The New Prime theorems (1541)—（1590）

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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, CLAYMA, IAS, THES, MPIM, MSRI. Recently<Annals of Mathematics> publishes the many false papers of the prime numbers to see P52-53. In this paper using Jiang function $J_2(\omega)$ we prove that the new prime theorems (1541)-(1590) 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. Institute for advanced study was the undisputed Mecca of the Riemann hypothesis, now no existence.

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

$$L(s)=\sum_{n=1}^{\infty}\frac{a_n}{n^s}\neq 0, s=\sigma+it$$

for all Riemann hypotheses and the Birch and Swinnerton-Dyer conjecture. These conjectures are false, because zero calculations are approximate and error values. For example, H. M. Bui, Brian Conroy and Matthew P. Young, More than 41% of the zeros of the zeta function are on the critical line, Acta Arithmetical, 150. 1(2011), 35-64，G. A. Hiary, Fast methods to compute the Riemann zeta function. Ann Math., 174-2(2011)891-946. To see http: // www. i-b-r.org/docs/JiangRiemann.pdf；http://vixra.org/abs/1004.0028

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 The sieve methods and circle method are outdated methods which cannot prove twin prime conjecture and Goldbach's conjecture.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 Gree-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 prove Goldabch 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 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/0904.00001v1.pdf)

There are no Jiang's epoch-making works in ICM2010. It cannot represent the modern 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)-(1540)]: (http//www.wbabin.net/xuan.htm#chun-xuan)
(http://vixra.org/numth/)

The New Prime Theorem (1541)

$$p, jp^{3022}+k-j(j=1,2,...,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3022}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3022}+k-j(j=1,\cdots,k-1) \tag{1}$$

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

$$\prod_{j=1}^{k-1}(jq^{3022}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \tag{3}$$

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 $jp^{3022}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3022}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3022)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \tag{6}$$

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 $k=3,3023$

From (2) and (3) we have

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

We prove that for $k=3,3023$

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

Example 2. Let $k\ne 3,3023$

From (2) and (3) we have

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

We prove that for $k\ne 3,3023$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1542)

$$p, jp^{3024}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3024}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3024}+k-j(j=1,\cdots,k-1) \tag{1}$$

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

$$\prod_{j=1}^{k-1}(jq^{3024}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 . \tag{3}$$

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 $jp^{3024}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3024}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3024)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} , \tag{6}$$

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 $k=3,5,7,13,17,19,29,37,43,73,109,127,433,757$

From (2) and (3) we have

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

We prove that for $k=3,5,7,13,17,19,29,37,43,73,109,127,433,757$

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

Example 2. Let $k\ne 3,5,7,13,17,19,29,37,43,73,109,127,433,757$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,17,19,29,37,43,73,109,127,433,757$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1543)

$$p, jp^{3026}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3026}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3026}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3026}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3026}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3026}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3026)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,179$

From (2) and (3) we have

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

We prove that for $k=3,179$

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

Example 2. Let $k\ne 3,179$

From (2) and (3) we have

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

We prove that for $k\ne 3,179$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1544)

$$p, jp^{3028}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3028}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3028}+k-j (j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3028}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3028}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3028}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3028)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N} , \quad (6)$$

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 (1545)

$$p, jp^{3030}+k-j (j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3030}+k-j$ contain infinitely many prime solutions and no prime

solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3030}+k-j(j=1,\cdots,k-1) \tag{1}$$

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

$$\prod_{j=1}^{k-1}(jq^{3030}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1. \tag{3}$$

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 $jp^{3030}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3030}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3030)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \tag{6}$$

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 $k=3,7,11,31,607$

From (2) and (3) we have

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

We prove that for $k=3,7,11,31,607$

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

Example 2. Let $k\ne 3,7,11,31,607$

From (2) and (3) we have

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

We prove that for $k\ne 3,7,11,31,607$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1546)

$$p, jp^{3032}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3032}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3032}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3032}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3032}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3032}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3032)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 (1547)

$$p, jp^{3034}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3034}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3034} + k - j (j = 1, \cdots, k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1} (jq^{3034} + k - j) \equiv 0 \pmod{p}, q = 1, \cdots, p-1 \quad (3)$$

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 $jp^{3034} + k - j$ 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]

$$\pi_k(N, 2) = \left| \{ P \le N : jp^{3034} + k - j = \text{prime} \} \right| \sim \frac{J_2(\omega)\omega^{k-1}}{(3034)^{k-1} \varphi^k(\omega)} \frac{N}{\log^k N}, \quad (6)$$

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 (1548)

$$p, jp^{3036} + k - j (j = 1, 2, \cdots, k-1), p > k$$

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Abstract

Using Jiang function we prove that $jp^{3036} + k - j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3036} + k - j (j = 1, \cdots, k-1) \quad (1)$$

Contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}(jq^{3036}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \qquad (3)$$

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 $jp^{3036}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3036}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3036)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \qquad (6)$$

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 $k=3,5,7,13,23,47,67,139,277,3037$

From (2) and (3) we have

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

We prove that for $k=3,5,7,13,23,47,67,139,277,3037$

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

Example 2. Let $k\ne 3,5,7,13,23,47,67,139,277,3037$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,23,47,67,139,277,3037$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1549)

$$p, jp^{3038}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3038}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3038}+k-j(j=1,\cdots,k-1) \qquad (1)$$

Contain infinitely many prime solutions and no prime solutions.

Proof. We have Jiang function [1,2]

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

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

$$\prod_{j=1}^{k-1}(jq^{3038}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1. \quad (3)$$

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 $jp^{3038}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3038}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3038)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k\neq 3$

From (2) and (3) we have

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

We prove that for $k\neq 3$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1550)

$$p, jp^{3040}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3040}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3040}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3040}+k-j) \equiv 0 \pmod{p}, q = 1,\cdots,p-1. \quad (3)$$

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 $jp^{3040}+k-j$ 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]

$$\pi_k(N,2) = \left|\{P \le N : jp^{3040}+k-j = \text{prime}\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(3040)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N}, \quad (6)$$

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 $k = 3,5,11,17,41,191,761,3041$

From (2) and (3) we have

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

We prove that for $k = 3,5,11,17,41,191,761,3041$

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

Example 2. Let $k \ne 3,5,11,17,41,191,761,3041$

From (2) and (3) we have

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

We prove that for $k \ne 3,5,11,17,41,191,761,3041$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1551)

$$p, jp^{3042}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3042}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3042}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3042}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3042}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3042}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3042)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,7,19,79$

From (2) and (3) we have

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

We prove that for $k=3,7,19,79$

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

Example 2. Let $k\ne 3,7,19,79$

From (2) and (3) we have

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

We prove that for $k\ne 3,7,19,79$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1552)

$$p, jp^{3044}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3044}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3044}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3044}+k-j) \equiv 0 \pmod{p}, q = 1,\cdots,p-1 \quad (3)$$

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 $jp^{3044}+k-j$ 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]

$$\pi_k(N,2) = \left|\{P \le N : jp^{3044}+k-j = \text{prime}\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(3044)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N}, \quad (6)$$

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 $k = 3,5,1523$

From (2) and (3) we have

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

We prove that for $k = 3,5,1523$

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

Example 2. Let $k \neq 3,5,1523$

From (2) and (3) we have

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

We prove that for $k \neq 3,5,1523$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1553)

$$p, jp^{3046}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3046}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3046}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3046}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3046}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3046}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3046)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 (1554)

$$p, jp^{3048}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3048}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3048}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3048}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3048}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3048}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3048)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,7,13,509,3049$

From (2) and (3) we have

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

We prove that for $k=3,5,7,13,509,3049$

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

Example 2. Let $k\ne 3,5,7,13,509,3049$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,509,3049$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1555)

$$p, jp^{3050}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3050}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3050}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3050}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1. \qquad (3)$$

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 $jp^{3050}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3050}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3050)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \qquad (6)$$

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 $k=3,11$

From (2) and (3) we have

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

We prove that for $k=3,11$

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

Example 2. Let $k\ne 3,11$

From (2) and (3) we have

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

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

(1) contain infinitely many prime solutions.

The New Prime Theorem (1556)

$$p, jp^{3052}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3052}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3052}+k-j(j=1,\cdots,k-1) \qquad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3052}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1. \quad (3)$$

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 $jp^{3052}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3052}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3052)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,29$

From (2) and (3) we have

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

We prove that for $k=3,5,29$

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

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

From (2) and (3) we have

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

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

(1) contain infinitely many prime solutions.

