a prime, $i \in Z_+$), (1+2) plus

$x*2(x \in Z_+$ or $x = 0)$equals an infinite number of primes Q_i, then the difference between P_i and Q_i is 2, so 2 can be written as the difference of infinitely many primes, which is exactly what the twin prime conjecture describes.

The twin prime conjecture is whether there are infinite pairs of prime numbers that differ by 2. Using Euclid's theorem that there are infinite prime numbers, we can easily prove the twin prime conjecture.

And here we go:

If only prime numbers are recorded, 1 plus $x*2(x\in Z_+$ or $x = 0)$ will always become an infinite number of prime numbers, expressed by $\{P_i\}(P_i$ is a prime, $i \in Z_+)$, is

1,3,5,7,11,13,17,... ,

If only prime numbers are recorded, 5 plus (x-2) $*2(x \in Z_+$ or $x = 0)$ will always become an infinite number of prime numbers, expressed by $\{Q_i\}(U_i$ is prime, $i \in Z_+)$, 1,3,5,7,11,13,17,... P_i=Q_i(P_i is prime, Q_i is prime, $i \in Z_+)$.

If only prime numbers are recorded, 5 plus $x*2(x\in Z_+$or $x = 0)$ will always become an infinite number of prime numbers, expressed by $\{U_i\}(Q_i$ is prime, $i \in Z_+)$ as 5,7,11,13,17,... ,

If only the primes are taken, it is obvious that 1 plus $x*2(x \in Z_+$or $x = 0)$ 2 and

5 plus (x-2) $*2(x \in Z_+$or $x = 0)$ all become the same infinite number of primes, 1, 3, 5, 7, 11, 13, 17,... With $\{P_i\}$ (P_i as the prime, $i \in Z_+$) and $\{Q_i\}$ (Q_i as the prime numbers, $i \in Z_+$), then P_i=Q_i (P_i into primes, Q_i as the prime, $i \in Z_+$). 1 plus $x*2$ $(x \in Z_+$or $x = 0)$ 2 and 5 plus (x-2)$*2(x \in Z_+$and $x \geq 2)$ differ by 4, so 4 can be written as the difference between infinitely many prime numbers.

Here's another look:

If only prime numbers are recorded, 1 plus $x*2(x\in Z_+$ or $x = 0)$ will always become an infinite number of prime numbers, expressed by $\{P_i\}(P_i$ is prime, $i \in Z_+)$, is

1,3,5,7,11,13,17,... ,

If only prime numbers are recorded, 7 plus (x-3) $*2($ $x\in Z_+$ or $x = 0)$ will always become an infinite number of prime numbers, expressed by $\{Q_i\}(Q_i$ is prime, $i \in Z_+)$, 1,3,5,7,11,13,17,... P_i=Q_i(P_i is prime, Q_i is prime, $i \in Z_+$).

1 plus $x*2(x\in Z_+$ and $x\geq3)$ and 7 plus (x-3) $*2(x\in Z_+$and $x\geq3)$ always become the same infinite number of prime numbers, 7, 11, 13, 17,... ,is expressed by $\{U_i\}(U_i$ is a prime number, $i \in Z_+)$. The difference between 1 and 7 is 6, is also that 1 plus $x*2(x\in Z_+$ or $x = 0)$ and 1 plus $x*2(x\in Z_+$ and $x\geq3)$ difference by 6, so 1 plus $x*2$ $(x \in Z_+$or $x = 0)$ 2 and 7 plus (x-3)$*2(x \in Z_+$and $x \geq 3)$ differ by 6,taking into account the set of prime numbers $\{P_i\}$, $\{Q_i\}$ and$\{U_i\}$, 6 can be written as the difference of infinitely many pairs of prime numbers.

Here's another look:

If only prime numbers are recorded, 1 plus $x*2(x\in Z_+$ or $x = 0)$ will always become an infinite number of prime numbers, expressed by $\{P_i\}(P_i$ is prime, $i \in Z_+)$, is

1,3,5,7,11,13,17,... ,

If only prime numbers are recorded, 9 plus (x-4)$*2(x\in Z_+$ or $x = 0)$ will always become an infinite number of prime numbers, expressed by $\{P_i\}(P_i$ is prime, $i \in Z_+)$, is 1,3,5,7,11,13,17,... P_i=Q_i(P_i is prime, Q_i is prime, $i \in Z_+$).

1 plus x $(x\in Z_+$ and $x\geq4)$ 2 and 9 plus (x-4)$*2(x\in Z_+$ and $x\geq4)$ both get (9), 11, 13, (15), 17,... ,Odd numbers are placed in parentheses, and when odd numbers are removed, the same infinite number of prime numbers will be obtained,expressed by $\{U_i\}$ (U_i is a prime number, $i \in Z_+$), is 11,13,,17,... .

