

The solution of Riemann conjecture and Goldbach conjecture derived from the sum of prime numbers

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Abstract: By connecting the sum of powers of multiple prime numbers with the power sum of natural numbers, the relationship between even numbers in natural numbers and the sum of powers of multiple prime numbers is obtained.

Key words: Euler product formula, Riemann conjecture, Goldbach conjecture.

If I hadn't calculated the sum of the products of different prime powers, I'm afraid I would never have anything to do with Euler, because knowing how magic works, it would be very simple.

$$\forall m, n, k, d, n_k \in \mathbf{N}, \forall p, p_k, \in \text{prime numbers}, \forall p^n = \frac{p^n - 1}{1 - p^{-n}}, \forall \prod_{k=0}^{\infty} p_k^n = \prod_{k=0}^{\infty} \frac{p_k^{n+1} - 1}{1 - p_k^{-n}},$$

Divisor of $\forall p^n$, Such as, $p^0, p^1, p^2, p^3, p^4, \dots, p^n$,

$$\text{Sum of divisors of } \forall p^n, S_n = \sum_{m=0}^n p^m = \frac{p^{n+1} - p^0}{p^1 - 1},$$

The reciprocal of the divisor of $\forall p^n$, Such as, $p^0, p^{-1}, p^{-2}, p^{-3}, p^{-4}, \dots, p^{-n}$,

$$\text{The reciprocal sum of the divisor of } \forall p^n, S_{-n} = \sum_{m=0}^n p^{-m} = \frac{p^{-n-1} - p^0}{p^{-1} - 1} = \frac{p^{n+1} - p^0}{p^n(p^1 - 1)},$$

$$\Rightarrow \forall p^n = \frac{S_n}{S_{-n}} = \frac{\sum_{m=0}^n p^m}{\sum_{m=0}^n p^{-m}} = \frac{p^{n+1} - p^0}{p^1 - 1} / \frac{p^{-n-1} - p^0}{p^{-1} - 1}, \prod_{k=0}^{\infty} p_k^n = \prod_{k=0}^{\infty} \frac{\sum_{m=0}^n p_k^m}{\sum_{m=0}^n p_k^{-m}} = \prod_{k=0}^{\infty} \left(\frac{p_k^{n+1} - p_k^0}{p_k^1 - 1} / \frac{p_k^{-n-1} - p_k^0}{p_k^{-1} - 1} \right),$$

$$n \rightarrow \infty, \Rightarrow \prod_{k=0}^{\infty} p_k^n = \prod_{k=0}^{\infty} \left(\frac{p_k^{n+1} - p_k^0}{p_k^1 - 1} / \frac{p_k^{-n-1} - p_k^0}{p_k^{-1} - 1} \right) = \frac{\sum_{d=1}^{\infty} d^{+1}}{\sum_{d=1}^{\infty} d^{-1}}, \sum_{d=1}^{\infty} d^{\pm 1} = \prod_{k=0}^{\infty} \frac{p_k^{\pm(n+1)} - p_k^0}{p_k^{\pm 1} - 1},$$

$$n \rightarrow \infty, n_k \rightarrow \infty, \Rightarrow \prod_{k=0}^{\infty} p_k^{s+n_k} = \frac{\sum_{d=1}^{\infty} d^{+s}}{\sum_{d=1}^{\infty} d^{-s}}, \sum_{d=1}^{\infty} d^{\pm s} = \prod_{k=0}^{\infty} \frac{p_k^{\pm s(n_k+1)} - p_k^0}{p_k^{\pm s} - 1}.$$

So, the Euler product formula is not accurate, that is, $\sum_{d=1}^{\infty} d^{-s} \neq \prod_{k=0}^{\infty} \frac{1}{1 - p_k^{-s}}$.

$$\Rightarrow \sum_{d=1}^{\infty} d^{-s} = \prod_{k=0}^{\infty} \frac{p_k^{-s(n_k+1)} - p_k^0}{p_k^{-s} - 1} = \left(\sum_{d=1}^{\infty} d^{+s} \right) \prod_{k=0}^{\infty} \frac{1 - p_k^{-s+n_k}}{p_k^{-s+n_k} - 1}, \text{ If } \sum_{d=1}^{\infty} d^{-s} = 0,$$

$$\Rightarrow s = -\frac{\log p_k}{n_k + 1}, s = -\frac{\log p_k}{n_k}, \text{ So, Riemann's conjecture is wrong.}$$

$\forall x_{c_n}, x_{g_n}, x_{f_n} \in \mathbf{N}, \forall p_a, p_b, p_{c_n}, p_{g_n}, p_{f_n} \in \text{prime numbers}, \forall p_{g_m}, p_{f_n} < p_a, \forall p_{f_m}, p_{f_n} < p_b,$

$$\forall p_a = \prod_{n=0}^m p_{g_n}^{x_{g_n}} + 1, \forall p_b = \prod_{n=0}^m p_{f_n}^{x_{f_n}} + 1, m \rightarrow \infty,$$

$$\Rightarrow p_a + p_b = \prod_{n=0}^m p_{g_n}^{x_{g_n}} + \prod_{n=0}^m p_{f_n}^{x_{f_n}} + 2 = 2 \prod_{n=0}^m p_{c_n}^{x_{c_n}} + 2, 2 + 2 = 4,$$

So, the sum of any two primes can be written as an even number greater than 2, Goldbach's conjecture is correct.

Reference: none.