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4N=Pn-Pm

Mi Zhou

Suqian economic and trade vocational school, Suqian, 223600, China

†Email: zhoumi19920626@163.com

Abstract

In his book unsolved problems in number theory, Canadian guy proposed a conjecture that all even Numbers are the difference between two prime Numbers. Based on the calculation of elementary number theory, this article concludes that this conjecture is true and concludes that All integral multiples of 4 are the difference between two primes.

Keywords: Number Theory; Computation; Prime Numbers

1 INTRODUCTION

In his book unsolved problems in number theory [1], Canadian guy proposed a conjecture: that all even Numbers are the difference between two prime numbers [2]. Based on the calculation of elementary number theory[3], this article concludes that this conjecture is true and concludes that all even Numbers are the difference between two prime Numbers. At the same time, the unsolved problem twin prime number conjecture [4] is solved, and also get there are an infinite number of prime pairs that differ by even Numbers.

2 COMPUTATION

When N=2mn+m+ N, 2N+1=2(2mn+m+N)+1= (2m +1) (2N+1) is composite. When N is not equal to 2mn + m + N, 2N + 1 is prime. Suppose that N1 can be expressed as 2mn+m+n, and N2 can be expressed as 2mn+m+n+x, then 2N1+1=2(2mn+m+n)+1= (2m +1) (2n+1), is composite number;2N2-(2x - 1) =(2m +1) (2n+1), which is composite. When N1 cannot be represented as 2mn+m+n, 2N1+1 is prime, and when N2 cannot be represented as 2mn+m+n+x, 2N2- (2x-1) is prime. When N1=N2, and can not be expressed as 2mn+m+n and 2mn+m+n+x, 2N1+1 and 2N2-(2x-1) are both prime Numbers, and (2N1+1)- (2N2-2x+1) =2x, 2x is even, is the difference between the two primes.

Just show that 2mn+m+n and 2mn+m+n+x cannot represent all natural Numbers greater than 4.
Let's talk about what happens when x is even
2 mn + m + n
2 mn + m + n + x
2mn is even.

There are three cases:
1. m, n are all even, and x is even, so both of these can only represent even Numbers
2. m, n are all odd numbers, and x is even and both of these things can only represent even Numbers
3. m+n is odd, 2mn+m+n can only represent odd; 2mn+m+n+x, it's only odd;

Combining the above four terms, 2mn+m+n,2mn+m+n+x (m+n is odd), these two expressions must be able to represent all the odd Numbers, x is a fixed value.

In these three cases, in order to represent all the natural Numbers, 3 has to represent all the odd Numbers.
2mn+m+n and 2mn+m+n+x, m, n an odd and an even, x is even, that doesn't mean all odd Numbers.
M = 2m ', n = 2n+1, 2mn+m+n = 2m '(2n+1), 2m+2n+1 = 8mn+4m+2m+2n+1 = 2 (4mn+4m+2m+2n+1), 2mn+m+n+x = 2mn+m+n+2p = 2 (4m+n+3m+n+p) +1, and if you want to represent all the odd Numbers, you have to represent all the natural Numbers, we had to show that 2mn+m+ n and 2mn + m +n + x also have to represent all of the natural Numbers, and these four polynomials are obviously different. If 2mn+m+n and 2mn+m+n+x represent all of the natural Numbers, 4mn+3m+n 'is not exactly equal to 2mn+m+n, the unequal part, 2mn+m+n can be

represented, 4mn+3m+n' cannot be represented. So 4mn+3m+n and 4mn+3m+n+p can’t represent all the natural Numbers.

CONCLUSION

An integral multiple of 4 is the difference between two primes.
4N = Pn - Pm

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AUTHORS

Mi Zhou, is from JiangSu, his research interest is number theory.