The New Prime theorems（191）-（240）

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Abstract

Using Jiang function we prove that the new prime theorems (141)-（190) contain infinitely many prime solutions and no prime solutions.

School of mathematics(institute for advanced study)has long been recognized as the leading international center of research and postdoctoral training in pure mathematics.They should support the new prime theorems(1)-(240).

The New Prime theorem（191）

$$P, jP^{302}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{302}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{302}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{302}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{302}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(302)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

we prove that for $k=3$, (1) contain no prime solutions

Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (8)$$

We prove that for $k>3$ (1) contain infinitely many prime solutions

The New Prime theorem（192）

$$P,\ jP^{304}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{304}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\ jP^{304}+k-j(j=1,\cdots,k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{304}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\{P\le N: jP^{304}+k-j=prime\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(304)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,17$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,5,17$ (1) contain no prime solutions.

Example 2. Let $k\neq 3,5,17$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (8)$$

We prove that for $k\neq 3,5,17$, (1) contain infinitely many prime solutions

The New Prime theorem（193）

$$P, jP^{306}+k-j (j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{306}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{306}+k-j (j=1,\cdots,k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{306}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{306}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(306)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,7,19,103,307$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,7,19,103,307$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,7,19,103,307$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,7,19,103,307$ (1) contain infinitely many prime solutions

The New Prime theorem（194）

$$P, jP^{308}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{308}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\ jP^{308}+k-j(j=1,\cdots,k-1)\,. \quad (1)$$

contain infinitely many prime solutions or no prime solutions.
Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{308}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{308}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(308)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,23,29$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,23,29$ (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,23,29$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,5,23,29$ (1) contain infinitely many prime solutions

The New Prime theorem（195）

$$P,\ jP^{310}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang

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Abstract

Using Jiang function we prove that $jP^{310}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{310}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \tag{2}$$

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

$$\prod_{j=1}^{k-1}\left[jq^{310}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \tag{4}$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \tag{5}$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{310}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(310)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,11,311$. From (2) and(3) we have

$$J_2(\omega)=0 \tag{7}$$

We prove that for $k=3,11,311$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,11,311$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \tag{8}$$

We prove that for $k\ne 3,11,311$, (1) contain infinitely many prime solutions

The New Prime theorem（196）

$$P,\, jP^{312}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{312}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\, jP^{312}+k-j(j=1,\cdots,k-1)\,. \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{312}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{312}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(312)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,7,13,53,79,157,313$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k = 3,5,7,13,53,79,157,313$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,5,7,13,53,79,157,313$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \qquad (8)$$

We prove that for $k \neq 3,5,7,13,53,79,157,313$, (1) contain infinitely many prime solutions

The New Prime theorem（197）

$$P, jP^{314} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{314} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{314} + k - j (j = 1, \cdots, k-1), \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1} \left[jq^{314} + k - j \right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \qquad (3)$$

If $\chi(P) \leq P-2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P-1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{314}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(314)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3$, (1) contain no prime solutions.
Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k>3$, (1) contain infinitely many prime solutions

The New Prime theorem（198）

$$P, jP^{316}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{316}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{316}+k-j(j=1,\cdots,k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.
Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{316}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{316}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(316)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,317$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,317$, (1) contain no prime solutions.

Example 2. Let $k\neq 3,5,317$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \quad (8)$$

We prove that for $k\neq 3,5,317$, (1) contain infinitely many prime solutions

The New Prime theorem（199）

$$P, jP^{318}+k-j (j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{318}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{318}+k-j (j=1,\cdots,k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{318}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P - 1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{318} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(318)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega) = \prod_P (P-1)$.

Example 1. Let $k = 3, 7, 107$. From (2) and(3) we have

$$J_2(\omega) = 0 \quad (7)$$

We prove that for $k = 3, 7, 107$, (1) contain no prime solutions.