The New Prime Theorem (1557)

$$p, jp^{3054}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3054}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3054}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3054}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3054}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3054}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3054)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,7,1019$

From (2) and (3) we have

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

We prove that for $k=3,7,1019$

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

Example 2. Let $k\neq 3,7,1019$

From (2) and (3) we have

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

We prove that for $k\neq 3,7,1019$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1558)

$$p, jp^{3056}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3056}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3056}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3056}+k-j) \equiv 0 \pmod{p}, q = 1,\cdots,p-1. \quad (3)$$

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 $jp^{3056}+k-j$ 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]

$$\pi_k(N,2) = \left|\left\{P \le N : jp^{3056}+k-j = \text{prime}\right\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(3056)^{k-1}\phi^k(\omega)} \frac{N}{\log^k N}, \quad (6)$$

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 $k = 3,5,17,383$

From (2) and (3) we have

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

We prove that for $k = 3,5,17,383$

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

Example 2. Let $k \ne 3,5,17,383$

From (2) and (3) we have

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

We prove that for $k \ne 3,5,17,383$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1559)

$$p, jp^{3058}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3058}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3058}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3058}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3058}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3058}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3058)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k\neq 3,23$

From (2) and (3) we have

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

We prove that for $k\neq 3,23$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1560)

$$p, jp^{3060}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3060}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3060}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3060}+k-j) \equiv 0 \pmod{p}, q = 1,\cdots,p-1 \quad (3)$$

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 $jp^{3060}+k-j$ 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]

$$\pi_k(N,2) = \left|\{P \le N : jp^{3060}+k-j = \text{prime}\}\right| \sim \frac{J_2(\omega)\omega^{k-1}}{(3060)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k = 3,5,7,11,13,19,31,37,61,103,181,307,613,1531,3061$

From (2) and (3) we have

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

We prove that for $k = 3,5,7,11,13,19,31,37,61,103,181,307,613,1531,3061$

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

Example 2. Let $k \ne 3,5,7,11,13,19,31,37,61,103,181,307,613,1531,3061$

From (2) and (3) we have

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

We prove that for $k \ne 3,5,7,11,13,19,31,37,61,103,181,307,613,1531,3061$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1561)

$$p, jp^{3062}+k-j(j=1,2,\cdots,k-1), p > k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3062}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3062}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3062}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3062}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3062}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3062)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k\neq 3$

From (2) and (3) we have

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

We prove that for $k\neq 3$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1562)

$$p, jp^{3064}+k-j (j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3064}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3064}+k-j (j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3064}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3064}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\leq N: jp^{3064}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3064)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,7,13$

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 (1563)

$$p, jp^{3066}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3066}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3066}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3066}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3066}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3066}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3066)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,7,43,439,3067$

From (2) and (3) we have

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

We prove that for $k=3,7,43,439,3067$

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

Example 2. Let $k\neq 3,7,43,439,3067$

From (2) and (3) we have

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

We prove that for $k\neq 3,7,43,439,3067$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1564)

$$p, jp^{3068}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3068}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3068}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3068}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1. \quad (3)$$

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 $jp^{3068}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3068}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3068)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,53$

From (2) and (3) we have

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

We prove that for $k=3,5,53$

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

Example 2. Let $k\ne 3,5,53$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,53$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1565)

$$p, jp^{3070}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3070}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3070}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3070}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3070}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3070}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3070)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,11$

From (2) and (3) we have

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

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

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

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

(1) contain infinitely many prime solutions.

The New Prime Theorem (1566)

$$p, jp^{3072}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3072}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3072}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3072}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3072}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3072}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3072)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,7,13,17,97,193,257,769$

From (2) and (3) we have

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

We prove that for $k=3,5,7,13,17,97,193,257,769$

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

Example 2. Let $k\ne 3,5,7,13,17,97,193,257,769$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,17,97,193,257,769$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1567)

$$p, jp^{3074}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3074}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3074}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3074}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3074}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3074}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3074)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,59,107$

From (2) and (3) we have

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

We prove that for $k=3,59,107$

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

Example 2. Let $k\ne 3,59,107$

From (2) and (3) we have

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

We prove that for $k\ne 3,59,107$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1568)

$$p, jp^{3076}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3076}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3076}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3076}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3076}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3076}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3076)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 (1569)

$$p, jp^{3078}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3078}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3078}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3078}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3078}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3078}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3078)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,7,19,163,487,3079$

From (2) and (3) we have

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

We prove that for $k=3,7,19,163,487,3079$

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

Example 2. Let $k\ne 3,7,19,163,487,3079$

From (2) and (3) we have

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

We prove that for $k\ne 3,7,19,163,487,3079$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1570)

$$p, jp^{3080}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3080}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3080}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3080}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3080}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3080}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3080)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,11,29,41,71,89,617$

From (2) and (3) we have

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

We prove that for $k=3,5,11,29,41,71,89,617$

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

Example 2. Let $k\ne 3,5,11,29,41,71,89,617$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,11,29,41,71,89,617$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1571)

$$p, jp^{3082}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3082}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3082}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3082}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \tag{3}$$

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 $jp^{3082}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3082}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3082)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \tag{6}$$

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 $k=3,47,3083$

From (2) and (3) we have

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

We prove that for $k=3,47,3083$

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

Example 2. Let $k\ne 3,47,3083$

From (2) and (3) we have

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

We prove that for $k\ne 3,47,3083$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1572)

$$p, jp^{3084}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3084}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3084}+k-j(j=1,\cdots,k-1) \tag{1}$$

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

$$\prod_{j=1}^{k-1}(jq^{3084}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3084}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3084}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3084)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,7,13,1543$

From (2) and (3) we have

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

We prove that for $k=3,5,7,13,1543$

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

Example 2. Let $k\ne 3,5,7,13,1543$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,1543$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1573)

$$p, jp^{3086}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3086}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3086}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3086}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \qquad (3)$$

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 $jp^{3086}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3086}+k-j=\text{prime}\}\right|\sim \frac{J_2(\omega)\omega^{k-1}}{(3086)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \qquad (6)$$

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 $k=3$

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 (1574)

$$p, jp^{3088}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3088}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3088}+k-j(j=1,\cdots,k-1) \qquad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3088}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3088}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3088}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3088)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,17,773,3089$

From (2) and (3) we have

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

We prove that for $k=3,5,17,773,3089$

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

Example 2. Let $k\ne 3,5,17,773,3089$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,17,773,3089$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1575)

$$p, jp^{3090}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3090}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3090}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3090}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3090}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3090}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3090)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,7,11,31,619$

From (2) and (3) we have

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

We prove that for $k=3,7,11,31,619$

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

Example 2. Let $k\ne 3,7,11,31,619$

From (2) and (3) we have

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

We prove that for $k\ne 3,7,11,31,619$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1576)

$$p, jp^{3092}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3092}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3092}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3092}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1. \quad (3)$$

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 $jp^{3092}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3092}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3092)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 (1577)

$$p, jp^{3094}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3094}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3094}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3094}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3094}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3094}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3094)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,239,443$

From (2) and (3) we have

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

We prove that for $k=3,239,443$

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

Example 2. Let $k\ne 3,239,443$

From (2) and (3) we have

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

We prove that for $k\ne 3,239,443$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1578)

$$p, jp^{3096}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3096}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3096}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3096}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \tag{3}$$

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 $jp^{3096}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3096}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3096)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \tag{6}$$

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 $k=3,5,7,13,19,37,73,173,1033,1549$

From (2) and (3) we have

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

We prove that for $k=3,5,7,13,19,37,73,173,1033,1549$

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

Example 2. Let $k\ne 3,5,7,13,19,37,73,173,1033,1549$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,19,37,73,173,1033,1549$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1579)

$$p, jp^{3098}+k-j (j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3098}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3098}+k-j (j=1,\cdots,k-1) \tag{1}$$

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

$$\prod_{j=1}^{k-1}(jq^{3098}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3098}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3098}+k-j=\text{prime}\}\right|\sim \frac{J_2(\omega)\omega^{k-1}}{(3098)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 (1580)

$$p, jp^{3100}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3100}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3100}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3100}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3100}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3100}+k-j=\text{prime}\}\right|\sim \frac{J_2(\omega)\omega^{k-1}}{(3100)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,11,101,311$

From (2) and (3) we have

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

We prove that for $k=3,5,11,101,311$

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

Example 2. Let $k\ne 3,5,11,101,311$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,11,101,311$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1581)

$$p, jp^{3102}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3102}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3102}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3102}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3102}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3102}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3102)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,7,23,67,283$

From (2) and (3) we have

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

We prove that for $k=3,7,23,67,283$

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

Example 2. Let $k\ne 3,7,23,67,283$

From (2) and (3) we have

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

We prove that for $k\ne 3,7,23,67,283$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1582)

$$p, jp^{3104}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3104}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3104}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3104}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3104}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3104}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3104)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,17,289,1553$

From (2) and (3) we have

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

We prove that for $k=3,5,17,289,1553$

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

Example 2. Let $k\ne 3,5,17,289,1553$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,17,289,1553$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1583)

$$p, jp^{3106}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3106}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3106}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3106}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3106}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3106}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3106)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 (1584)

$$p, jp^{3108}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3108}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3108}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3108}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3108}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3108}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3108)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,7,13,29,149,223,3109$

From (2) and (3) we have

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

We prove that for $k=3,5,7,13,29,149,223,3109$

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

Example 2. Let $k\ne 3,5,7,13,29,149,223,3109$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,13,29,149,223,3109$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1585)

$$p, jp^{3110}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3110}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3110}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3110}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \qquad (3)$$

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 $jp^{3110}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3110}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3110)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \qquad (6)$$

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 $k=3,11$

From (2) and (3) we have

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

We prove that for $k=3,11$

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

Example 2. Let $k\ne 3,11$

From (2) and (3) we have

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

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

(1) contain infinitely many prime solutions.

The New Prime Theorem (1586)

$$p, jp^{3112}+k-j(j=1,2,\cdots,k-1), p>k$$

Chun-Xuan Jiang
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Abstract

Using Jiang function we prove that $jp^{3112}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3112}+k-j(j=1,\cdots,k-1) \qquad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3112}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 . \quad (3)$$

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 $jp^{3112}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3112}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3112)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 (1587)

$$p, jp^{3114}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3114}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3114}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3114}+k-j)\equiv 0 \pmod p, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3114}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\leq N: jp^{3114}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3114)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,7,19,347,1039$

From (2) and (3) we have

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

We prove that for $k=3,7,19,347,1039$

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

Example 2. Let $k\neq 3,7,19,347,1039$

From (2) and (3) we have

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

We prove that for $k\neq 3,7,19,347,1039$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1588)

$$p, jp^{3116}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3116}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3116}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3116}+k-j)\equiv 0 \pmod p), q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3116}+k-j$ 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]

$$\pi_k(N,2)=\left|\{P\le N: jp^{3116}+k-j=\text{prime}\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3116)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,5,83,1559$

From (2) and (3) we have

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

We prove that for $k=3,5,83,1559$

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

Example 2. Let $k\ne 3,5,83,1559$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,83,1559$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1589)

$$p, jp^{3118}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3118}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3118}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3188}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 \quad (3)$$

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 $jp^{3188}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3188}+k-j=\text{prime}\right\}\right|\sim\frac{J_2(\omega)\omega^{k-1}}{(3188)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \quad (6)$$

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 $k=3,3119$

From (2) and (3) we have

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

We prove that for $k=3,3119$

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

Example 2. Let $k\ne 3,3119$

From (2) and (3) we have

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

We prove that for $k\ne 3,3119$

(1) contain infinitely many prime solutions.

