# The New Prime theorems（691）-（740）

Jiang, Chun-Xuan (蒋春暄)

Institute for Basic Research, Palm Harbor, FL34682-1577, USA
And: P. O. Box 3924, Beijing 100854, China (蒋春暄，北京 3924 信箱，100854)
jiangchunxuan@sohu.com, cxjiang@mail.bcf.net.cn, jcxuan@sina.com, Jiangchunxuan@vip.sohu.com, jcxxxx@163.com

**Abstract:** Using Jiang function we are able to prove almost all prime problems in prime distribution. This is the Book proof. No great mathematicians study prime problems and prove Riemann hypothesis in AIM, CLAYMI, IAS, THES, MPIM, MSRI. In this paper using Jiang function $J_2(\omega)$ we prove that the new prime theorems (691)-（740) contain infinitely many prime solutions and no prime solutions. From (6) we are able to find the smallest solution $\pi_k(N_0,2)\geq 1$. This is the Book theorem.

[Jiang, Chun-Xuan (蒋春暄). **The New Prime theorems（691）-（740）.** *Academ Arena* 2016;8(1s): 463-516]. (ISSN 1553-992X). http://www.sciencepub.net/academia. 10. doi:10.7537/marsaaj0801s1610.

**Keywords**: new; prime theorem; Jiang Chunxuan

*It will be another million years, at least, before we understand the primes.*
Paul Erdos (1913-1996)
*TATEMENT OF INTENT*

*If elected. I am willing to serve the IMU and the international mathematical community as president of the IMU. I am willing to take on the duties and responsibilities of this function.*

*These include (but are not restricted to) working with the IMU's Executive Committee on policy matters and its tasks related to organizing the 2014 ICM, fostering the development of mathematics, in particular in developing countries and among young people worldwide, representing the interests of our community in contacts with other international scientific bodies, and helping the IMU committees in their function.*

--IMU president, Ingrid Daubechies—
Satellite conference to ICM 2010

Analytic and combinatorial number theory (August 29-September 3, ICM2010) is a conjecture. The sieve methods and circle method are outdated methods which cannot prove twin prime conjecture and Goldbach's conjecture. The papers of Goldston-Pintz-Yildirim and Green-Tao are based on the Hardy-Littlewood prime k-tuple conjecture (1923). But the Hardy-Littlewood prime k-tuple conjecture is false:
(http://www.wbabin.net/math/xuan77.pdf)
(http://vixra.org/pdf/1003.0234v1.pdf).

The world mathematicians read Jiang's book and papers. In 1998 Jiang disproved Riemann hypothesis. In 1996 Jiang proved Goldbach conjecture and twin prime conjecture. Using a new analytical tool Jiang invented: the Jiang function, Jiang prove almost all prime problems in prime distribution. Jiang established the foundations of Santilli's isonumber theory. China rejected to speak the Jiang epoch-making works in ICM2002 which was a failure congress. China considers Jiang epoch-making works to be pseudoscience. Jiang negated ICM2006 Fields medal (Green and Tao theorem is false) to see.
(http://www.wbabin.net/math/xuan39e.pdf)
(http://www.vixra.org/pdf/0904.0001v1.pdf).

There are no Jiang's epoch-making works in ICM2010. It cannot represent the modern mathematical level. Therefore ICM2010 is failure congress. China rejects to review Jiang's epoch-making works. For fostering the development of Jiang prime theory IMU is willing to take on the duty and responsibility of this function to see[new prime k-tuple theorems (1)-(20)] and the [new prime theorems (1)-(690)]: (http://www.wbabin.net/xuan.htm#chun-xuan) (http://vixra.org/numth/)

**The New Prime theorem（691）**

$$P, jP^{1302}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1302}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1302}+k-j(j=1,\cdots,k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1302}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1302}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1302}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1302)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,7,43,1303$. From (2) and(3) we have

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

we prove that for $k=3,7,43,1303$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,7,43,1303$.