Since 1 and 9 differ by 8, is also 1 plus x*2 (x$\in Z_+$ or $x = 0$) and 1 plus x*2 (x$\in Z_+$and x≥4) differ by 8, so 1 plus x$*$ 2 ($x \in Z_+$or $x = 0$) 2 and 9 plus (x-4)$*$ 2($x \in Z_+$and $x \geq 4$) differ by 8,taking into account the set of prime numbers $\{P_i\}$, $\{Q_i\}$ and$\{U_i\}$, 8 can be written as the difference of infinitely many pairs of prime numbers.

If only prime numbers are recorded, 1 plus $x * 2$(x$\in Z_+$ or $x = 0$) will always become an infinite number of prime numbers, expressed by $\{P_i\}$(P_i is prime, $i \in Z_+$), is
1,3,5,7,11,13,17,... ,
If only prime numbers are recorded, 11 plus $(x - 5) *$
$2(x \in Z_+$ or $x =$
$0)$will always become an infinite number of prime numbers, expressed by $\{Q_i\}$(Q_i is prime, $i \in$
Z_+), 1,3,5,7,11,13,17, . . . , P_i=Q_i(P_i is prime, Q_i is prime, $i \in Z_+$).

1 plus $x * 2$(x$\in Z_+$ and x≥5) 2 and 11 plus (x-5) $*$ 2(x$\in Z_+$ and x≥5) both 11, 13, (15), 17,... (21), 23,... ,Odd numbers are placed in parentheses, and when odd numbers are removed, the same infinite number of prime numbers will be obtained,expressed by $\{U_i\}$ (U_i is a prime number, $i \in Z_+$), is 11,13,17,... . Since 1 and 11 differ by 10, is also 1 plus x$*$ 2(x$\in Z_+$ or $x = 0$) and 1 plus x$*$ 2(x$\in Z_+$ and x≥5) differ by 10, so 1 plus x$*$ 2 ($x \in Z_+$or $x = 0$) 2 and 11 plus (x-5)$*$ 2($x \in Z_+$and $x \geq 5$) differ by 10,taking into account the set of prime numbers $\{P_i\}$, $\{Q_i\}$ and$\{U_i\}$, 10 can be written as the difference of infinitely many pairs of prime numbers.

Here's another look:

If only prime numbers are recorded, 1 plus x$*$ 2(x$\in Z_+$ or $x = 0$) will always become an infinite number of prime numbers, expressed by $\{P_i\}$(P_i is prime, $i \in Z_+$), is
1,3,5,7,11,13,17,... ,
If only prime numbers are recorded, 13 plus $(x - 6) *$
$2(x \in Z_+$ or $x =$
$0)$will always become an infinite number of prime numbers, expressed by $\{Q_i\}$(Q_i is prime, $i \in$
Z_+), 1,3,5,7,11,13,17, . . . , P_i=Q_i(P_i is prime, Q_i is prime, $i \in Z_+$).

1 plus $x * 2$ (x$\in Z_+$ or x≥6) and 13 plus (x-6) $*$ 2(x$\in Z_+$ or x≥6) both 13， (15), 17， …(21)

23， …， Odd numbers are placed in parentheses, and when odd numbers

are removed, the same infinite number of prime numbers will be obtained,expressed by $\{U_i\}$ (U_i is a prime number, $i \in Z_+$), is 13， ，17， 19, ..., Since 1 and 13 differ by 12, is also 1 plus x*2 (x$\in Z_+$ or $x = 0$) and 1 plus x$*$ 2 (x$\in Z_+$ or x≥6) differ by 12, taking into account the set of prime numbers $\{P_i\}$, $\{Q_i\}$ and$\{U_i\}$, 12 can be written as the difference of infinitely many pairs of prime numbers.

Here's another look:

If only prime numbers are recorded, 1 plus x$*$ 2(x$\in Z_+$ or $x = 0$) will always become an infinite number of prime numbers, expressed by $\{P_i\}$(P_i is prime, $i \in Z_+$), is 1,3,5,7,11,13,17,... ,
If only prime numbers are recorded, 15 plus $(x - 7) *$
$2(x \in Z_+$ or $x =$
$0)$will always become an infinite number of prime numbers, expressed by $\{Q_i\}$(Q_i is prime, $i \in$
Z_+), 1,3,5,7,11,13,17, . . . , P_i=Q_i(P_i is prime, Q_i is prime, $i \in Z_+$).