The New Prime Theorem (1590)

$$p, jp^{3120}+k-j(j=1,2,\cdots,k-1), p>k$$

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Abstract

Using Jiang function we prove that $jp^{3120}+k-j$ contain infinitely many prime solutions and no prime solutions.

Theorem. Let k be a given odd prime.

$$p, jp^{3120}+k-j(j=1,\cdots,k-1) \quad (1)$$

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

$$\prod_{j=1}^{k-1}(jq^{3120}+k-j)\equiv 0 \pmod{p}, q=1,\cdots,p-1 . \qquad (3)$$

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 $jp^{3120}+k-j$ 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]

$$\pi_k(N,2)=\left|\left\{P\le N: jp^{3120}+k-j=\text{prime}\right\}\right|\sim \frac{J_2(\omega)\omega^{k-1}}{(3120)^{k-1}\phi^k(\omega)}\frac{N}{\log^k N}, \qquad (6)$$

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 $k=3,5,7,11,13,17,31,41,53,61,79,131,157,313,521,1249,3121$

From (2) and (3) we have

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

We prove that for $k=3,5,7,11,13,17,31,41,53,61,79,131,157,313,521,1249,3121$ (1) contain no prime solutions. 1 is not a prime.

Example 2. Let $k\ne 3,5,7,11,13,17,31,41,53,61,79,131,157,313,521,1249,3121$

From (2) and (3) we have

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

We prove that for $k\ne 3,5,7,11,13,17,31,41,53,61,79,131,157,313,521,1249,3121$ (1) contain infinitely many prime solutions.

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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)

Jiang's function $J_{n+1}(\omega)$ in prime distribution

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Dedicated to the 30-th anniversary of hadronic mechanics

Abstract: We define that prime equations

$$f_1(P_1,\cdots,P_n),\cdots,f_k(P_1,\cdots P_n) \tag{5}$$

are polynomials (with integer coefficients) irreducible over integers, where $P_1,\cdots,P_n$ are all prime. If Jiang's function $J_{n+1}(\omega)=0$ then (5) has finite prime solutions. If $J_{n+1}(\omega)\neq 0$ then there are infinitely many primes $P_1,\cdots,P_n$ such that $f_1,\cdots f_k$ are primes. We obtain a unite prime formula in prime distribution

$$\pi_{k+1}(N,n+1)=\left|\{P_1,\cdots,P_n\le N: f_1,\cdots,f_k \text{ are } k \text{ primes}\}\right|$$

$$=\prod_{i=1}^{k}(\deg f_i)^{-1}\times\frac{J_{n+1}(\omega)\omega^k}{n!\phi^{k+n}(\omega)}\frac{N^n}{\log^{k+n}N}(1+o(1)). \tag{8}$$

Jiang's function is accurate sieve function. Using Jiang's function we prove about 600 prime theorems [6]. Jiang's function provides proofs of the prime theorems which are simple enough to understand and accurate enough

to be useful.

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

It will be another million years, at least, before we understand the primes.

Paul Erdös

Suppose that Euler totient function

$$\phi(\omega)=\prod_{2\le P}(P-1)=\infty \quad \text{as} \quad \omega\to\infty, \tag{1}$$

where $\omega=\prod_{2\le P}P$ is called primorial.

Suppose that $(\omega,h_i)=1$, where $i=1,\cdots,\phi(\omega)$. We have prime equations

$$P_1=\omega n+1,\cdots,P_{\phi(\omega)}=\omega n+h_{\phi(\omega)} \tag{2}$$

where $n=0,1,2,\cdots$.

(2) is called infinitely many prime equations (IMPE). Every equation has infinitely many prime solutions. We have

$$\pi_{h_i}=\sum_{\substack{P_i\le N\\ P_i\equiv h_i \pmod{\omega}}}1=\frac{\pi(N)}{\phi(\omega)}(1+o(1)), \tag{3}$$

where π_{h_i} denotes the number of primes $P_i\le N$ in $P_i=\omega n+h_i$ $n=0,1,2,\cdots$, $\pi(N)$ the number of primes less than or equal to N.

We replace sets of prime numbers by IMPE. (2) is the fundamental tool for proving the prime theorems in prime distribution.

Let $\omega=30$ and $\phi(30)=8$. From (2) we have eight prime equations

$$P_1=30n+1,\ P_2=30n+7,\ P_3=30n+11,\ P_4=30n+13,\ P_5=30n+17,$$
$$P_6=30n+19,\ P_7=30n+23,\ P_8=30n+29,\ n=0,1,2,\cdots \tag{4}$$

Every equation has infinitely many prime solutions.

THEOREM. We define that prime equations

$$f_1(P_1,\cdots,P_n),\cdots,f_k(P_1,\cdots,P_n) \tag{5}$$

are polynomials (with integer coefficients) irreducible over integers, where $P_1,\cdots,P_n$ are primes. If Jiang's function $J_{n+1}(\omega)=0$ then (5) has finite prime solutions. If $J_{n+1}(\omega)\ne 0$ then there exist infinitely many primes $P_1,\cdots,P_n$ such that each f_k is a prime.

PROOF. Firstly, we have Jiang's function [1-11]

$$J_{n+1}(\omega)=\prod_{3\le P}[(P-1)^n-\chi(P)], \tag{6}$$

where $\chi(P)$ is called sieve constant and denotes the number of solutions for the following congruence

$$\prod_{i=1}^{k}f_i(q_1,\cdots,q_n)\equiv 0 \pmod{P}, \tag{7}$$

where $q_1=1,\cdots,P-1,\cdots,q_n=1,\cdots,P-1$.

$J_{n+1}(\omega)$ denotes the number of sets of $P_1,\cdots,P_n$ prime equations such that $f_1(P_1,\cdots,P_n),\cdots,f_k(P_1,\cdots,P_n)$ are prime equations. If $J_{n+1}(\omega)=0$ then (5) has finite prime solutions. If

$J_{n+1}(\omega)\neq 0$ using $\chi(P)$ we sift out from (2) prime equations which can not be represented $P_1,\cdots,P_n$, then residual prime equations of (2) are $P_1,\cdots,P_n$ prime equations such that $f_1(P_1,\cdots,P_n),\cdots,\ f_k(P_1,\cdots,P_n)$ are prime equations. Therefore we prove that there exist infinitely many primes $P_1,\cdots,P_n$ such that $f_1(P_1,\cdots,P_n),\cdots,\ f_k(P_1,\cdots,P_n)$ are primes.

Secondly, we have the best asymptotic formula [2,3,4,6]

$$\pi_{k+1}(N,n+1)=\left|\{P_1,\cdots,P_n\le N: f_1,\cdots,f_k \text{ are } k \text{ primes}\}\right|$$
$$=\prod_{i=1}^{k}(\deg f_i)^{-1}\times\frac{J_{n+1}(\omega)\omega^k}{n!\phi^{k+n}(\omega)}\frac{N^n}{\log^{k+n}N}(1+o(1)). \tag{8}$$

(8) is called a unite prime formula in prime distribution. Let $n=1,k=0$, $J_2(\omega)=\phi(\omega)$. From (8) we have prime number theorem

$$\pi_1(N,2)=\left|\{P_1\le N: P_1 \text{ is prime}\}\right|=\frac{N}{\log N}(1+o(1)). \tag{9}$$

Number theorists believe that there are infinitely many twin primes, but they do not have rigorous proof of this old conjecture by any method. All the prime theorems are conjectures except the prime number theorem, because they do not prove that prime equations have infinitely many prime solutions. We prove the following conjectures by this theorem.

Example 1. Twin primes $P, P+2$ (300BC)**.**

From (6) and (7) we have Jiang's function

$$J_2(\omega)=\prod_{3\le P}(P-2)\neq 0.$$

Since $J_2(\omega)\neq 0$ in (2) exist infinitely many P prime equations such that $P+2$ is a prime equation. Therefore we prove that there are infinitely many primes P such that $P+2$ is a prime.

Let $\omega=30$ and $J_2(30)=3$. From (4) we have three P prime equations

$$P_3=30n+11,\quad P_5=30n+17,\quad P_8=30n+29.$$

From (8) we have the best asymptotic formula

$$\pi_2(N,2)=\left|\{P\le N: P+2 \text{ prime}\}\right|=\frac{J_2(\omega)\omega}{\phi^2(\omega)}\frac{N}{\log^2 N}(1+o(1))$$
$$=2\prod_{3\le P}\left(1-\frac{1}{(P-1)^2}\right)\frac{N}{\log^2 N}(1+o(1)).$$

In 1996 we proved twin primes conjecture [1]

Remark. $J_2(\omega)$ denotes the number of P prime equations, $\frac{\omega}{\phi^2(\omega)}\frac{N}{\log^2 N}(1+o(1))$ the number of solutions of primes for every P prime equation.

Example 2. Even Goldbach's conjecture $N=P_1+P_2$**.** Every even number $N\ge 6$ is the sum of two primes**.**

From (6) and (7) we have Jiang's function

$$J_2(\omega)=\prod_{3\le P}(P-2)\prod_{P|N}\frac{P-1}{P-2}\neq 0.$$

Since $J_2(\omega)\neq 0$ as $N\to\infty$ in (2) exist infinitely many P_1 prime equations such that $N-P_1$ is a prime equation. Therefore we prove that every even number $N \geq 6$ is the sum of two primes.