From (2) and (3) we have

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

We prove that for $k\ne 3,7,43,1303$,

(1) contain infinitely many prime solutions

**The New Prime theorem（692）**

$$P, jP^{1304}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1304}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1304}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1304}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1304}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1304}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1304)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,653$. From (2) and(3) we have

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

we prove that for $k=3,5,653$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5,653$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5,653$,

(1) contain infinitely many prime solutions

**The New Prime theorem（693）**

$$P, jP^{1306}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1306}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1306}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1306}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1306}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1306}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1306)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,1307$. From (2) and(3) we have

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

we prove that for $k=3,1307$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,1307$.

From (2) and (3) we have

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

We prove that for $k\ne 3,1307$,

(1) contain infinitely many prime solutions

**The New Prime theorem（694）**

$$P, jP^{1308}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1308}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1308}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1308}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1308}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1308}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1308)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,5,7,13$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,7,13$.

From (2) and (3) we have

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

We prove that for $k\neq 3,5,7,13$,

(1) contain infinitely many prime solutions

**The New Prime theorem（695）**

$$P, jP^{1310}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1310}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1310}+k-j(j=1,\cdots,k-1) \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1310}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1310}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1310}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1310)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,11,263$. From (2) and(3) we have

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

we prove that for $k=3,11,263$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,11,263$.

From (2) and (3) we have

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

We prove that for $k \neq 3,11,263$,
(1) contain infinitely many prime solutions

**The New Prime theorem（696）**

$$P, jP^{1312}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1312}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1312}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1312}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1312}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jP^{1312}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1312)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\geq 1$.

Example 1. Let $k=3,5,17,83$. From (2) and(3) we have

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

we prove that for $k=3,5,17,83$,
(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,17,83$.
From (2) and (3) we have

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

We prove that for $k \neq 3,5,17,83$,

(1) contain infinitely many prime solutions

**The New Prime theorem（697）**

$$P, jP^{1314}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1314}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1314}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1314}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1314}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jP^{1314}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1314)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\geq 1$.

Example 1. Let $k=3,7,19,439$. From (2) and(3) we have

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

we prove that for $k=3,7,19,439$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k \neq 3,7,19,439$.

From (2) and (3) we have

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

We prove that for $k \neq 3,7,19,439$,

(1) contain infinitely many prime solutions

**The New Prime theorem（698）**

$$P, jP^{1316} + k - j (j = 1, \cdots, k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1316} + k - j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1316} + k - j (j = 1, \cdots, k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1316} + k - j\right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1316} + k - j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P) = P - 1$. Substituting it into (2) 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]

$$\pi_k(N,2) = \left|\left\{P \leq N : jP^{1316} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1316)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0, 2) \geq 1$.

Example 1. Let $k = 3,5,29,659$. From (2) and(3) we have

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

we prove that for $k=3,5,29,659$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k \neq 3,5,29,659$.

From (2) and (3) we have

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

We prove that for $k \neq 3,5,29,659$,

(1) contain infinitely many prime solutions

**The New Prime theorem（699）**

$$P, jP^{1318}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1318}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1318}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1318}+k-j\right] \equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1318}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P \leq N: jP^{1318}+k-j=prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1318)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2) \geq 1$.

Example 1. Let $k=3,1319$. From (2) and(3) we have

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

we prove that for $k=3,1319$,
(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,1319$.
From (2) and (3) we have

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

We prove that for $k\neq 3,1319$,
(1) contain infinitely many prime solutions

**The New Prime theorem（700）**

$$P, jP^{1320}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1320}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1320}+k-j(j=1,\cdots,k-1). \tag{1}$$

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

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1320}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1320}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jP^{1320}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1320)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\geq 1$.

Example 1. Let $k = 3,5,7,11,13,23,31,41,61,89,331,661,1321$. From (2) and(3) we have

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

we prove that for $k = 3,5,7,11,13,23,31,41,61,89,331,661,1321$, (1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k \neq 3,5,7,11,13,23,31,41,61,89,331,661,1321$.

From (2) and (3) we have

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

We prove that for $k \neq 3,5,7,11,13,23,31,41,61,89,331,661,1321$, (1) contain infinitely many prime solutions

**The New Prime theorem（701）**

$$P, jP^{1322} + k - j (j = 1, \cdots, k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1322} + k - j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1322} + k - j (j = 1, \cdots, k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1} \left[ jq^{1322} + k - j \right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1322} + k - j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P) = P - 1$. Substituting it into (2) 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]

$$\pi_k(N,2) = \left| \left\{ P \leq N : jP^{1322} + k - j = prime \right\} \right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1322)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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. 1 is not a prime.