1 plus x (x $\in Z_+$ or x≥7) 2 and 15 plus (x-7) $*2$ (x $\in Z_+$ or x≥7) both (15),17,…,(21),23,(25),(27),29,…,Odd numbers are placed in parentheses, and when odd numbers are removed, the same infinite number of prime numbers will be obtained, expressed by $\{U_i\}$ (U_i is a prime number, $i \in Z_+$), is $17,19,23,29,31,\ldots$,Since 1 and 15 differ by 14, is also 1 plus $x*2$ ($x\in Z_+$ or $x = 0$) and 1 plus $x*2$($x\in Z_+$ or x≥7) differ by 14, taking into account the set of prime numbers $\{P_i\}$, $\{Q_i\}$ and$\{U_i\}$, 14 can be written as the difference of infinitely many pairs of prime numbers.

1,3,5,7,11,13,17,…,

Here's another look:

If only prime numbers are recorded, 1 plus $x*2$($x\in Z_+$ or $x = 0$) will always become an infinite number of prime numbers, expressed by $\{P_i\}$(P_i is prime, $i \in Z_+$), is

1,3,5,7,11,13,17,…,

If only prime numbers are recorded, 15 plus $(x-8)*$
$2(x \in Z_+$ or $x =$
$0)$will always become an infinite number of prime numbers, expressed by $\{Q_i\}$(Q_i is prime, $i \in$
Z_+), $1,3,5,7,11,13,17,\ldots$, P_i=Q_i(P_i is prime, Q_i is prime, $i \in Z_+$).

1 plus x (x $\in Z_+$ and x≥8) 2 and 17 plus (x-8) $*2$ (x $\in Z_+$ and x≥8) both 17,19,(21),23,(25),(27),29,…,Odd numbers are placed in parentheses, and when odd numbers are removed, the same infinite number of prime numbers will be obtained,expressed by $\{U_i\}$ (U_i is a prime number, $i \in Z_+$), is $17,19,23,29,31,\ldots$, Since 1 and 17 differ by 16, is also 1 plus $x*2$ ($x\in Z_+$ or $x = 0$) and 1 plus $x*2$($x\in Z_+$ and x≥8) differ by 16, taking into account the set of prime numbers $\{P_i\}$, $\{Q_i\}$ and$\{U_i\}$, 16 can be written as the difference of infinitely many pairs of prime numbers.

…

And so on:

If only prime numbers are recorded, 1 plus $x*2$($x\in Z_+$ or $x = 0$) will always become an infinite number of prime numbers, expressed by $\{P_i\}$ (P_i is prime, $i \in Z_+$), is

1,3,5,7,11,13,17,... ,

If only prime numbers are recorded, p(p is any prime number) plus (x-j) $*2$($x\in Z_+$ or $x = 0$, $j \in Z_+$) will always become an infinite number of prime numbers, expressed by $\{Q_i\}$(Q_i is prime, $i \in Z_+$), which is 1,3,5,7,11,13,17,... P_i= Q_i(P_i is prime, Q_i is prime, $i \in Z_+$).1 plus x ($x\in Z_+$ and x≥j and $j \in Z_+$) 2 and p(p is any prime number) plus (x-j) $*2$($x \in Z_+$ and x≥j, $j \in Z_+$), give P_1,P_2,(q_1),...,(q_2), P_i, (q_i),…,the odd number is placed in parentheses, and when the odd number is removed, the same infinite number of prime numbers will be obtained, represented by $\{U_i\}$ (U_i is prime, $i \in Z_+$), $P_1, P_2, \ldots, P_i, \ldots$,because 1 and P_i (or q_i) differ by $2k(k \in Z_+)$, which is 1 plus $x*2$($x\in Z_+$ or $x = 0$) and 1 plus $x*2$($x\in Z_+$ and $x \geq j$ and $j \in Z_+$) differ by $2k(k \in Z_+)$, at the same time considering primes set $\{P_i\}$、$\{Q_i\}$ and $\{U_i\}$, so $2k(k \in Z_+)$ can be written as the difference of infinitely many prime numbers. This is exactly what the Polignac conjecture describes, so the Polignac conjecture holds.If Polignac's conjecture is true, Goldbach's conjecture automatically holds. $Q_i(i \in Z_+)$ and $P_i(i \in Z_+)$ are both prime numbers, If $Q_i >= P_i$, according to the Polignac conjecture, then $Q_i - P_i = 2k(k \in Z_+$ or $k = 0)$, $Q_i - P_i + 2P_i = 2k + 2P_i(k \in Z_+$ or $k = 0)$, so