From (8) we have the best asymptotic formula

$$\pi_2(N,2) = \left|\{P_1 \leq N, N - P_1 \text{ prime}\}\right| = \frac{J_2(\omega)\omega}{\phi^2(\omega)} \frac{N}{\log^2 N}(1+o(1)).$$

$$= 2\prod_{3\leq P}\left(1 - \frac{1}{(P-1)^2}\right)\prod_{P|N}\frac{P-1}{P-2}\frac{N}{\log^2 N}(1+o(1)).$$

In 1996 we proved even Goldbach's conjecture [1]

Example 3. Prime equations $P, P+2, P+6$.

From (6) and (7) we have Jiang's function

$$J_2(\omega) = \prod_{5\leq P}(P-3) \neq 0,$$

$J_2(\omega)$ is denotes the number of P prime equations such that $P+2$ and $P+6$ are prime equations. Since $J_2(\omega) \neq 0$ in (2) exist infinitely many P prime equations such that $P+2$ and $P+6$ are prime equations. Therefore we prove that there are infinitely many primes P such that $P+2$ and $P+6$ are primes.

Let $\omega = 30,\ J_2(30) = 2$. From (4) we have two P prime equations

$$P_3 = 30n + 11, \quad P_5 = 30n + 17.$$

From (8) we have the best asymptotic formula

$$\pi_3(N,2) = \left|\{P \leq N : P+2, P+6 \text{ are primes}\}\right| = \frac{J_2(\omega)\omega^2}{\phi^3(\omega)} \frac{N}{\log^3 N}(1+o(1)).$$

Example 4. Odd Goldbach's conjecture $N = P_1 + P_2 + P_3$. Every odd number $N \geq 9$ is the sum of three primes.

From (6) and (7) we have Jiang's function

$$J_3(\omega) = \prod_{3\leq P}\left(P^2 - 3P + 3\right)\prod_{P|N}\left(1 - \frac{1}{P^2 - 3P + 3}\right) \neq 0.$$

Since $J_3(\omega) \neq 0$ as $N \to \infty$ in (2) exist infinitely many pairs of P_1 and P_2 prime equations such that $N - P_1 - P_2$ is a prime equation. Therefore we prove that every odd number $N \geq 9$ is the sum of three primes.

From (8) we have the best asymptotic formula

$$\pi_2(N,3) = \left|\{P_1, P_2 \leq N : N - P_1 - P_2 \text{ prime}\}\right| = \frac{J_3(\omega)\omega}{2\phi^3(\omega)} \frac{N^2}{\log^3 N}(1+o(1)).$$

$$= \prod_{3\leq P}\left(1 + \frac{1}{(P-1)^3}\right)\prod_{P|N}\left(1 - \frac{1}{P^3 - 3P + 3}\right)\frac{N^2}{\log^3 N}(1+o(1)).$$

Example 5. Prime equation $P_3 = P_1 P_2 + 2$.

From (6) and (7) we have Jiang's function

$$J_3(\omega) = \prod_{3\leq P}\left(P^2 - 3P + 2\right) \neq 0$$

$J_3(\omega)$ denotes the number of pairs of P_1 and P_2 prime equations such that P_3 is a prime equation. Since $J_3(\omega) \neq 0$ in (2) exist infinitely many pairs of P_1 and P_2 prime equations such that P_3 is a prime equation. Therefore we prove that there are infinitely many pairs of primes P_1 and P_2 such that P_3 is a prime.

From (8) we have the best asymptotic formula

$$\pi_2(N,3)=\left|\{P_1,P_2\le N:P_1P_2+2\text{ prime}\}\right|=\frac{J_3(\omega)\omega}{4\phi^3(\omega)}\frac{N^2}{\log^3 N}(1+o(1)).$$

Note. $\deg(P_1P_2)=2$.

Example 6 [12]. Prime equation $P_3=P_1^3+2P_2^3$.

From (6) and (7) we have Jiang's function

$$J_3(\omega)=\prod_{3\le P}\left[(P-1)^2-\chi(P)\right]\ne 0,$$

where $\chi(P)=3(P-1)$ if $2^{\frac{P-1}{3}}\equiv 1(\bmod P)$; $\chi(P)=0$ if $2^{\frac{P-1}{3}}\not\equiv 1(\bmod P)$; $\chi(P)=P-1$ otherwise.

Since $J_3(\omega)\ne 0$ in (2) there are infinitely many pairs of P_1 and P_2 prime equations such that P_3 is a prime equation. Therefore we prove that there are infinitely many pairs of primes P_1 and P_2 such that P_3 is a prime.

From (8) we have the best asymptotic formula

$$\pi_2(N,3)=\left|\{P_1,P_2\le N:P_1^3+2P_2^3\text{ prime}\}\right|=\frac{J_3(\omega)\omega}{6\phi^3(\omega)}\frac{N^2}{\log^3 N}(1+o(1)).$$

Example 7 [13]. Prime equation $P_3=P_1^4+(P_2+1)^2$.

From (6) and (7) we have Jiang's function

$$J_3(\omega)=\prod_{3\le P}\left[(P-1)^2-\chi(P)\right]\ne 0$$

where $\chi(P)=2(P-1)$ if $P\equiv 1(\bmod 4)$; $\chi(P)=2(P-3)$ if $P\equiv 1(\bmod 8)$; $\chi(P)=0$ otherwise.

Since $J_3(\omega)\ne 0$ in (2) there are infinitely many pairs of P_1 and P_2 prime equations such that P_3 is a prime equation. Therefore we prove that there are infinitely many pairs of primes P_1 and P_2 such that P_3 is a prime.

From (8) we have the best asymptotic formula

$$\pi_2(N,3)=\left|\{P_1,P_2\le N:P_3\text{ prime}\}\right|=\frac{J_3(\omega)\omega}{8\phi^3(\omega)}\frac{N^2}{\log^3 N}(1+o(1)).$$

Example 8 [14-20]. Arithmetic progressions consisting only of primes. We define the arithmetic progressions of length k.

$$P_1,P_2=P_1+d,P_3=P_1+2d,\cdots,P_k=P_1+(k-1)d,(P_1,d)=1. \quad (10)$$

From (8) we have the best asymptotic formula

$$\pi_2(N,2)=\left|\{P_1\le N:P_1,P_1+d,\cdots,P_1+(k-1)d\text{ are primes}\}\right|$$
$$=\frac{J_2(\omega)\omega^{k-1}}{\phi^k(\omega)}\frac{N}{\log^k N}(1+o(1)).$$

If $J_2(\omega)=0$ then (10) has finite prime solutions. If $J_2(\omega)\ne 0$ then there are infinitely many primes P_1 such that $P_2,\cdots,P_k$ are primes.

To eliminate d from (10) we have

$$P_3=2P_2-P_1,\quad P_j=(j-1)P_2-(j-2)P_1, 3\le j\le k.$$

From (6) and (7) we have Jiang's function

$$J_3(\omega)=\prod_{3\le P<k}(P-1)\prod_{k\le P}(P-1)(P-k+1)\neq 0$$

Since $J_3(\omega)\neq 0$ in (2) there are infinitely many pairs of P_1 and P_2 prime equations such that $P_3,\cdots,P_k$ are prime equations. Therefore we prove that there are infinitely many pairs of primes P_1 and P_2 such that $P_3,\cdots,P_k$ are primes.

From (8) we have the best asymptotic formula

$$\pi_{k-1}(N,3)=\left|\{P_1,P_2\le N:(j-1)P_2-(j-2)P_1 \text{ prime}, 3\le j\le k\}\right|$$

$$=\frac{J_3(\omega)\omega^{k-2}}{2\phi^k(\omega)}\frac{N^2}{\log^k N}(1+o(1))\qquad =\frac{1}{2}\prod_{2\le P<k}\frac{P^{k-2}}{(P-1)^{k-1}}\prod_{k\le P}\frac{P^{k-2}(P-k+1)}{(P-1)^{k-1}}\frac{N^2}{\log^k N}(1+o(1)).$$

Example 9. It is a well-known conjecture that one of $P,P+2,P+2^2$ is always divisible by 3. To generalize above to the $k-$primes, we prove the following conjectures. Let n be a square-free even number.

1. $P,P+n,P+n^2$,

where $3|(n+1)$.

From (6) and (7) we have $J_2(3)=0$, hence one of $P,P+n,P+n^2$ is always divisible by 3.

2. $P,P+n,P+n^2,\cdots,P+n^4$,

where $5|(n+b), b=2,3.$

From (6) and (7) we have $J_2(5)=0$, hence one of $P,P+n,P+n^2,\cdots,P+n^4$ is always divisible by 5.

3. $P,P+n,P+n^2,\cdots,P+n^6$,

where $7|(n+b), b=2,4.$

From (6) and (7) we have $J_2(7)=0$, hence one of $P,P+n,P+n^2,\cdots,P+n^6$ is always divisible by 7.

4. $P,P+n,P+n^2,\cdots,P+n^{10}$,

where $11|(n+b), b=3,4,5,9.$

From (6) and (7) we have $J_2(11)=0$, hence one of $P,P+n,P+n^2,\cdots,P+n^{10}$ is always divisible by 11.

5. $P,P+n,P+n^2,\cdots,P+n^{12}$,

where $13|(n+b), b=2,6,7,11.$

From (6) and (7) we have $J_2(13)=0$, hence one of $P,P+n,P+n^2,\cdots,P+n^{12}$ is always divisible by 13.

6. $P,P+n,P+n^2,\cdots,P+n^{16}$,

where $17|(n+b), b=3,5,6,7,10,11,12,14,15.$

From (6) and (7) we have $J_2(17)=0$, hence one of $P,P+n,P+n^2,\cdots,P+n^{16}$ is always divisible by 17.

