

Proof Of $n^2 + 1$ Conjecture

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Abstract

This paper attempts to prove $n^2 + 1$ Conjecture using Mills' formula and the limiting case of $n^2 + 1$ Conjecture .

Keywords: Conjecture; mathematical problem; mathematical proof

1. Mathematical derivation

$n^2 + 1$ Conjecture states that there exist infinitely many natural numbers n . The number obtained by substituting a natural number n into formula $n^2 + 1$ is always a prime number.¹ Mills' formula always yields a prime number.² Therefore, by dividing $n^2 + 1$ by Mills' formula and setting $n = +\infty$ in both formulas, we can derive the following mathematical formula:

$$n^2 + 1 = +\infty^2 + 1$$

$$\theta^{3^n} = \theta^{+\infty}$$

Based on the mathematical formula above, we can calculate the result of $n^2 + 1$ divided by the Mills formula; the mathematical result is as follows:

$$\frac{+\infty^2 + 1}{\theta^{+\infty}} = \frac{+\infty + 1}{+\infty} = 1 + \frac{1}{+\infty}$$

Therefore, based on the calculation results above, the quotient of the largest prime number divided by a prime number is not 1; thus, $n^2 + 1$ Conjecture does not hold, as the calculation yields a number that is not prime.

2. Conclusion

This paper demonstrates that the conjecture is false and establishes that the calculated results associated with the conjecture include numbers that are not prime.

References

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