$Q_i + P_i$=2k + $2P_i$($k \in Z_+$ or $k = 0$), because $2k(k \in Z_+$ or $k = 0)$ represents all even numbers, so 2k= {0,2,4,6,8,10,... }, and P_i is prime and P_i≥1, so $2P_i$ is twice the number of all primes,$2P_i$= {2,6,10,14,... , 2p} (p is prime),2k+$2P_i$ represents all even sets {0,2,4,6,8,10,...}, the value of each element in,} is added to the set {2,6,10,14,... the value of any element in 2p} (p is prime), the result is still all even, so 2k+P_i= {0,2,4,6,8,10,... }, so it can still be expressed as 2k(k is a non-negative integer), then 2k+2P_i= {0,2,4,6,8,10,... ,}=2k($k \in Z_+$ or $k = 0$), then $Q_i + P_i$=2k($k \in Z_+$ or $k = 0$).Obviously Q_i+P_i=2k($k \in Z_+$ or $k = 0$) is what Goldbach's conjecture describes. $Q_i + P_i$is at least the sum of a pair of prime numbers, and Q_i and P_i can be equal or unequal, so even numbers greater than zero can be at least written as the sum of a pair of prime numbers.Since P_i(P_i is a prime number, $i \in Z_+$) and Q_i(Q_i is a prime number, $i \in Z_+$) can be expressed as an infinite number of prime numbers, but since the value of the specific even number is finite, according to $Q_i + P_i$=2k($k \in Z_+$ or $k = 0$), We can see that all even numbers can be expressed as the sum of finite pairs of prime numbers,

i.e.Goldbach's conjecture holds. According to the Polignac conjecture,there are an infinite number of primes $P_i(i \in Z_+)$ and $Q_i(i \in Z_+)$ by 2k ($k \in Z_+$ or $k = 0$).That is $Q_i - P_i = 2k(i \in Z_+, k \in Z_+$ or $k = 0)$.Also have an infinite number of primes $R_i(i \in Z_+)$, $Q_i(i \in Z_+)$ are 2k ($k \in Z_+$ or $k = 0$), namely $R_i - Q_i = 2k(i \in Z_+,\ k \in Z_+$ or $k = 0)$ .So $R_i - Q_i = Q_i - P_i = 2k(i \in Z_+, k \in Z_+$ or $k = 0)$. Then R_i、Q_i、P_i form an arithmetic sequence with a tolerance of 2k($k \in Z_+$ or $k = 0$), and there are infinitely many groups, so there are infinitely many groups of arithmetic sequences made up of prime number.

Ferma's last theorem states that the equation $x^n+y^n=z^n$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1, n \in Z_+, n > 2$) has no positive integer solution. Ferma himself proved that $x^4+y^4=z^4$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1$) has no positive integer solution. Euler proved that there is no positive integer solution for $x^3+y^3=z^3$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1$). Later, it was proved that $x^5+y^5=z^7$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1$) and $x^7+y^7=z^7$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1$) have no positive integer solutions. Suppose N=2p+3q(p ∈Z, q∈Z), since N=2p+3q=2p+2q+q=2(p+q)+q (p ∈Z, q∈Z), since p and q are both integers, assuming first that p is any integer and then assuming that q is any even number, then N=2p+3q is all even numbers.If p is any integer and q is odd, then N=2p+3q is all odd numbers, so 2p+3q(p ∈Z, q ∈Z) can represent all integers.

For N = 2 p + 3 q = 2 (p + q) + q = $\frac{4}{2}$(p+q)+q=$\frac{4(p+q)+2q}{2}$=$\frac{4p+6q}{2}$=$\frac{4p+3*(2q)}{2}$ (p ∈Z, q∈Z, p * is multiplication), for N = $\frac{4p+3*(2q)}{2}$ (p ∈Z, q∈Z, p * is multiplication) can represent all the integers,

So $\frac{4p+3*(2q)}{2}$ (p ∈Z, q∈Z) can all the odd Numbers and all the odd Numbers, so all the integer can be represented as $\frac{4p+3*(2q)}{2}$ (p ∈Z, q∈Z) (p ∈Z, q∈Z) ,because the $x^4+y^4=z^4$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1$) no positive integer solutions, and the $x^3+y^3=z^3$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1$) no positive integer solutions, therefore, according to Ferma and Euler's method, it must be proved that for any n>2(n is an integer), $x^n+y^n=z^n$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1, n \in Z_+, n > 2$) has no positive integer solution. This proof process I omit not to write, the following focus on the following proof of Fermar's last theorem.