7. $P,P+n,P+n^2,\cdots,P+n^{18}$,

where $19|(n+b), b=4,5,6,9,16.17.$

From (6) and (7) we have $J_2(19)=0$, hence one of $P, P+n, P+n^2, \cdots, P+n^{18}$ is always divisible by 19.

Example 10. Let n be an even number.

1. $P, P+n^i, i=1,3,5,\cdots,2k+1$,

From (6) and (7) we have $J_2(\omega)\neq 0$. Therefore we prove that there exist infinitely many primes P such that $P, P+n^i$ are primes for any k.

2. $P, P+n^i, i=2,4,6,\cdots,2k$.

From (6) and (7) we have $J_2(\omega)\neq 0$. Therefore we prove that there exist infinitely many primes P such that $P, P+n^i$ are primes for any k.

Example 11. Prime equation $2P_2 = P_1 + P_3$

From (6) and (7) we have Jiang's function

$$J_3(\omega)=\prod_{3\le P}(P^2-3P+2)\neq 0.$$

Since $J_3(\omega)\neq 0$ in (2) there are infinitely many pairs of P_1 and P_2 prime equations such that P_3 is prime equations. Therefore we prove that there are infinitely many pairs of primes P_1 and P_2 such that P_3 is a prime.

From (8) we have the best asymptotic formula

$$\pi_2(N,3)=\left|\{P_1,P_2\le N : P_3 \text{ prime}\}\right|=\frac{J_3(\omega)\omega}{2\phi^3(\omega)}\frac{N^2}{\log^3 N}(1+o(1)).$$

In the same way we can prove $2P_2^2 = P_3 + P_1$ which has the same Jiang's function.

Jiang's function is accurate sieve function. Using it we can prove any irreducible prime equations in prime distribution. There are infinitely many twin primes but we do not have rigorous proof of this old conjecture by any method [20]. As strong as the numerical evidence may be, we still do not even know whether there are infinitely many pairs of twin primes [21]. All the prime theorems are conjectures except the prime number theorem, because they do not prove the simplest twin primes. They conjecture that the prime distribution is randomness [12-26], because they do not understand theory of prime numbers.

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The Hardy-Littlewood prime *k*-tuple conjecture is false

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Abstract: Using Jiang function we prove Jiang prime k-tuple theorem. We prove that the Hardy-Littlewood prime k-tuple conjecture is false. Jiang prime k-tuple theorem can replace the Hardy-Littlewood prime k-tuple conjecture.

(A) Jiang prime k-tuple theorem [1, 2].

We define the prime k-tuple equation

$$p,\ p+n_i, \qquad (1)$$

where $2|n_i, i=1,\cdots k-1$.

we have Jiang function [1, 2]

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

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

$$\prod_{i=1}^{k-1}(q+n_i)\equiv 0 \pmod P, \quad q=1,\cdots,p-1. \tag{3}$$

If $\chi(P)<P-1$ then $J_2(\omega)\neq 0$. There exist infinitely many primes P such that each of $P+n_i$ is prime. If $\chi(P)=P-1$ then $J_2(\omega)=0$. There exist finitely many primes P such that each of $P+n_i$ is prime. $J_2(\omega)$ is a subset of Euler function $\phi(\omega)$ [2].

If $J_2(\omega)\neq 0$, then we hae the best asymptotic formula of the number of prime P [1, 2]

$$\pi_k(N,2)=\left|\{P\le N: P+n_i=prime\}\right|\sim \frac{J_2(\omega)\omega^{k-1}}{\phi^k(\omega)}\frac{N}{\log^k N}=C(k)\frac{N}{\log^k N} \tag{4}$$

$$\phi(\omega)=\prod_P (P-1),$$

$$C(k)=\prod_P\left(1-\frac{1+\chi(P)}{P}\right)\left(1-\frac{1}{P}\right)^{-k} \tag{5}$$

Example 1. Let $k=2, P, P+2$, twin primes theorem.

From (3) we have

$$\chi(2)=0,\quad \chi(P)=1 \text{ if } P>2, \tag{6}$$

Substituting (6) into (2) we have

$$J_2(\omega)=\prod_{P\ge 3}(P-2)\neq 0 \tag{7}$$

There exist infinitely many primes P such that $P+2$ is prime. Substituting (7) into (4) we have the best asymptotic pormula

$$\pi_k(N,2)=\left|\{P\le N: P+2=prime\}\right|\sim 2\prod_{P\ge 3}\left(1-\frac{1}{(P-1)^2}\right)\frac{N}{\log^2 N}. \tag{8}$$

Example 2. Let $k=3, P, P+2, P+4$.

From (3) we have

$$\chi(2)=0,\quad \chi(3)=2 \tag{9}$$

From (2) we have

$$J_2(\omega)=0. \tag{10}$$

It has only a solution $P=3$, $P+2=5$, $P+4=7$. One of $P, P+2, P+4$ is always divisible by 3.

Example 3. Let $k=4, P, P+n$, where $n=2,6,8$.

From (3) we have

$$\chi(2)=0, \chi(3)=1, \chi(P)=3 \text{ if } P>3. \tag{11}$$

Substituting (11) into (2) we have

$$J_2(\omega)=\prod_{P\ge 5}(P-4)\neq 0, \tag{12}$$

There exist infinitely many primes P such that each of $P+n$ is prime.

Substituting (12) into (4) we have the best asymptotic formula

$$\pi_4(N,2)=\left|\{P\le N: P+n=prime\}\right|\sim \frac{27}{3}\prod_{P\ge 5}\frac{P^3(P-4)}{(P-1)^4}\frac{N}{\log^4 N} \tag{13}$$

Example 4. Let $k=5$, P, $P+n$, where $n=2,6,8,12$.

From (3) we have

$$\chi(2)=0, \chi(3)=1, \chi(5)=3, \chi(P)=4 \text{ if } P>5 \quad (14)$$

Substituting (14) into (2) we have

$$J_2(\omega)=\prod_{P\ge 7}(P-5)\ne 0 \quad (15)$$

There exist infinitely many primes P such that each of $P+n$ is prime. Substituting (15) into (4) we have the best asymptotic formula

$$\pi_5(N,2)=\left|\{P\le N: P+n=prime\}\right|\sim \frac{15^4}{2^{11}}\prod_{P\ge 7}\frac{(P-5)P^4}{(P-1)^5}\frac{N}{\log^5 N} \quad (16)$$

Example 5. Let $k=6$, P, $P+n$, where $n=2,6,8,12,14$.

From (3) and (2) we have

$$\chi(2)=0,\ \chi(3)=1,\ \chi(5)=4,\quad J_2(5)=0 \quad (17)$$

It has only a solution $P=5$, $P+2=7$, $P+6=11$, $P+8=13$, $P+12=17$, $P+14=19$. One of $P+n$ is always divisible by 5.

(B) The Hardy-Littlewood prime k-tuple conjecture[3-14].

This conjecture is generally believed to be true,but has not been proved(Odlyzko et al.1999).

We define the prime k-tuple equation

$$P, P+n_i \quad (18)$$

where $2|n_i, i=1,\cdots,k-1$.

In 1923 Hardy and Littlewood conjectured the asymptotic formula

$$\pi_k(N,2)=\left|\{P\le N: P+n_i=prime\}\right|\sim H(k)\frac{N}{\log^k N}, \quad (19)$$

where

$$H(k)=\prod_P\left(1-\frac{\nu(P)}{P}\right)\left(1-\frac{1}{P}\right)^{-k} \quad (20)$$

$\nu(P)$ is the number of solutions of congruence

$$\prod_{i=1}^{k-1}(q+n_i)\equiv 0 \pmod P, \quad q=1,\cdots,P. \quad (21)$$

From (21) we have $\nu(P)<P$ and $H(k)\ne 0$. For any prime k-tuple equation there exist infinitely many primes P such that each of $P+n_i$ is prime, which is false.

Conjectore 1. Let $k=2, P, P+2$, twin primes theorem

Frome (21) we have

$$\nu(P)=1 \quad (22)$$

Substituting (22) into (20) we have

$$H(2)=\prod_P\frac{P}{P-1} \quad (23)$$

Substituting (23) into (19) we have the asymptotic formula

$$\pi_2(N,2)=\left|\{P\le N: P+2=prime\}\right|\sim \prod_P\frac{P}{P-1}\frac{N}{\log^2 N} \quad (24)$$

which is false see example 1.

Conjecture 2. Let $k=3, P, P+2, P+4$.

From (21) we have

$$\nu(2)=1,\ \nu(P)=2 \text{ if } P>2 \tag{25}$$

Substituting (25) into (20) we have

$$H(3)=4\prod_{P\ge 3}\frac{P^2(P-2)}{(P-1)^3} \tag{26}$$

Substituting (26) into (19) we have asymptotic formula

$$\pi_3(N,2)=\left|\{P\le N: P+2=prime, P+4=prim\}\right| \sim 4\prod_{P\ge 3}\frac{P^2(P-2)}{(P-1)^3}\frac{N}{\log^3 N} \tag{27}$$

which is false see example 2.

Conjecutre 3. Let $k=4$, $P, P+n$, where $n=2,6,8$.

From (21) we have

$$\nu(2)=1,\ \nu(3)=2,\ \nu(P)=3 \text{ if } P>3 \tag{28}$$

Substituting (28) into (20) we have

$$H(4)=\frac{27}{2}\prod_{P>3}\frac{P^3(P-3)}{(P-1)^4} \tag{29}$$

Substituting (29) into (19) we have asymptotic formula

$$\pi_4(N,2)=\left|\{P\le N: P+n=prime\}\right| \sim \frac{27}{2}\prod_{P>3}\frac{P^3(P-3)}{(P-1)^4}\frac{N}{\log^4 N} \tag{30}$$

Which is false see example 3.