**Example 2**. Let $k\ne 3$.

From (2) and (3) we have

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

We prove that for $k\ne 3$,

(1) contain infinitely many prime solutions

**The New Prime theorem（702）**

$$P, jP^{1324}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1324}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1324}+k-j(j=1,\cdots,k-1). \qquad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1324}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1324}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1324}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1324)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,5$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5$,

(1) contain infinitely many prime solutions

**The New Prime theorem（703）**

$$P, jP^{1326}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang

Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1326}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1326}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1326}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1326}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jP^{1326}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1326)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\geq 1$.

Example 1. Let $k=3,7,79,103,443,1327$. From (2) and(3) we have

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

we prove that for $k=3,7,79,103,443,1327$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,7,79,103,443,1327$.

From (2) and (3) we have

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

We prove that for $k\neq 3,7,79,103,443,1327$,

(1) contain infinitely many prime solutions

**The New Prime theorem（704）**

$$P, jP^{1328}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1328}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1328}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1328}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1328}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1328}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1328)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,17,167$. From (2) and(3) we have

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

we prove that for $k=3,5,17,167$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,17,167$.

From (2) and (3) we have

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

We prove that for $k\neq 3,5,17,167$,

(1) contain infinitely many prime solutions

**The New Prime theorem（705）**

$$P, jP^{1330}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1330}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1330}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1330}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1330}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\{P\le N: jP^{1330}+k-j=prime\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1330)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,11,71,191,267$. From (2) and(3) we have

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

we prove that for $k=3,11,71,191,267$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,11,71,191,267$.

From (2) and (3) we have

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

We prove that for $k\neq 3,11,71,191,267$,

(1) contain infinitely many prime solutions

## The New Prime theorem（706）

$$P, jP^{1332}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang

Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1332}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1332}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1332}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes

$P$ such that each of $jp^{1332}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1332}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1332)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,7,13,19,37,223$. From (2) and(3) we have

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

we prove that for $k=3,5,7,13,19,37,223$,
(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,7,13,19,37,223$.
From (2) and (3) we have

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

We prove that for $k\neq 3,5,7,13,19,37,223$,
(1) contain infinitely many prime solutions

**The New Prime theorem（707）**

$$P, jP^{1334}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1334}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1334}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1334}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1334}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1334}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1334)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,47$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,47$.

From (2) and (3) we have

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

We prove that for $k\neq 3,47$,

(1) contain infinitely many prime solutions

**The New Prime theorem（708）**

$$P,jP^{1336}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1336}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P,jP^{1336}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1336}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1336}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2) = \left|\{P \le N : jP^{1336}+k-j = prime\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1336)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2) \ge 1$.

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

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

we prove that for $k=3,5$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k \neq 3,5$.

From (2) and (3) we have

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

We prove that for $k \neq 3,5$,

(1) contain infinitely many prime solutions

## The New Prime theorem（709）

$$P, jP^{1338}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1338}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1338}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1338}+k-j\right] \equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1338}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P) = P-1$. Substituting it into (2) 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]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{1338}+k-j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1338)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0, 2) \ge 1$.

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

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

we prove that for $k = 3, 7$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k \ne 3, 7$.

From (2) and (3) we have

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

We prove that for $k \ne 3, 7$,

(1) contain infinitely many prime solutions

## The New Prime theorem（710）

$$P, jP^{1340}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1340}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1340}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1340}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1340}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1340}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1340)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,11,269$. From (2) and(3) we have

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

we prove that for $k=3,5,11,269$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5,11,269$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5,11,269$,

(1) contain infinitely many prime solutions

**The New Prime theorem（711）**

$$P, jP^{1342}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1342}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1342}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1342}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1342}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1342}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1342)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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. 1 is not a prime.