Ferma's last theorem says that equation $x^n+y^n=z^n$ ($x\in Z_+$, $y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1, n \in Z_+, n > 2$) has no positive integer solution, according to $(x+y)^n=z^n$ ($y \in Z_+$, $z \in Z_+$, $x\neq y \neq z \neq 1, n \in Z_+$, and $n > 2$),
then $(x+y)^n=x^n+j_1 u^{p-k-h(i)}v^{p-k-g(j)} +j_2 u^{p-k-h(i)}v^{p-k-g(j)}+\ldots +j_k u^{p-k-h(i)}v^{p-k-g(j)}+\ldots+y^n>z^n$($x\in Z_+, y \in Z_+, z \in Z_+$, $x \neq y \neq z \neq 1, k \in Z_+, j_1 \in Z, j_2 \in Z, \ldots, j_i \in Z, i \in Z_+, h(i) \in Z, j \in Z_+, g(j) \in Z, n \in Z_+$ and $n > 2$) , If $x^n+y^n=z^n$ ($x\in Z_+, y \in Z_+, z \in Z_+, x\neq y \neq z \neq 1, n \in Z_+$, and $n > 2$) has a positive integer solution, then x+y≠z, and x+y>z, Otherwise it would be wrong and contradictory.When $x^p+y^p=z^p$ ($x\neq y \neq z \neq 1$, p is any prime number, p≥3) ,suppose
$x^p+y^p=z^p$($x\neq y \neq z \neq 1$,p is any prime number, $p \geq 3$) has a positive integer solution when p is any prime,then because $2^px^p+2^py^p=2^pz^p$ ($x \neq y \neq z \neq 1$,p is any prime number ,$p \geq 3$),when 2x=u+v ($x\in Z_+$, $u \in Z_+$, $v \in Z_+$, $u > 3, v > 1$) *and* 2y=u-v ($x\in Z_+$, $u \in Z_+$, $v \in Z_+$, $z \neq 1, u > 3, v > 1$),

so let's put 2x=u+v($x\in Z_+$, $u \in Z_+$, $v \in Z_+$, $u > 3, v > 1$) and 2y=u-v ($x\in Z_+$, $u \in Z_+$, $v \in Z_+$, $u > 3, v > 1$) into $2^px^p+2^py^p=2^pz^p$($x \neq y \neq z \neq 1$, p is any prime number, $p \geq 3$),So(2u)*
$(u^{p-1}+j_1u^{p-3}v^{p-3}+j_2u^{p-4}v^{p-4}+\ldots+j_ku^{p-k-h(i)}v^{p-k-g(j)} +\ldots+pv^{p-1})$
$=(2z)(2z)^{p-1}$(p is any prime number, $p \geq 3$, $k \in Z_+, u \in Z_+, v \in Z_+, j_1 \in Z, j_2 \in Z, \ldots, j_k \in Z$, $i \in Z_+, h(i) \in Z$, $j \in Z_+$, $g(j) \in Z$, $u \in Z_+, v \in Z_+$, $u > 3, v > 1$),

then $(u)*(u^{p-1}+j_1u^{p-3}v^{p-3}+j_2u^{p-4}v^{p-4}+\ldots+j_ku^{p-k-h(i)}v^{p-k-g(j)} +\ldots+pv^{p-1})=(z)(2z)^{p-1}$
$=(z)(2)^{p-1}(z)^{p-1}$(p is any prime number, $p \geq 3$, $k \in Z_+, u \in Z_+, v \in Z_+, j_1 \in Z, j_2 \in Z, \ldots, j_k \in Z$, $i \in Z_+$, $h(i) \in Z, j \in Z_+$, $g(j) \in Z, u \in Z_+, v \in Z_+$, $u > 3, v > 1$),

Since u is a positive integer product factor of the value on the right-hand side of the equation, and because u and z are variables, not constants, and $u > 3$, *so* $u = z$ *or* $u \geq (2z)$ or $3 < u < z$. When $u \geq 2z$, then 2x=u+v≥ 2z+v, then x>z, then $x^p+y^p>z^p$ (p is any prime number, $p \geq 3$,$x\in Z_+, y \in Z_+, z \in Z_+ x\neq y \neq z \neq 1$),then $x^p+y^p=z^p$
(p is any prime number, $p \geq 3$, $x \in Z_+, y \in Z_+, z \in Z_+$ $x \neq y \neq z \neq 1$) has no positive integer solution. So let's just think about u=z and $3 < u < z$ .When u=z,then$(u^{p-1}+j_1u^{p-3}v^{p-3}+j_2u^{p-4}v^{p-4}+\ldots+j_ku^{p-k-h(i)}v^{p-k-g(j)}+\ldots+pv^{p-1}) =(2)^{p-1}(z)^{p-1}$
(p is any prime number, $p \geq 3$, $k\in Z_+, u \in Z_+, v \in Z_+, j_1 \in Z, j_2 \in Z, \ldots, j_k \in Z$, $i \in Z_+$, $h(i) \in Z$, $j \in Z_+$, $g(j) \in Z$). And $2(x+y)= (u+v)+ (u-v)$,then u=x+y, according to u=z, then x+y=z .