Conjecture 4. Let $k=5,\ P, P+n$, where $n=2,6,8,12$

From (21) we have

$$\nu(2)=1,\ \nu(3)=2,\ \nu(5)=3,\ \nu(P)=4 \text{ if } P>5 \tag{31}$$

Substituting (31) into (20) we have

$$H(5)=\frac{15^4}{4^5}\prod_{P>5}\frac{P^4(P-4)}{(P-1)^5} \tag{32}$$

Substituting (32) into (19) we have asymptotic formula

$$\pi_5(N,2)=\left|\{P\le N: P+n=prime\}\right| \sim \frac{15^4}{4^5}\prod_{P>5}\frac{P^4(P-4)}{(P-1)^5}\frac{N}{\log^5 N} \tag{33}$$

Which is false see example 4.

Conjecutre 5. Let $k=6$, P, $P+n$, where $n=2,6,8,12,14$.

From (21) we have

$$\nu(2)=1,\ \nu(3)=2,\ \nu(5)=4,\ \nu(P)=5 \text{ if } P>5 \tag{34}$$

Substituting (34) into (20) we have

$$H(6)=\frac{15^5}{2^{13}}\prod_{P>5}\frac{(P-5)P^5}{(P-1)^6} \tag{35}$$

Substituting (35) into (19) we have asymptotic formula

$$\pi_6(N,2)=\left|\{P\le N: P+n=prime\}\right| \sim \frac{15^5}{2^{13}}\prod_{P>5}\frac{(P-5)P^5}{(P-1)^6}\frac{N}{\log^6 N} \tag{36}$$

which is false see example 5.

Conclusion. The Hardy-Littlewood prime k-tuple conjecture is false. The tool of addive prime number theory is basically the Hardy-Littlewood prime tuples conjecture. Jiang prime k-tuple theorem can replace Hardy-Littlewood prime k-tuple Conjecture. There cannot be really modern prime theory without Jiang function.

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Riemann Paper (1859) Is False

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Abstract: In 1859 Riemann defined the zeta function $\zeta(s)$. From Gamma function he derived the zeta function with Gamma function $\bar{\zeta}(s)$. $\bar{\zeta}(s)$ and $\zeta(s)$ are the two different functions. It is false that $\bar{\zeta}(s)$ replaces $\zeta(s)$. After him later mathematicians put forward Riemann hypothesis(RH) which is false. The Jiang function $J_n(\omega)$ can replace RH.

AMS mathematics subject classification: Primary 11M26.

In 1859 Riemann defined the Riemann zeta function (RZF)[1]

$$\zeta(s)=\prod_P(1-P^{-s})^{-1}=\sum_{n=1}^{\infty}\frac{1}{n^s}, \tag{1}$$

where $s=\sigma+ti, i=\sqrt{-1}$, σ and t are real, P ranges over all primes. RZF is the function of the complex variable s in $\sigma \geq 0, t \neq 0$, which is absolutely convergent.

In 1896 J. Hadamard and de la Vallee Poussin proved independently [2]

$$\zeta(1+ti) \neq 0. \tag{2}$$

In 1998 Jiang proved [3]

$$\zeta(s) \neq 0, \tag{3}$$

where $0 \leq \sigma \leq 1$.

Riemann paper (1859) is false [1] We define Gamma function [1, 2]

$$\Gamma\left(\frac{s}{2}\right) = \int_0^\infty e^{-t} t^{\frac{s}{2}-1} dt. \tag{4}$$

For $\sigma > 0$. On setting $t = n^2 \pi x$, we observe that

$$\pi^{-\frac{s}{2}} \Gamma\left(\frac{s}{2}\right) n^{-s} = \int_0^\infty x^{\frac{s}{2}-1} e^{-n^2 \pi x} dx. \tag{5}$$

Hence, with some care on exchanging summation and integration, for $\sigma > 1$,

$$\pi^{-\frac{s}{2}} \Gamma\left(\frac{s}{2}\right) \overline{\zeta}(s) = \int_0^\infty x^{\frac{s}{2}-1} \left(\sum_{n=1}^\infty e^{-n^2 \pi x} \right) dx$$

$$= \int_0^\infty x^{\frac{s}{2}-1} \left(\frac{\vartheta(x) - 1}{2} \right) dx, \tag{6}$$

where $\overline{\zeta}(s)$ is called Riemann zeta function with gamma function rather than $\zeta(s)$,

$$\vartheta(x) := \sum_{n=-\infty}^{\infty} e^{-n^2 \pi x}, \tag{7}$$

is the Jacobi theta function. The functional equation for $\vartheta(x)$ is

$$x^{\frac{1}{2}} \vartheta(x) = \vartheta(x^{-1}), \tag{8}$$

and is valid for $x > 0$.

Finally, using the functional equation of $\vartheta(x)$, we obtain

$$\overline{\zeta}(s) = \frac{\pi^{\frac{s}{2}}}{\Gamma\left(\frac{s}{2}\right)} \left\{ \frac{1}{s(s-1)} + \int_1^\infty (x^{\frac{s}{2}-1} + x^{-\frac{s}{2}-\frac{1}{2}}) \cdot (\frac{\vartheta(x)-1}{2}) dx \right\}. \tag{9}$$

From (9) we obtain the functional equation

$$\pi^{-\frac{s}{2}} \Gamma\left(\frac{s}{2}\right) \overline{\zeta}(s) = \pi^{-\frac{1-s}{2}} \Gamma\left(\frac{1-s}{2}\right) \overline{\zeta}(1-s). \tag{10}$$

The function $\overline{\zeta}(s)$ satisfies the following

1. $\overline{\zeta}(s)$ has no zero for $\sigma > 1$;
2. The only pole of $\overline{\zeta}(s)$ is at $s = 1$; it has residue 1 and is simple;
3. $\overline{\zeta}(s)$ has trivial zeros at $s = -2, -4, \ldots$ but $\zeta(s)$ has no zeros;
4. The nontrivial zeros lie inside the region $0 \leq \sigma \leq 1$ and are symmetric about both the vertical line

$\sigma = 1/2$.

The strip $0 \le \sigma \le 1$ is called the critical strip and the vertical line $\sigma = 1/2$ is called the critical line.

Conjecture (The Riemann Hypothesis). All nontrivial zeros of $\overline{\zeta}(s)$ lie on the critical line $\sigma = 1/2$, which is false. [3]

$\overline{\zeta}(s)$ and $\zeta(s)$ are the two different functions. It is false that $\overline{\zeta}(s)$ replaces $\zeta(s)$, Pati proved that is not all complex zeros of $\overline{\zeta}(s)$ lie on the critical line: $\sigma = 1/2$ [4].

Schadeck pointed out that the falsity of RH implies the falsity of RH for finite fields [5, 6]. RH is not directly related to prime theory. Using RH mathematicians prove many prime theorems which is false. In 1994 Jiang discovered Jiang function $J_n(\omega)$ which can replace RH, Riemann zeta function and L-function in view of its proved feature: if $J_n(\omega) \neq 0$ then the prime equation has infinitely many prime solutions; and if $J_n(\omega) = 0$, then the prime equation has finitely many prime solutions. By using $J_n(\omega)$ Jiang proves about 600 prime theorems including the Goldbach's theorem, twin prime theorem and theorem on arithmetic progressions in primes[7,8].

In the same way we have a general formula involving $\overline{\zeta}(s)$

$$\int_0^\infty x^{s-1}\sum_{n=1}^{\infty} F(nx)dx = \sum_{n=1}^{\infty} \int_0^\infty x^{s-1}F(nx)dx$$

$$= \sum_{n=1}^{\infty} \frac{1}{n^s}\int_0^\infty y^{s-1}F(y)dy = \overline{\zeta}(s)\int_0^\infty y^{s-1}F(y)dy, \qquad (11)$$

where $F(y)$ is arbitrary.

From (11) we obtain many zeta functions $\overline{\zeta}(s)$ which are not directly related to the number theory.

The prime distributions are order rather than random. The arithmetic progressions in primes are not directly related to ergodic theory ,harmonic analysis, discrete geometry, and combinatories. Using the ergodic theory Green and Tao prove that there exist infinitely many arithmetic progressions of length k consisting only of primes which is false [9, 10, 11]. Fermat's last theorem (FLT) is not directly related to elliptic curves. In 1994 using elliptic curves Wiles proved FLT which is false [12]. There are Pythagorean theorem and FLT in the complex hyperbolic functions and complex trigonometric functions. In 1991 without using any number theory Jiang proved FLT which is Fermat's marvelous proof[7, 13].

Primes Represented by $P_1^n + mP_2^n$ **[14]**

(1) Let $n = 3$ and $m = 2$. We have

$P_3 = P_1^3 + 2P_2^3$.

We have Jiang function

$$J_3(\omega) = \prod_{3 \le P} (P^2 - 3P + 3 - \chi(P)) \neq 0,$$

Where $\chi(P) = 2P - 1$ if $2^{\frac{P-1}{3}} \equiv 1 \pmod{P}$; $\chi(P) = -P + 2$ if $2^{\frac{P-1}{3}} \not\equiv 1 \pmod{P}$; $\chi(P) = 1$ otherwise.

Since $J_n(\omega) \neq 0$, there exist infinitely many primes P_1 and P_2 such that P_3 is a prime.

We have the best asymptotic formula

$$\pi_2(N,3) = \left|\{P_1, P_2 : P_1, P_2 \le N, P_1^3 + 2P_2^3 = P_3 \text{ prime}\}\right|$$

$$\sim \frac{J_3(\omega)\omega}{6\Phi^3(\omega)}\frac{N^2}{\log^3 N}=\frac{1}{3}\prod_{3\le P}\frac{P(P^2-3P+3-\chi(P))}{(P-1)^3}\frac{N^2}{\log^3 N}.$$

where $\omega=\prod_{2\le P}P$ is called primorial, $\Phi(\omega)=\prod_{2\le P}(P-1)$.