**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（712）**

$$P, jP^{1344}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1344}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1344}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1344}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1344}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1344}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1344)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,7,13,17,29,43,97,113,337,449,673$. From (2) and(3) we have

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

we prove that for $k=3,5,7,13,17,29,43,97,113,337,449,673$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5,7,13,17,29,43,97,113,337,449,673$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,17,29,43,97,113,337,449,673$,

(1) contain infinitely many prime solutions

**The New Prime theorem（713）**

$$P, jP^{1346}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1346}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1346}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1346}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1346}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1346}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1346)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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. 1 is not a prime.

**Example 2**. Let $k\ne 3$.

From (2) and (3) we have

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

We prove that for $k\ne 3$,

(1) contain infinitely many prime solutions

**The New Prime theorem（714）**

$$P, jP^{1348}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1348}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1348}+k-j(j=1,\cdots,k-1) \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1348}+k-j\right]\equiv 0 \pmod{P}, q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1348}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1348}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1348)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,5$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5$.

From (2) and (3) we have

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

We prove that for $k\neq 3,5$,

(1) contain infinitely many prime solutions

**The New Prime theorem（715）**

$$P, jP^{1350}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1350}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1350}+k-j(j=1,\cdots,k-1) \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1350}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1350}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1350}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1350)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,7,11,19,31,151,271$. From (2) and(3) we have

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

we prove that for $k=3,7,11,19,31,151,271$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,7,11,19,31,151,271$.

From (2) and (3) we have

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

We prove that for $k\ne 3,7,11,19,31,151,271$,

(1) contain infinitely many prime solutions

**The New Prime theorem（716）**

$$P, jP^{1352}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1352}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1352}+k-j(j=1,\cdots,k-1) \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1352}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1352}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1352}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1352)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,53,677$. From (2) and(3) we have

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

we prove that for $k=3,5,53,677$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,53,677$.

From (2) and (3) we have

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

We prove that for $k\neq 3,5,53,677$,

(1) contain infinitely many prime solutions

**The New Prime theorem（717）**

$$P, jP^{1354}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1354}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1354}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1354}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1354}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1354}+k-j=prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1354)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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. 1 is not a prime.

**Example 2**. Let $k\ne 3$.

From (2) and (3) we have

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

We prove that for $k\ne 3$,

(1) contain infinitely many prime solutions

**The New Prime theorem（718）**

$$P, jP^{1356}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1356}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1356}+k-j(j=1,\cdots,k-1) \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1356}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1356}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1356}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1356)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,7,13,227$. From (2) and(3) we have

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

we prove that for $k=3,5,7,13,227$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5,7,13,227$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,227$,

(1) contain infinitely many prime solutions

**The New Prime theorem（719）**

$$P, jP^{1358}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1358}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1358}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1358}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1358}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1358}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1358)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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. 1 is not a prime.

**Example 2**. Let $k\neq 3$.

From (2) and (3) we have

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

We prove that for $k\neq 3$,

(1) contain infinitely many prime solutions

**The New Prime theorem（720）**

$$P, jP^{1360}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1360}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1360}+k-j(j=1,\cdots,k-1) \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1360}+k-j\right]\equiv 0 \pmod{P}, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1360}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1360}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1360)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,11,41,137,1361$. From (2) and(3) we have

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

we prove that for $k=3,5,11,41,137,1361$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5,11,41,137,1361$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5,11,41,137,1361$,

(1) contain infinitely many prime solutions

**The New Prime theorem（721）**

$$P, jP^{1362}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1362}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1362}+k-j(j=1,\cdots,k-1) \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1362}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1362}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1362}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1362)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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. 1 is not a prime.

**Example 2**. Let $k\ne 3,7$.

From (2) and (3) we have

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

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

**The New Prime theorem（722）**

$$P, jP^{1364}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1364}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1364}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1364}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1364}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jP^{1364}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1364)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\geq 1$.

Example 1. Let $k=3,5,23,683$. From (2) and(3) we have

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

we prove that for $k=3,5,23,683$,
(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,23,683$.

From (2) and (3) we have

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

We prove that for $k \neq 3,5,23,683$,
(1) contain infinitely many prime solutions

**The New Prime theorem（723）**

$$P, jP^{1366} + k - j (j = 1, \cdots, k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1366} + k - j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1366} + k - j (j = 1, \cdots, k-1). \quad (1)$$

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

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

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

$$\prod_{j=1}^{k-1} \left[ jq^{1366} + k - j \right] \equiv 0 \pmod P, q = 1, \cdots, P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1366} + k - j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P) = P-1$. Substituting it into (2) 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]

$$\pi_k(N,2) = \left| \left\{ P \leq N : jP^{1366} + k - j = prime \right\} \right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1366)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0, 2) \geq 1$.