When x+y=z, then$(x+y)^p = z^p$, then $x^p+y^p<z^p$ (p is any prime number, $p \geq 3, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1, u \in Z_+, v \in Z_+, u > 3, v > 1$), so $x^p+y^p=z^p$ (p is any prime number, $p \geq 3, x \in Z_+, y \in Z_+, z \in Z_+ x \neq y \neq z \neq 1$) has no positive integer solution, this contradicts the previous assumption that $x^p+y^p=z^p$ ($x \neq y \neq z \neq 1$,p is any prime number,$p \geq 3$) has positive integer solutions, and when $3 < u < z$, then according to u=x+y, then x+y<z ,and when x+y<z, then $(x+y)^p < z^p$, then $x^p+y^p<z^p$(p is any prime number, $p \geq 3, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1, u \in Z_+, v \in Z_+, u > 3, v > 1$) ,so $x^p+y^p=z^p$(p is any prime number, $p \geq 3, x \in Z_+, y \in Z_+, z \in Z_+ \ x \neq y \neq z \neq 1$) has no positive integersolution, this contradicts the previous assumption that $x^p+y^p=z^p$ ($x \neq y \neq z \neq 1$,p is any prime number,$p \geq 3$) has positive integer solutions.Therefore, it is wrong to assume that if p is a prime number, then $x^p+y^p=z^p$ ($x \neq y \neq z \neq 1$,p is any prime number,$p \geq 3$) has a positive integer solution,so for any prime number p, $x^p+y^p=z^p$($x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1$, p is any prime number, $p \geq 3$) has no positive integer solutions. So the fermat equation $x^n+y^n=z^n$($x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1, n \in Z_+$, and $n > 2$) has no positive integer solutions.

At the same time according to the Pythagorean theorem, we can wait until the $x^2+y^2=z^2$ ($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1$) was established, if $x^{n-2}=y^{n-2}=z^{n-2}$($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+$), that we can get the $x^2 x^{n-2}+y^2 y^{n-2}=z^2 z^{n-2}$($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1$), then the equation $x^2x^{n-2}+y^2y^{n-2}=z^2z^{n-2}$($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1, n > 2$) and equation $x^2+y^2=z^2$ ($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1, n > 2$) have the same positive integer solutions. In fact, because when $x \neq y \neq z \neq 1$, then $x^{n-2}=y^{n-2}=z^{n-2}$ ($x \neq y \neq z \neq 1, n > 2$) can not be true. In turn, because $x \neq y \neq z \neq 1$, therefore, $x^{n-2} \neq y^{n-2}$、$y^{n-2} \neq z^{n-2}, z^{n-2} \neq x^{n-2}$, then the equation $x^2x^{n-2}+y^2y^{n-2}=z^2z^{n-2}$($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1, n > 2$) and equation $x^2+y^2=z^2$($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1$) will not have any positive integer solutions, and $x^2x^{n-2}+y^2y^{n-2}=z^2z^{n-2}$($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1, n > 2$) will not have any integer solutions, so fermat theorem suppose $x^n+y^n=z^n$($n \in Z_+, x \in Z_+, y \in Z_+, z \in Z_+, x \neq y \neq z \neq 1, x^{n-2} \neq y^{n-2} \neq z^{n-2} \neq 1, n > 2$) no integer solutions was established. Actually $x^n+y^n=z^n$($n \in Z_+, x \in R, y \in R, z \in R, x \neq y \neq z \neq 1, x^{n-2} \neq y^{n-2} \neq z^{n-2} \neq 1, n > 2$) no real solution, at the same time $x^n+y^n=z^n$($n \in Z_+, x \in C, y \in C, z \in C, x \neq y \neq z \neq 1, x^{n-2} \neq y^{n-2} \neq z^{n-2} \neq 1, n > 2$) without any complex solution.

Solving any complex power of any positive number is of great significance to the study of fractal geometry. I have solved this problem after many years' efforts.
Because e=2.718281828459045... ,e is a natural constant, I use * for Multiplication, ^ for multiplication, then based on euler's e^{ix}=cosx+isin(x) (x∈R),

get (e^(3i))^(2)=(cos(3)+isin(3))^(2)=cos(2*3)+isin(2*3)=cos(6)+isin(6),

because e^(6i)=cos(6)+isin(6),

so (e^(3i))^(2)= e^(6i),

In general,

(e^(bi))^(c)= e^(b*ci)(b∈R, c∈R)is established.