Example 2. Let $k \neq 3, 7, 107$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k \neq 3, 7, 107$, (1) contain infinitely many prime solutions

The New Prime theorem（200）

$$P, jP^{320} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{320} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{320} + k - j (j = 1, \cdots, k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{320}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{320}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(320)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,11,17,41$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,11,17,41$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,11,17,41$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,5,11,17,41$, (1) contain infinitely many prime solutions

The New Prime theorem（201）

$$P, jP^{322}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{322}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{322}+k-j(j=1,\cdots,k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{322}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{322}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(322)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,47$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

we prove that for $k=3,47$, (1) contain no prime solutions

Example 2. Let $k\ne 3,47$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (8)$$

We prove that for $k\ne 3,47$ (1) contain infinitely many prime solutions

The New Prime theorem（202）

$$P, jP^{324}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{324}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{324}+k-j(j=1,\cdots,k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{324}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{324}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(324)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,7,13,19,37,109,163$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,5,7,13,19,37,109,163$ (1) contain no prime solutions.

Example 2. Let $k \neq 3,5,7,13,19,37,109,163$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \qquad (8)$$

We prove that for $k \neq 3,5,7,13,19,37,109,163$, (1) contain infinitely many prime solutions

The New Prime theorem（203）

$$P, jP^{326} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{326} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{326} + k - j (j = 1, \cdots, k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1} \left[jq^{326} + k - j \right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \qquad (3)$$

If $\chi(P) \leq P - 2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P - 1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N, 2) = \left| \left\{ P \leq N : jP^{326} + k - j = prime \right\} \right| \sim \frac{J_2(\omega)\omega^{k-1}}{(326)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \tag{7}$$

We prove that for $k=3$, (1) contain no prime solutions.
Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \tag{8}$$

We prove that for $k>3$ (1) contain infinitely many prime solutions

The New Prime theorem（204）

$$P, jP^{328}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{328}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{328}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions or no prime solutions.
Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \tag{2}$$

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

$$\prod_{j=1}^{k-1}\left[jq^{328}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

If $\chi(P)\leq P-2$ then from (2) and (3) we have

$$J_2(\omega)\neq 0 \tag{4}$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \tag{5}$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{328}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(328)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,83$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,83$ (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,83$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,5,83$ (1) contain infinitely many prime solutions

The New Prime theorem（205）

$$P, jP^{330}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{330}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{330}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{330}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P-1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{330} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(330)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega) = \prod_P (P-1)$.

Example 1. Let $k = 3,7,11,23,31,67,331$. From (2) and(3) we have

$$J_2(\omega) = 0 \quad (7)$$

We prove that for $k = 3,7,11,23,31,67,331$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,7,11,23,31,67,331$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k \neq 3,7,11,23,31,67,331$, (1) contain infinitely many prime solutions

The New Prime theorem（206）

$$P, jP^{332} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{332} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{332} + k - j (j = 1, \cdots, k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{332}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{332}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(332)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,167$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,5,167$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,167$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (8)$$

We prove that for $k\ne 3,5,167$, (1) contain infinitely many prime solutions

The New Prime theorem（207）

$$P, jP^{334}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{334}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{334}+k-j(j=1,\cdots,k-1), \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.
Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{334}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{334}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(334)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3$, (1) contain no prime solutions.
Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (8)$$

We prove that for $k>3$, (1) contain infinitely many prime solutions

The New Prime theorem（208）

$$P, jP^{336}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{336}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{336}+k-j(j=1,\cdots,k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{336}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{336}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(336)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,7,13,17,29,43,113,337$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,7,13,17,29,43,113,337$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,7,13,17,29,43,113,337$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,5,7,13,17,29,43,113,337$, (1) contain infinitely many prime solutions

The New Prime theorem（209）

$$P, jP^{338}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{338}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{338}+k-j(j=1,\cdots,k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{338}+k-j\right]\equiv 0 \pmod{P}, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{338}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(338)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3$, (1) contain no prime solutions.

Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k>3$, (1) contain infinitely many prime solutions

The New Prime theorem（210）

$$P,\ jP^{340}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{340}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\ jP^{340}+k-j(j=1,\cdots,k-1), \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{340}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{340}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(340)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,11$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k = 3,5,11$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,5,11$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k \neq 3,5,11$, (1) contain infinitely many prime solutions

The New Prime theorem（211）

$$P, jP^{342} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{342} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{342} + k - j (j = 1, \cdots, k-1) . \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1} \left[jq^{342} + k - j \right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \quad (3)$$

If $\chi(P) \leq P - 2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P - 1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{342}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(342)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,7,19$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

we prove that for $k=3,7,19$, (1) contain no prime solutions

Example 2. Let $k\ne 3,7,19$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (8)$$

We prove that for $k\ne 3,7,19$ (1) contain infinitely many prime solutions

The New Prime theorem（212）

$$P, jP^{344}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{344}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{344}+k-j(j=1,\cdots,k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{344}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{344}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(344)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,173$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,173$ (1) contain no prime solutions.

Example 2. Let $k\neq 3,5,173$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \quad (8)$$

We prove that for $k\neq 3,5,173$, (1) contain infinitely many prime solutions

The New Prime theorem（213）

$$P, jP^{346}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{346}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{346}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{346}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{346}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(346)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,347$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,347$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,347$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (8)$$

We prove that for $k\ne 3,347$ (1) contain infinitely many prime solutions

The New Prime theorem（214）

$$P, jP^{348}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{348}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{348}+k-j(j=1,\cdots,k-1).\qquad (1)$$

contain infinitely many prime solutions or no prime solutions.
Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)]\qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{348}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1\qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0\qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0\qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{348}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(348)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}\qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,7,13,59,349$. From (2) and(3) we have

$$J_2(\omega)=0\qquad (7)$$

We prove that for $k=3,5,7,13,59,349$ (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,7,13,59,349$. From (2) and (3) we have

$$J_2(\omega)\ne 0\qquad (8)$$

We prove that for $k\ne 3,5,7,13,59,349$ (1) contain infinitely many prime solutions

The New Prime theorem（215）

$$P, jP^{350}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang

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Abstract

Using Jiang function we prove that $jP^{350}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\ jP^{350}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \tag{2}$$

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

$$\prod_{j=1}^{k-1}\left[jq^{350}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \tag{4}$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \tag{5}$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{350}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(350)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,11,71$. From (2) and(3) we have

$$J_2(\omega)=0 \tag{7}$$

We prove that for $k=3,11,71$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,11,71$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \tag{8}$$

We prove that for $k\ne 3,11,71$, (1) contain infinitely many prime solutions

The New Prime theorem（216）

$$P,\ jP^{352}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{352}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\ jP^{352}+k-j(j=1,\cdots,k-1)\,. \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{352}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{352}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(352)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,17,23,89,353$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k = 3,5,17,23,89,353$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,5,17,23,89,353$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \qquad (8)$$

We prove that for $k \neq 3,5,17,23,89,353$, (1) contain infinitely many prime solutions

The New Prime theorem（217）

$$P, jP^{354} + k - j (j = 1, \cdots, k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{354} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{354} + k - j (j = 1, \cdots, k-1), \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1} \left[jq^{354} + k - j \right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \qquad (3)$$

If $\chi(P) \leq P - 2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P - 1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{354}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(354)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,7$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,7$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,7$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,7$, (1) contain infinitely many prime solutions

The New Prime theorem（218）

$$P, jP^{356}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{356}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{356}+k-j(j=1,\cdots,k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{356}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P-1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \tag{5}$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{356} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(356)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \tag{6}$$

where $\phi(\omega) = \prod_P (P-1)$.