Example 1. Let $k = 3,1367$. From (2) and(3) we have

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

we prove that for $k = 3,1367$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k \neq 3,1367$.

From (2) and (3) we have

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

We prove that for $k \neq 3,1367$,

(1) contain infinitely many prime solutions

**The New Prime theorem（724）**

$$P, jP^{1368}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1368}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1368}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1368}+k-j\right] \equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1368}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P \leq N : jP^{1368}+k-j=prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1368)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2) \geq 1$.

Example 1. Let $k=3,5,7,13,19,37,229,457$. From (2) and(3) we have

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

we prove that for $k=3,5,7,13,19,37,229,457$,
(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,7,13,19,37,229,457$.
From (2) and (3) we have

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

We prove that for $k\neq 3,5,7,13,19,37,229,457$,
(1) contain infinitely many prime solutions

**The New Prime theorem（725）**

$$P, jP^{1370}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1370}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1370}+k-j(j=1,\cdots,k-1). \tag{1}$$

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

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1370}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1370}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1370}+k-j=prime\right\}\right|\sim \frac{J_2(\omega)\omega^{k-1}}{(1370)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,11$,
(1) contain no prime solutions. 1 is not a prime.

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

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

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

**The New Prime theorem（726）**

$$P, jP^{1372}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1372}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1372}+k-j(j=1,\cdots,k-1). \tag{1}$$

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

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1372}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1372}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jP^{1372}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1372)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,29,197,1373$. From (2) and(3) we have

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

we prove that for $k=3,5,29,197,1373$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5,29,197,1373$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5,29,197,1373$,

(1) contain infinitely many prime solutions

## The New Prime theorem（727）

$$P, jP^{1374}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1374}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1374}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1374}+k-j\right]\equiv 0 \pmod{P}, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1374}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1374}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1374)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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. 1 is not a prime.

**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（728）**

$$P, jP^{1376}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1376}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1376}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1376}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1376}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jP^{1376}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1376)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\geq 1$.

Example 1. Let $k=3,5,17,173$. From (2) and(3) we have

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

we prove that for $k=3,5,17,173$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,17,173$.

From (2) and (3) we have

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

We prove that for $k\neq 3,5,17,173$,

(1) contain infinitely many prime solutions

**The New Prime theorem（729）**

$$P, jP^{1378}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1378}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1378}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1378}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1378}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1378}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1378)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,107$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,107$.

From (2) and (3) we have

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

We prove that for $k\neq 3,107$,

(1) contain infinitely many prime solutions

**The New Prime theorem（730）**

$$P, jP^{1380}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1380}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1380}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1380}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes

$P$ such that each of $jp^{1380}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1380}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1380)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,7,11,31,47,61,139,277,691,1381$. From (2) and(3) we have

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

we prove that for $k=3,5,7,11,31,47,61,139,277,691,1381$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\neq 3,5,7,11,31,47,61,139,277,691,1381$.

From (2) and (3) we have

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

We prove that for $k\neq 3,5,7,11,31,47,61,139,277,691,1381$,

(1) contain infinitely many prime solutions

## The New Prime theorem（731）

$$P, jP^{1382}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1382}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1382}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1382}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1382}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jP^{1382}+k-j=prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1382)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\geq 1$.

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. 1 is not a prime.

**Example 2**. Let $k\neq 3$.

From (2) and (3) we have

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

We prove that for $k\neq 3$,

(1) contain infinitely many prime solutions

## The New Prime theorem（732）

$$P, jP^{1384}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1384}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1384}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1384}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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

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

We prove that (1) contain infinitely many prime solutions that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1384} + k - j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P) = P-1$. Substituting it into (2) 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]

$$\pi_k(N,2) = \left|\left\{P \le N : jP^{1384} + k - j = prime\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(1384)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N} \qquad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0, 2) \ge 1$.