For x>0(x∈R),suppose e^j=x (e=2.718281828459045…, x∈R and x>0, j∈R), then j=ln(x),based on euler's e^{ix}= cos(x)+isin(x) (x∈R),will get $e^{ji} = e^{\ln(x)i}$=cos(lnx)+isin(lnx)(x∈R and x>0).
suppose y∈R and $y \neq 0$, now let's figure out expression for x^{yi}(x∈R, and x>0, y∈R and $y \neq 0$) is $x^{yi}=(e^j)^{yi}=(e^{ji})^y=(\cos(\ln x) + i\sin(\ln x))^y$.
Suppose s is any complex number, and s=ρ+yi (ρ∈R,y∈ R and $y \neq 0$,s∈C) ,then let's find the expression of x^s(x∈R and x>0, s∈C) ,
You put s=ρ+yi (ρ∈R,y∈ R and $y \neq 0$,s∈C) and $x^{yi}=(e^j)^{yi}=(e^{ji})^y=(\cos(\ln x) + i\sin(\ln x))^y$ into x^s and you will get:
$x^s=x^{(\rho+yi)}=x^\rho x^{yi}=x^\rho(\cos(\ln x) + i\sin(\ln x))^y=x^\rho(\cos(y\ln x) + i\sin(y\ln x))$.

Let's say I have any complex number Z=x+yi(x∈R, y∈R), and I have any complex number s=ρ+ui(ρ∈R, u∈R).We use r(r∈R,andr>0) to represent the module |Z| of complex Z=x+yi(x∈R, y∈R), and φ to represent the argument Am(Z) of complex Z=x+yi(x∈R, y∈R).That is |Z|=r, then $r= (x^2 + y^2)^{\frac{1}{2}}$,

Z=r(Cos(φ)+iSin(φ)) and φ=|arccos($\frac{x}{(x^2+y^2)^{\frac{1}{2}}}$)|,and φ∈(-π, π], then φ=Am(Z).

Base ond $x^s=x^{(\rho+ui)}=x^\rho x^{ui}=x^\rho(\cos(\ln x) + i\sin(\ln x))^u=x^\rho(\cos(u\ln x) + i\sin(u\ln x))$ can get $r^s=r^\rho r^{ui} = r^\rho(\cos(\ln x) + i\sin(\ln x))^u$ $=r^\rho(\cos(u\ln x) + i\sin(u\ln x))$ (r>0), then

$f(Z,s)=z^s=(r(\cos(\varphi) + i\sin(\varphi))^{\rho+u\,i}=(r(\cos(\varphi) + i\sin(\varphi))^\rho\ (r(\cos(\varphi) + i\sin(\varphi))^{ui}$ =

$r^\rho(\cos(\rho\varphi) + i\sin(\rho\varphi))(r(\cos(\varphi) + i\sin(\varphi))^{ui} = r^\rho(\cos(\rho\varphi) + i\sin(\rho\varphi))r^{ui}(\cos(\varphi) + i\sin(\varphi))^{ui} = r^\rho(\cos(\rho\varphi) + i\sin(\rho\varphi))(\cos(u\ln r) + i\sin(u\ln r))(\cos(u\varphi) + i\sin(u\varphi))^i$
$=r^\rho(\cos(\rho\varphi) + i\sin(\rho\varphi))(\cos(u\ln r) + i\sin(u\ln r))(\cos(u\varphi) + i\sin(u\varphi))^i$
$=r^\rho(\cos(\rho\varphi + u\ln r) + i\sin(\rho\varphi + u\ln r))(\cos(u\varphi) + i\sin(u\varphi))^i$.
Beacuse of
$Z = e^{\ln|Z|+iAm(Z)} = e^{\ln|Z|}e^{iAm(Z)} = e^{\ln|Z|}$ (cos(Am(Z))+isin(Am (Z)))=r(cos(Am(Z))+isin(Am (Z))),so lnZ=ln|Z|+iAm(Z)($-\pi$<Am(Z)<= π).

Suppose a>0,then $a^x=e^{\ln a^x}=e^{x\ln a}$, then $z^s=e^{s\ln z}$.

Suppose any complex Number Q=α+βi=$(\cos(u\varphi)+i\sin(u\varphi))(\alpha\in R,\beta\in R)$, and Suppose any complex ψ=w+vi=i(w∈R, V∈R),then lnQ=ln|Q|+iAm(Q) $(-\pi<Am(Q)<=\pi)$.