Example 1. Let $k = 3,5,179$. From (2) and(3) we have

$$J_2(\omega) = 0 \tag{7}$$

We prove that for $k = 3,5,179$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,5,179$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \tag{8}$$

We prove that for $k \neq 3,5,179$, (1) contain infinitely many prime solutions

The New Prime theorem（219）

$$P, jP^{358} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{358} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{358} + k - j (j = 1, \cdots, k-1), \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \tag{2}$$

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

$$\prod_{j=1}^{k-1}\left[jq^{358}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{358}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(358)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,359$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,359$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,359$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (8)$$

We prove that for $k\ne 3,359$, (1) contain infinitely many prime solutions

The New Prime theorem（220）

$$P, jP^{360}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{360}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\ jP^{360}+k-j\,(j=1,\cdots,k-1), \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.
Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{360}+k-j\right]\equiv 0 \pmod P,\ q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{360}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(360)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,7,11,13,19,31,37,41,61,73,181$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,5,7,11,13,19,31,37,41,61,73,181$, (1) contain no prime solutions.

Example 2. Let $k\neq 3,5,7,11,13,19,31,37,41,61,73,181$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (8)$$

We prove that for $k\neq 3,5,7,11,13,19,31,37,41,61,73,181$, (1) contain infinitely many prime solutions

The New Prime theorem（221）

$$P, jP^{362}+k-j (j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{362}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{362}+k-j (j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P [P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{362}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{362}+k-j=prime\right\}\right|\sim \frac{J_2(\omega)\omega^{k-1}}{(362)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P (P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

we prove that for $k=3$, (1) contain no prime solutions

Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \quad (8)$$

We prove that for $k>3$ (1) contain infinitely many prime solutions

The New Prime theorem（222）

$$P, jP^{364}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{364}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{364}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{364}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{364}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(364)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,29,53$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,29,53$ (1) contain no prime solutions.

Example 2. Let $k \neq 3,5,29,53$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k \neq 3,5,29,53$, (1) contain infinitely many prime solutions

The New Prime theorem（223）

$$P, jP^{366}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{366}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{366}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{366}+k-j\right] \equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P) \leq P-2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P \leq N: jP^{366}+k-j=prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(366)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_{P}(P-1)$.

Example 1. Let $k=3,7,367$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,7,367$, (1) contain no prime solutions.

Example 2. Let $k\neq 3,7,367$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \quad (8)$$

We prove that for $k\neq 3,7,367$ (1) contain infinitely many prime solutions

The New Prime theorem（224）

$$P,\ jP^{368}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{368}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\ jP^{368}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions or no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_{P}[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{368}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\leq P-2$ then from (2) and (3) we have

$$J_2(\omega)\neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{368}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(368)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,17,47$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,17,47$ (1) contain no prime solutions.

Example 2. Let $k\neq 3,5,17,47$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \quad (8)$$

We prove that for $k\neq 3,5,17,47$ (1) contain infinitely many prime solutions

The New Prime theorem（225）

$$P, jP^{370}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{370}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{370}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{370}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P) \le P-2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P-1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{370} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(370)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega) = \prod_P (P-1)$.

Example 1. Let $k = 3,11$. From (2) and(3) we have

$$J_2(\omega) = 0 \qquad (7)$$

We prove that for $k = 3,11$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,11$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \qquad (8)$$

We prove that for $k \neq 3,11$, (1) contain infinitely many prime solutions

The New Prime theorem（226）

$$P, jP^{372} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{372} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{372} + k - j (j = 1, \cdots, k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{372}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{372}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(372)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,7,13,373$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,5,7,13,373$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,7,13,373$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (8)$$

We prove that for $k\ne 3,5,7,13,373$, (1) contain infinitely many prime solutions

The New Prime theorem（227）

$$P, jP^{374}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{374}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{374}+k-j(j=1,\cdots,k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{374}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{374}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(374)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,23$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,23$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,23$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,23$, (1) contain infinitely many prime solutions

The New Prime theorem（228）

$$P, jP^{376}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{376}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{376}+k-j(j=1,\cdots,k-1), \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{376}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{376}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(376)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,5$, (1) contain no prime solutions.