It is the simplest theorem which is called the Heath-Brown problem [15].

（2）Let $n=P_0$ be an odd prime, $2|m$ and $m\neq \pm b^{P_0}$.

we have

$P_3=P_1^{P_0}+mP_2^{P_0}$

We have

$$J_3(\omega)=\prod_{3\le P}(P^2-3P+3-\chi(P))\neq 0,$$

where $\chi(P)=-P+2$ if $P|m$; $\chi(P)=(P_0-1)P-P_0+2$ if $m^{\frac{P-1}{P_0}}\equiv 1 \pmod P$;

$\chi(P)=-P+2$ if $m^{\frac{P-1}{P_0}}\not\equiv 1 \pmod P$; $\chi(P)=1$ otherwise.

Since $J_n(\omega)\neq 0$, there exist infinitely many primes P_1 and P_2 such that P_3 is a prime.

We have

$$\pi_2(N,3)\sim \frac{J_3(\omega)\omega}{2P_0\Phi^3(\omega)}\frac{N^2}{\log^3 N}.$$

The Polynomial $P_1^n+(P_2+1)^2$ Captures Its Primes [14]

（1）Let $n=4$, We have

$P_3=P_1^4+(P_2+1)^2$,

We have Jiang function

$$J_3(\omega)=\prod_{3\le P}(P^2-3P+3-\chi(P))\neq 0,$$

Where $\chi(P)=P$ if $P\equiv 1 \pmod 4$; $\chi(P)=P-4$ if $P\equiv 1$（mod 8）; $\chi(P)=-P+2$ otherwise.

Since $J_n(\omega)\neq 0$, there exist infinitely many primes P_1 and P_2 such that P_3 is a prime.

We have the best asymptotic formula

$$\pi_2(N,3)=\left|\{P_1,P_2:P_1,P_2\le N, P_1^4+(P_2+1)^2=P_3\text{ prime}\}\right|$$

$$\sim \frac{J_3(\omega)\omega}{8\Phi^3(\omega)}\frac{N^2}{\log^3 N}.$$

It is the simplest theorem which is called Friedlander-Iwaniec problem [16].

（2）Let $n=4m$, We have

$P_3=P_1^{4m}+(P_2+1)^2$,

where $m=1,2,3,\cdots$.

We have Jiang function

$$J_3(\omega)=\prod_{3\le P\le P_i}(P^2-3P+3-\chi(P))\neq 0,$$

where $\chi(P)=P-4m$ if $8m|(P-1)$; $\chi(P)=P-4$ if $8|(P-1)$; $\chi(P)=P$ if $4|(P-1)$;

$\chi(P) = -P + 2$ otherwise.

Since $J_3(\omega) \neq 0$, there exist infinitely many primes P_1 and P_2 such that P_3 is a prime. It is a generalization of Euler proof for the existence of infinitely many primes.

We have the best asymptotic formula

$$\pi_2(N,3) \sim \frac{J_3(\omega)\omega}{8m\Phi^3(\omega)} \frac{N^2}{\log^3 N}.$$

（3）Let $n = 2b$. We have

$$P_3 = P_1^{2b} + (P_2 + 1)^2,$$

where b is an odd.

We have Jiang function

$$J_3(\omega) = \prod_{3 \le P} (P^2 - 3P + 3 - \chi(P)) \neq 0,$$

Where $\chi(P) = P - 2b$ if $4b|(P-1)$; $\chi(P) = P - 2$ if $4|(P-1)$; $\chi(P) = -P + 2$ otherwise.

We have the best asymptotic formula

$$\pi_2(N,3) \sim \frac{J_3(\omega)\omega}{4b\Phi^3(\omega)} \frac{N^2}{\log^3 N}.$$

（4）Let $n = P_0$, We have

$$P_3 = P_1^{P_0} + (P_2 + 1)^2.$$

where P_0 is an odd. Prime.

we have Jiang function

$$J_3(\omega) = \prod_{3 \le P} (P^2 - 3P + 3 - \chi(P)) \neq 0,$$

where $\chi(P) = P_0 + 1$ if $P_0|(P-1)$; $\chi(P) = 0$ otherwise.

Since $J_3(\omega) \neq 0$, there exist infinitely many primes P_1 and P_2 such that P_3 is also a prime.

We have the best asymptotic formula

$$\pi_2(N,3) \sim \frac{J_3(\omega)\omega}{2P_0\Phi^3(\omega)} \frac{N^2}{\log^3 N}.$$

The Jiang function $J_n(\omega)$ is closely related to the prime distribution. Using $J_n(\omega)$ we are able to tackle almost all prime problems in the prime distributions.

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Automorphic Functions And Fermat's Last Theorem(1)

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Abstract: In 1637 Fermat wrote: "*It is impossible to separate a cube into two cubes, or a biquadrate into two biquadrates, or in general any power higher than the second into powers of like degree: I have discovered a truly marvelous proof, which this margin is too small to contain.*"

This means: $x^n+y^n=z^n(n>2)$ has no integer solutions, all different from 0(i.e., it has only the trivial solution, where one of the integers is equal to 0). It has been called Fermat's last theorem (FLT). It suffices to prove FLT for exponent 4. and every prime exponent P. Fermat proved FLT for exponent 4. Euler proved FLT for exponent 3.

In this paper using automorphic functions we prove FLT for exponents $3P$ and P, where P is an odd prime. The proof of FLT must be direct. But indirect proof of FLT is disbelieving.

In 1974 Jiang found out Euler formula of the cyclotomic real numbers in the cyclotomic fields

$$\exp\left(\sum_{i=1}^{n-1} t_i J^i\right)=\sum_{i=1}^{n} S_i J^{i-1} \qquad (1)$$

where J denotes a n th root of unity, $J^n=1$, n is an odd number, t_i are the real numbers.

S_i is called the automorphic functions(complex hyperbolic functions) of order n with $n-1$ variables [1-7].

$$S_i=\frac{1}{n}\left[e^A+2\sum_{j=1}^{\frac{n-1}{2}}(-1)^{(i-1)j}e^{B_j}\cos\left(\theta_j+(-1)^j\frac{(i-1)j\pi}{n}\right)\right] \qquad (2)$$

where i=1,2,…,n;

$$A=\sum_{\alpha-1}^{n-1} t_\alpha, \qquad B_j=\sum_{\alpha=1}^{n-1} t_\alpha(-1)^{\alpha j}\cos\frac{\alpha j\pi}{n},$$

$$\theta_j = (-1)^{j+1}\sum_{\alpha=1}^{n-1} t_\alpha (-1)^{\alpha j} \sin\frac{\alpha j\pi}{n}, \qquad A + 2\sum_{j=1}^{\frac{n-1}{2}} B_j = 0 \tag{3}$$

(2) may be written in the matrix form

$$\begin{bmatrix} S_1 \\ S_2 \\ S_3 \\ \cdots \\ S_n \end{bmatrix} = \frac{1}{n}\begin{bmatrix} 1 & 1 & 0 & \cdots & 0 \\ 1 & -\cos\frac{\pi}{n} & -\sin\frac{\pi}{n} & \cdots & -\sin\frac{(n-1)\pi}{2n} \\ 1 & \cos\frac{2\pi}{n} & \sin\frac{2\pi}{n} & \cdots & -\sin\frac{(n-1)\pi}{n} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ 1 & \cos\frac{(n-1)\pi}{n} & \sin\frac{(n-1)\pi}{n} & \cdots & -\sin\frac{(n-1)^2\pi}{2n} \end{bmatrix} \begin{bmatrix} e^A \\ 2e^{B_1}\cos\theta_1 \\ 2e^{B_1}\sin\theta_1 \\ \cdots \\ 2\exp B_{\frac{n-1}{2}} \sin\theta_{\frac{n-1}{2}} \end{bmatrix} \tag{4}$$

where $(n-1)/2$ is an even number.

From (4) we have its inverse transformation

$$\begin{bmatrix} e^A \\ e^{B_1}\cos\theta_1 \\ e^{B_1}\sin\theta_1 \\ \cdots \\ \exp(B_{\frac{n-1}{2}})\sin(\theta_{\frac{n-1}{2}}) \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 & \cdots & 1 \\ 1 & -\cos\frac{\pi}{n} & \cos\frac{2\pi}{n} & \cdots & \cos\frac{(n-1)\pi}{n} \\ 0 & -\sin\frac{\pi}{n} & \sin\frac{2\pi}{n} & \cdots & \sin\frac{(n-1)\pi}{n} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ 0 & -\sin\frac{(n-1)\pi}{2n} & -\sin\frac{(n-1)\pi}{n} & \cdots & -\sin\frac{(n-1)^2\pi}{2n} \end{bmatrix} \begin{bmatrix} S_1 \\ S_2 \\ S_3 \\ \cdots \\ S_n \end{bmatrix} \tag{5}$$

From (5) we have

$$e^A = \sum_{i=1}^{n} S_i, \qquad e^{B_j}\cos\theta_j = S_1 + \sum_{i=1}^{n-1} S_{1+i}(-1)^{ij}\cos\frac{ij\pi}{n}$$

$$e^{B_j}\sin\theta_j = (-1)^{j+1}\sum_{i=1}^{n-1} S_{1+i}(-1)^{ij}\sin\frac{ij\pi}{n}, \tag{6}$$

In (3) and (6) t_i and S_i have the same formulas. (4) and (5) are the most critical formulas of proofs for FLT. Using (4) and (5) in 1991 Jiang invented that every factor of exponent n has the Fermat equation and proved FLT [1-7] Substituting (4) into (5) we prove (5).

