The New Prime theorem（27）

Hardy-Littlewood conjecture P: m^2+1 and m^2+3

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Abstract: Using Jiang function we prove Hardy-Littlewood conjecture P: m^2+1 and m^2+3 [4].

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Theorem. suppose prime equations

$$P_1=(2P)^2+1,\quad P_2=(2P)^2+3. \qquad (1)$$

There are infinitely many primes P such that P_1 and P_2 are all prime.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi_1(P)-\chi_2(P)], \qquad (2)$$

where $\omega=\prod_P P$, $\chi(P)$ is the number of solutions of congruence

$$[(2q)^2+1][(2q)^2+3]\equiv 0 \pmod P,\ q=1,\cdots,P-1. \qquad (3)$$

We have that if $\left(\frac{-1}{P}\right)=1$ then $\chi_1(P)=2$, if $\left(\frac{-1}{P}\right)=-1$ then $\chi_1(P)=0$; if $\left(\frac{-3}{P}\right)=1$ then $\chi_2(P)=2$, if $\left(\frac{-3}{P}\right)=-1$ then $\chi_2(P)=0$.

Substituting it into (2) we have.

$$J_2(\omega)=2\prod_{5\le P}[P-3-(-1)^{\frac{P-1}{2}}-(\frac{-3}{P})]\neq 0. \qquad (4)$$

We prove that there are infinitely many primes P such that P_1 and P_2 are all prime.

We have the best asymptotic formula [1,2]

$$\pi_3(N,2)=\left|\{P\le N: P_1,P_2=prime\}\right|\sim\frac{J_2(\omega)\omega^2}{4\phi^3(\omega)}\frac{N}{\log^3 N}. \qquad (5)$$

Remark. The prime number theory is basically to count the Jiang function $J_{n+1}(\omega)$ and Jiang prime k-tuple singular series $\sigma(J)=\frac{J_2(\omega)\omega^{k-1}}{\phi^k(\omega)}=\prod_P\left(1-\frac{1+\chi(P)}{P}\right)(1-\frac{1}{P})^{-k}$ [1,2], which can count the number of prime number. The prime distribution is not random. But Hardy prime k-tuple singular series $\sigma(H)=\prod_P\left(1-\frac{\nu(P)}{P}\right)(1-\frac{1}{P})^{-k}$ is false [3-8], which cannot count the number of prime numbers.

Szemerdi's theorem does not directly to the primes, because it can not count the number of primes. It is unusable. Cramr's random model can not prove prime problems. It is incorrect. The probability of $1/\log N$ of being prime is false.Assuming that the events "P is prime", "$P+2$ is prime" and "$P+4$ is prime" are independent, we conclude that P, $P+2$, $P+4$ are simultaneously prime with probability about $1/\log^3 N$. There are about $N/\log^3 N$ primes less than N. Letting $N \to \infty$ we obtain the prime conjecture, which is false. The tool of additive prime number theory is basically the Hardy-Littlewood prime tuple conjecture, but can not prove and count any prime problems[6].

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