Example 2. Let $k>5$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k > 5$, (1) contain infinitely many prime solutions

The New Prime theorem（229）

$$P, jP^{378} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{378} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{378} + k - j (j = 1, \cdots, k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1} \left[jq^{378} + k - j \right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \quad (3)$$

If $\chi(P) \leq P - 2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P - 1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N, 2) = \left| \left\{ P \leq N : jP^{378} + k - j = prime \right\} \right| \sim \frac{J_2(\omega)\omega^{k-1}}{(378)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega) = \prod_P (P-1)$.

Example 1. Let $k = 3, 7, 19, 23, 127, 379$. From (2) and(3) we have

$$J_2(\omega) = 0 \quad (7)$$

We prove that for $k = 3, 7, 19, 23, 127, 379$, (1) contain no prime solutions.

Example 2. Let $k \neq 3, 7, 19, 23, 127, 379$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k \neq 3, 7, 19, 23, 127, 379$, (1) contain infinitely many prime solutions

The New Prime theorem（230）

$$P, jP^{380} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{380} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{380} + k - j (j = 1, \cdots, k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1} \left[jq^{380} + k - j \right] \equiv 0 \pmod{P}, q = 1, \cdots, P-1 \quad (3)$$

If $\chi(P) \leq P - 2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P - 1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{380} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(380)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega) = \prod_P (P-1)$.

Example 1. Let $k = 3,5,11,191$. From (2) and(3) we have

$$J_2(\omega) = 0 \quad (7)$$

We prove that for $k = 3,5,11,191$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,5,11,191$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k \neq 3,5,11,191$, (1) contain infinitely many prime solutions

The New Prime theorem（231）

$$P, jP^{382} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{382} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{382} + k - j (j = 1, \cdots, k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega) = \prod_P [P - 1 - \chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1} \left[jq^{382} + k - j \right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \quad (3)$$

If $\chi(P) \le P-2$ then from (2) and (3) we have

$$J_2(\omega) \ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P-1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{382} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(382)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega) = \prod_P (P-1)$.

Example 1. Let $k = 3,383$. From (2) and(3) we have

$$J_2(\omega) = 0 \qquad (7)$$

we prove that for $k = 3,383$, (1) contain no prime solutions

Example 2. Let $k \ne 3,383$. From (2) and (3) we have

$$J_2(\omega) \ne 0 \qquad (8)$$

We prove that for $k \ne 3,383$ (1) contain infinitely many prime solutions

The New Prime theorem（232）

$$P, jP^{384} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{384} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{384} + k - j (j = 1, \cdots, k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{384}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{384}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(384)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,7,13,17,97,193$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,5,7,13,17,97,193$ (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,7,13,17,97,193$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (8)$$

We prove that for $k\ne 3,5,7,13,17,97,193$, (1) contain infinitely many prime solutions

The New Prime theorem（233）

$$P, jP^{386}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{386}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{386}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{386}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{386}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(386)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3$, (1) contain no prime solutions.

Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k>3$ (1) contain infinitely many prime solutions

The New Prime theorem（234）

$$P, jP^{388}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{388}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{388}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions or no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{388}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{388}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(388)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,389$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,389$ (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,389$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,5,389$ (1) contain infinitely many prime solutions

The New Prime theorem（235）

$$P,\ jP^{390}+k-j\ (j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{390}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P,\ jP^{390}+k-j\ (j=1,\cdots,k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P [P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{390}+k-j\right]\equiv 0 \pmod P,\ q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{390}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(390)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P (P-1)$.