Example 1. Let $k = 3, 5, 347$. From (2) and(3) we have

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

we prove that for $k = 3, 5, 347$,
(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k \ne 3, 5, 347$.
From (2) and (3) we have

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

We prove that for $k \ne 3, 5, 347$,
(1) contain infinitely many prime solutions

## The New Prime theorem（733）

$$P, jP^{1386} + k - j (j = 1, \cdots, k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1386} + k - j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1386} + k - j (j = 1, \cdots, k-1). \qquad (1)$$

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

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1386}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \qquad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1386}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1386}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1386)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \qquad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,7,19,23,43,67,127,199,463$. From (2) and(3) we have

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

we prove that for $k=3,7,19,23,43,67,127,199,463$,
(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,7,19,23,43,67,127,199,463$.
From (2) and (3) we have

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

We prove that for $k\ne 3,7,19,23,43,67,127,199,463$,
(1) contain infinitely many prime solutions

**The New Prime theorem（734）**

$$P, jP^{1388}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1388}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1388}+k-j(j=1,\cdots,k-1). \qquad (1)$$

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

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1388}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1388}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1388}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1388)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,5$,
(1) contain no prime solutions. 1 is not a prime.

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

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

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

**The New Prime theorem（735）**

$$P, jP^{1390}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1390}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1390}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1390}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1390}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1390}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1390)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,11$,
(1) contain no prime solutions. 1 is not a prime.

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

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

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

**The New Prime theorem（736）**

$$P, jP^{1392}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1392}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1392}+k-j(j=1,\cdots,k-1). \tag{1}$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1392}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \tag{3}$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1392}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1392}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1392)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \tag{6}$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,7,13,17,59,233,349$. From (2) and(3) we have

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

we prove that for $k=3,5,7,13,17,59,233,349$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5,7,13,17,59,233,349$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,17,59,233,349$,

(1) contain infinitely many prime solutions

## The New Prime theorem（737）

$$P, jP^{1394}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1394}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1394}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1394}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1394}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1394}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1394)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,83$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,83$.

From (2) and (3) we have

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

We prove that for $k\ne 3,83$,

(1) contain infinitely many prime solutions

**The New Prime theorem（738）**

$$P, jP^{1396}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1396}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1396}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1396}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1396}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1396}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1396)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

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

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

we prove that for $k=3,5$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5$,

(1) contain infinitely many prime solutions

**The New Prime theorem（739）**

$$P, jP^{1398}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1398}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1398}+k-j(j=1,\cdots,k-1) \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1398}+k-j\right]\equiv 0 \pmod P), q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1398}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1398}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1398)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,7,467,1399$. From (2) and(3) we have

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

we prove that for $k=3,7,467,1399$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,7,467,1399$.

From (2) and (3) we have

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

We prove that for $k\ne 3,7,467,1399$,

(1) contain infinitely many prime solutions

**The New Prime theorem（740）**

$$P, jP^{1400}+k-j(j=1,\cdots,k-1)$$

Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com

Abstract

Using Jiang function we prove that $jP^{1400}+k-j$ contain infinitely many prime solutions and no prime solutions.

**Theorem.** Let $k$ be a given odd prime.

$$P, jP^{1400}+k-j(j=1,\cdots,k-1). \quad (1)$$

contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}\left[jq^{1400}+k-j\right]\equiv 0 \pmod P, q=1,\cdots,P-1 \quad (3)$$

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 that is for any $k$ there are infinitely many primes $P$ such that each of $jp^{1400}+k-j$ is a prime.

Using Fermat's little theorem from (3) we have $\chi(P)=P-1$. Substituting it into (2) 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jP^{1400}+k-j=prime\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(1400)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} \quad (6)$$

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

From (6) we are able to find the smallest solution $\pi_k(N_0,2)\ge 1$.

Example 1. Let $k=3,5,11,29,41,71,101,281,701$. From (2) and(3) we have

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

we prove that for $k=3,5,11,29,41,71,101,281,701$,

(1) contain no prime solutions. 1 is not a prime.

**Example 2**. Let $k\ne 3,5,11,29,41,71,101,281,701$.

From (2) and (3) we have

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

We prove that for $k\ne 3,5,11,29,41,71,101,281,701$,

(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, Acta Math.,204(2010),1-47.
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.

4/12/2016