Because 0<=|sin(uφ)|<=1,
so

If $-\pi<u\varphi<=\pi$,then Am(Q)=uφ and $-\pi<Am(Q)<=\pi$;

If uφ>π, then Am(Q)=uφ-2kπ(k∈ Z+) and $-\pi<Am(Q)<=\pi$;

if $u\varphi<-\pi$,then Am(Q)=uφ+2kπ(k ∈ Z+) and $-\pi<Am(Q)<=\pi$. Then
If Am(Q)=uφ, then
$(\cos(u\varphi)+i\sin(u\varphi))^i=Q^\psi=e^{\psi\ln Q}=e^{\psi(\ln|Q|+iAm(Q))}=e^{i(o+iAm(Q))}=e^{-u\varphi}$.
then
$f(Z,s)=z^s=r^\rho(\cos(\rho\varphi+u\ln r)+i\sin(\rho\varphi+u\ln r))(\cos(u\varphi)+i\sin(u\varphi))^i$
$=r^\rho(\cos(\rho\varphi+u\ln r)+i\sin(\rho\varphi+u\ln r))(\cos(u\varphi)+i\sin(u\varphi))^i$

$=e^{-u\varphi}r^\rho(\cos(\rho\varphi+u\ln r)+ie^{-u\varphi}r^\rho\sin(\rho\varphi+u\ln r)$。

Substituting r= $(x^2+y^2)^{\frac{1}{2}}$ into the above equation gives:

$f(Z,s)=z^s=e^{-u\varphi}(x^2+y^2)^{\frac{\rho}{2}}(\cos(\rho\varphi+u\ln(x^2+y^2)^{\frac{1}{2}}))$

$+ie^{-u\varphi}(x^2+y^2)^{\frac{\rho}{2}}(\sin(\rho\varphi+u\ln(x^2+y^2)^{\frac{1}{2}}))$.

If Am(Q)=uφ-2kπ(k ∈ Z+),then
$(\cos(u\varphi)+i\sin(u\varphi))^i=Q^\psi=e^{\psi\ln Q}=e^{\psi(\ln|Q|+iAm(Q))}=e^{i(o+i(u\varphi-2k\pi))}=e^{2k\pi-u\varphi}$, then
$f(Z,s)=z^s=r^\rho(\cos(\rho\varphi+u\ln r)+i\sin(\rho\varphi+u\ln r))(\cos(u\varphi)+i\sin(u\varphi))^i$
$=r^\rho(\cos(\rho\varphi+u\ln r)+i\sin(\rho\varphi+u\ln r))(\cos(u\varphi)+i\sin(u\varphi))^i$
$=e^{2k\pi-u\varphi}r^\rho(\cos(\rho\varphi+u\ln r)+ie^{2k\pi-u\varphi}r^\rho\sin(\rho\varphi+u\ln r)$.

Substituting r= $(x^2+y^2)^{\frac{1}{2}}$ into the above equation gives:

$f(Z,s)=z^s=e^{2k\pi-u\varphi}(x^2+y^2)^{\frac{\rho}{2}}(\cos(\rho\varphi+u\ln(x^2+y^2)^{\frac{1}{2}}))$

$+ie^{2k\pi-u\varphi}(x^2+y^2)^{\frac{\rho}{2}}(\sin(\rho\varphi+u\ln(x^2+y^2)^{\frac{1}{2}}))$.

If Am(Q)=uφ+2kπ(k ∈ Z+), then
$(\cos(u\varphi)+i\sin(u\varphi))^i=Q^\psi=e^{\psi\ln Q}=e^{\psi(\ln|Q|+iAm(Q))}=e^{i(o+i(u\varphi+2k\pi))}=e^{-2k\pi-u\varphi}$, then
$f(Z,s)=z^s=r^\rho(\cos(\rho\varphi+u\ln r)+i\sin(\rho\varphi+u\ln r))(\cos(u\varphi)+i\sin(u\varphi))^i$
$=r^\rho(\cos(\rho\varphi+u\ln r)+i\sin(\rho\varphi+u\ln r))(\cos(u\varphi)+i\sin(u\varphi))^i$
$=e^{-2k\pi-u\varphi}r^\rho(\cos(\rho\varphi+u\ln r)+ie^{-2k\pi-u\varphi}r^\rho\sin(\rho\varphi+u\ln r)$.

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$+ie^{-2k\pi-u\varphi}(x^2+y^2)^{\frac{\rho}{2}}(\sin(\rho\varphi+u\ln(x^2+y^2)^{\frac{1}{2}}))$.

III. CONCLUSION

The Polignac conjecture, the twin prime conjecture, the Goldbach conjecture and the Fermar's last theorem are perfectly valid.

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V. CONTRIBUTIONS

The sole author, poses the research question, demonstrates and proves the quest

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