Example 1. Let $k=3,7,11,31,79,131$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,7,11,31,79,131$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,7,11,31,79,131$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k \neq 3,7,11,31,79,131$, (1) contain infinitely many prime solutions

The New Prime theorem（236）

$$P, jP^{392}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{392}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{392}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{392}+k-j\right] \equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P) \leq P-2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{392}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(392)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,29,197$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3,5,29,197$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,29,197$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k\ne 3,5,29,197$, (1) contain infinitely many prime solutions

The New Prime theorem（237）

$$P, jP^{394}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{394}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{394}+k-j(j=1,\cdots,k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{394}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\{P\leq N: jP^{394}+k-j=prime\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(394)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3$, (1) contain no prime solutions.
Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\neq 0 \qquad (8)$$

We prove that for $k>3$, (1) contain infinitely many prime solutions

The New Prime theorem（238）

$$P, jP^{396}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jP^{396}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{396}+k-j(j=1,\cdots,k-1), \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.
Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{396}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\leq P-2$ then from (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P) = P-1$ then from (2) and (3) we have

$$J_2(\omega) = 0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega) \neq 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{396} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(396)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega) = \prod_P (P-1)$.

Example 1. Let $k = 3,5,7,13,19,23,37,67,199,397$. From (2) and(3) we have

$$J_2(\omega) = 0 \quad (7)$$

We prove that for $k = 3,5,7,13,19,23,37,67,199,397$, (1) contain no prime solutions.

Example 2. Let $k \neq 3,5,7,13,19,23,37,67,199,397$. From (2) and (3) we have

$$J_2(\omega) \neq 0 \quad (8)$$

We prove that for $k \neq 3,5,7,13,19,23,37,67,199,397$, (1) contain infinitely many prime solutions

The New Prime theorem（239）

$$P, jP^{398} + k - j (j = 1, \cdots, k-1)$$

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Abstract

Using Jiang function we prove that $jP^{398} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{398} + k - j (j = 1, \cdots, k-1), \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \quad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{398}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \quad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{398}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(398)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3$. From (2) and(3) we have

$$J_2(\omega)=0 \quad (7)$$

We prove that for $k=3$, (1) contain no prime solutions.
Example 2. Let $k>3$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \quad (8)$$

We prove that for $k>3$, (1) contain infinitely many prime solutions

The New Prime theorem（240）

$$P, jP^{400}+k-j(j=1,\cdots,k-1)$$

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Abstract

Using Jiang function we prove that $jP^{400}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$P, jP^{400}+k-j(j=1,\cdots,k-1), \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.
Proof. We have Jiang function [1,2]

$$J_2(\omega)=\prod_P[P-1-\chi(P)] \qquad (2)$$

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

$$\prod_{j=1}^{k-1}\left[jq^{400}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

If $\chi(P)\le P-2$ then from (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (4)$$

We prove that (1) contain infinitely many prime solutions.

If $\chi(P)=P-1$ then from (2) and (3) we have

$$J_2(\omega)=0 \qquad (5)$$

We prove that (1) contain no prime solutions [1,2]

If $J_2(\omega)\ne 0$ then we have asymptotic formula [1,2]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{400}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(400)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

where $\phi(\omega)=\prod_P(P-1)$.

Example 1. Let $k=3,5,11,17,41,101,401$. From (2) and(3) we have

$$J_2(\omega)=0 \qquad (7)$$

We prove that for $k=3,5,11,17,41,101,401$, (1) contain no prime solutions.

Example 2. Let $k\ne 3,5,11,17,41,101,401$. From (2) and (3) we have

$$J_2(\omega)\ne 0 \qquad (8)$$

We prove that for $k\ne 3,5,11,17,41,101,401$, (1) contain infinitely many prime solutions

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 numbers. The prime distribution is not random. But Hardy-Littlewood prime k-tuple singular series $\sigma(H)=\prod_P\left(1-\frac{\nu(P)}{P}\right)(1-\frac{1}{P})^{-k}$ is false [3-17], which cannot count the number of prime numbers[3].

References

[1] Chun-Xuan Jiang, Foundations of Santilli's isonumber theory with applications to new cryptograms, Fermat's theorem and Goldbach's conjecture. Inter. Acad. Press, 2002, MR2004c:11001, (http://www.i-b-r.org/docs/jiang.pdf) (http://www.wbabin.net/math/xuan13.pdf)(http://vixra.org/numth/).

[2] Chun-Xuan Jiang, Jiang's function $J_{n+1}(\omega)$ in prime distribution.(http://www. wbabin.net/math /xuan2. pdf.) (http://wbabin.net/xuan.htm#chun-xuan.)(http://vixra.org/numth/)

[3] Chun-Xuan Jiang, The Hardy-Littlewood prime k-tuple conjectnre is false.(http://wbabin.net/xuan.htm# chun-xuan)(http://vixra.org/numth/)

[4] G. H. Hardy and J. E. Littlewood, Some problems of "Partitio Numerorum", III: On the expression of a number as a sum of primes. Acta Math., 44(1923)1-70.

[5] W. Narkiewicz, The development of prime number theory. From Euclid to Hardy and Littlewood. Springer-Verlag, New York, NY. 2000, 333-353.

[6] B. Green and T. Tao, Linear equations in primes. Ann. Math, 171(2010) 1753-1850.

[7] D. Goldston, J. Pintz and C. Y. Yildirim, Primes in tuples I. Ann. Math., 170(2009) 819-862.

[8] T. Tao. Recent progress in additive prime number theory, preprint. 2009. http://terrytao.files.wordpress. com/2009/08/prime-number-theory 1.pdf

[9] J. Bourgain, A. Gamburd, P. Sarnak, Affine linear sieve, expanders, and sum-product, Invent math, 179 (2010)559-644.

[10] K. Soundararajan, The distribution of prime numbers, In: A. Granville and Z. Rudnik (eds), Equidistribution in number theory, an Introduction, 59-83, 2007 Springer.

[11] B. Kra, The Green-Tao theorem on arithmetic progressions in the primes: an ergodic point of view, Bull. Amer. Math. Soc., 43(2006)3-23.

[12] K. Soundararajan, Small gaps between prime numbers: The work of Goldston-Pintz-Yildirim, Bull. Amer. Math. Soc., 44(2007)1-18.

[13] D. A. Goldston, S. W. Graham, J. Pintz and C. Y. Yildirim, Small gaps between products of two primes, Proc. London Math. Soc., 98(2009)741-774.

[14] B. Green and T. Tao, The primes contain arbitrarily long arithmetic progressions, Ann. Math., 167(2008) 481-547.

[15] D. A. Goldston, J. Pintz and C. Y. Yildirim, Primes in tuples II, preprint.

[16] B. Green, Generalising the Hardy-Littlewood method for primes, International congress of mathematicians, Vol, II, 373-399, Eur. Math. Soc., Zurich, 2006.

[17] T. Tao, The dichotomy between structure and randomness, arithmetic progressions, and the primes, International congress of mathematicians Vol. I, 581-608, Eur. Math. Soc., Zurich 2006.

Szemerédi's theorem does not directly to the primes, because it cannot count the number of primes. Cramér's random model cannot prove any prime problems. 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 tuples conjecture, but cannot prove and count any prime problems[6].

Mathematicians have tried in vain to discover some order in the sequence of prime numbers but we have every reason to believe that there are some mysteries which the human mind will never penetrate.

Leonhard Euler(1707-1783)

It will be another million years, at least, before we understand the primes.

Paul Erdos(1913-1996)

Of course, the primes are a deterministic set of integers, not a random one, so the predictions given by random models are not rigorous (Terence Tao, Structure and randomness in the prime numbers, preprint). Erdos and Turán(1936) contributed to probabilistic number theory, where the primes are treated as if they were random, which generates Szemerédi's theorem (1975) and Green-Tao theorem(2004). But they cannot actually prove and count any simplest prime examples: twin primes and Goldbach's conjecture. They don't know what prime theory means, only conjectures.