$$\begin{bmatrix} e^{A} \\ e^{B_1}\cos\theta_1 \\ e^{B_1}\sin\theta_1 \\ \cdots \\ \exp(B_{\frac{n-1}{2}})\sin(\theta_{\frac{n-1}{2}}) \end{bmatrix} = \frac{1}{n}\begin{bmatrix} 1 & 1 & 1 & \cdots & 1 \\ 1 & -\cos\frac{\pi}{n} & \cos\frac{2\pi}{n} & \cdots & \cos\frac{(n-1)\pi}{n} \\ 0 & -\sin\frac{\pi}{n} & \sin\frac{2\pi}{n} & \cdots & \sin\frac{(n-1)\pi}{n} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ 0 & -\sin\frac{(n-1)\pi}{2n} & -\sin\frac{(n-1)\pi}{n} & \cdots & -\sin\frac{(n-1)^2\pi}{2n} \end{bmatrix} \times$$

$$\begin{bmatrix} 1 & 1 & 0 & \cdots & 0 \\ 1 & -\cos\frac{\pi}{n} & -\sin\frac{\pi}{n} & \cdots & -\sin\frac{(n-1)\pi}{2n} \\ 1 & \cos\frac{2\pi}{n} & \sin\frac{2\pi}{n} & \cdots & -\sin\frac{(n-1)\pi}{n} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ 1 & \cos\frac{(n-1)\pi}{n} & \sin\frac{(n-1)\pi}{n} & \cdots & -\sin\frac{(n-1)^2\pi}{2n} \end{bmatrix}\begin{bmatrix} e^{A} \\ 2e^{B_1}\cos\theta_1 \\ 2e^{B_1}\sin\theta_1 \\ \cdots \\ 2\exp(B_{\frac{n-1}{2}})\sin(\theta_{\frac{n-1}{2}}) \end{bmatrix}$$

$$=\frac{1}{n}\begin{bmatrix} n & 0 & 0 & \cdots & 0 \\ 0 & \frac{n}{2} & 0 & \cdots & 0 \\ 0 & 0 & \frac{n}{2} & \cdots & 0 \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ 0 & 0 & 0 & \cdots & \frac{n}{2} \end{bmatrix}\begin{bmatrix} e^{A} \\ 2e^{B_1}\cos\theta_1 \\ 2e^{B_1}\sin\theta_1 \\ \cdots \\ 2\exp(B_{\frac{n-1}{2}})\sin(\theta_{\frac{n-1}{2}}) \end{bmatrix}$$

$$=\begin{bmatrix} e^{A} \\ e^{B_1}\cos\theta_1 \\ e^{B_1}\sin\theta_1 \\ \cdots \\ \exp(B_{\frac{n-1}{2}})\sin(\theta_{\frac{n-1}{2}}) \end{bmatrix}, \qquad (7)$$

where $1+\sum_{j=1}^{n-1}(\cos\frac{j\pi}{n})^2=\frac{n}{2}$, $\sum_{j=1}^{n-1}(\sin\frac{j\pi}{n})^2=\frac{n}{2}$.

From (3) we have

$$\exp(A+2\sum_{j=1}^{\frac{n-1}{2}}B_j)=1 . \qquad (8)$$

From (6) we have

$$\exp(A+2\sum_{j=1}^{\frac{n-1}{2}}B_j)=\begin{vmatrix} S_1 & S_n & \cdots & S_2 \\ S_2 & S_1 & \cdots & S_3 \\ \cdots & \cdots & \cdots & \cdots \\ S_n & S_{n-1} & \cdots & S_1 \end{vmatrix}=\begin{vmatrix} S_1 & (S_1)_1 & \cdots & (S_1)_{n-1} \\ S_2 & (S_2)_1 & \cdots & (S_2)_{n-1} \\ \cdots & \cdots & \cdots & \cdots \\ S_n & (S_n)_1 & \cdots & (S_n)_{n-1} \end{vmatrix}, \quad (9)$$

where $(S_i)_j=\frac{\partial S_i}{\partial t_j}$ [7].

From (8) and (9) we have the circulant determinant

$$\exp(A+2\sum_{j=1}^{\frac{n-1}{2}}B_j)=\begin{vmatrix} S_1 & S_n & \cdots & S_2 \\ S_2 & S_1 & \cdots & S_3 \\ \cdots & \cdots & \cdots & \vdots \\ S_n & S_{n-1} & \cdots & S_1 \end{vmatrix}=1 \quad (10)$$

If $S_i \neq 0$, where $i=1,2,\cdots,n$, then (10) has infinitely many rational solutions.

Assume $S_1 \neq 0$, $S_2 \neq 0$, $S_i=0$ where $i=3,4,\cdots,n.$ $S_i=0$ are $n-2$ indeterminate equations with $n-1$ variables. From (6) we have

$$e^A=S_1+S_2,\quad e^{2B_j}=S_1^2+S_2^2+2S_1S_2(-1)^j\cos\frac{j\pi}{n}. \quad (11)$$

From (10) and (11) we have the Fermat equation

$$\exp(A+2\sum_{j=1}^{\frac{n-1}{2}}B_j)=(S_1+S_2)\prod_{j=1}^{\frac{n-1}{2}}(S_1^2+S_2^2+2S_1S_2(-1)^j\cos\frac{j\pi}{n})=S_1^n+S_2^n=1 \quad (12)$$

Example[1]. Let $n=15$. From (3) we have

$$A=(t_1+t_{14})+(t_2+t_{13})+(t_3+t_{12})+(t_4+t_{11})+(t_5+t_{10})+(t_6+t_9)+(t_7+t_8)$$

$$B_1=-(t_1+t_{14})\cos\frac{\pi}{15}+(t_2+t_{13})\cos\frac{2\pi}{15}-(t_3+t_{12})\cos\frac{3\pi}{15}+(t_4+t_{11})\cos\frac{4\pi}{15}$$
$$-(t_5+t_{10})\cos\frac{5\pi}{15}+(t_6+t_9)\cos\frac{6\pi}{15}-(t_7+t_8)\cos\frac{7\pi}{15},$$

$$B_2=(t_1+t_{14})\cos\frac{2\pi}{15}+(t_2+t_{13})\cos\frac{4\pi}{15}+(t_3+t_{12})\cos\frac{6\pi}{15}+(t_4+t_{11})\cos\frac{8\pi}{15}$$
$$+(t_5+t_{10})\cos\frac{10\pi}{15}+(t_6+t_9)\cos\frac{12\pi}{15}+(t_7+t_8)\cos\frac{14\pi}{15},$$

$$B_3=-(t_1+t_{14})\cos\frac{3\pi}{15}+(t_2+t_{13})\cos\frac{6\pi}{15}-(t_3+t_{12})\cos\frac{9\pi}{15}+(t_4+t_{11})\cos\frac{12\pi}{15}$$
$$-(t_5+t_{10})\cos\frac{15\pi}{15}+(t_6+t_9)\cos\frac{18\pi}{15}-(t_7+t_8)\cos\frac{21\pi}{15},$$

$$B_4=(t_1+t_{14})\cos\frac{4\pi}{15}+(t_2+t_{13})\cos\frac{8\pi}{15}+(t_3+t_{12})\cos\frac{12\pi}{15}+(t_4+t_{11})\cos\frac{16\pi}{15}$$
$$+(t_5+t_{10})\cos\frac{20\pi}{15}+(t_6+t_9)\cos\frac{24\pi}{15}+(t_7+t_8)\cos\frac{28\pi}{15},$$

$$B_5 = -(t_1+t_{14})\cos\frac{5\pi}{15} + (t_2+t_{13})\cos\frac{10\pi}{15} - (t_3+t_{12})\cos\frac{15\pi}{15} + (t_4+t_{11})\cos\frac{20\pi}{15}$$
$$-(t_5+t_{10})\cos\frac{25\pi}{15} + (t_6+t_9)\cos\frac{30\pi}{15} - (t_7+t_8)\cos\frac{35\pi}{15},$$
$$B_6 = (t_1+t_{14})\cos\frac{6\pi}{15} + (t_2+t_{13})\cos\frac{12\pi}{15} + (t_3+t_{12})\cos\frac{18\pi}{15} + (t_4+t_{11})\cos\frac{24\pi}{15}$$
$$+(t_5+t_{10})\cos\frac{30\pi}{15} + (t_6+t_9)\cos\frac{36\pi}{15} + (t_7+t_8)\cos\frac{42\pi}{15},$$
$$B_7 = -(t_1+t_{14})\cos\frac{7\pi}{15} + (t_2+t_{13})\cos\frac{14\pi}{15} - (t_3+t_{12})\cos\frac{21\pi}{15} + (t_4+t_{11})\cos\frac{28\pi}{15}$$
$$-(t_5+t_{10})\cos\frac{35\pi}{15} + (t_6+t_9)\cos\frac{42\pi}{15} - (t_7+t_8)\cos\frac{49\pi}{15},$$
$$A + 2\sum_{j=1}^{7} B_j = 0, \qquad A + 2B_3 + 2B_6 = 5(t_5+t_{10}). \tag{13}$$

Form (12) we have the Fermat equation
$$\exp(A + 2\sum_{j=1}^{7} B_j) = S_1^{15} + S_2^{15} = (S_1^5)^3 + (S_2^5)^3 = 1. \tag{14}$$

From (13) we have
$$\exp(A + 2B_3 + 2B_6) = [\exp(t_5+t_{10})]^5. \tag{15}$$

From (11) we have
$$\exp(A + 2B_3 + 2B_6) = S_1^5 + S_2^5. \tag{16}$$

From (15) and (16) we have the Fermat equation
$$\exp(A + 2B_3 + 2B_6) = S_1^5 + S_2^5 = [\exp(t_5+t_{10})]^5. \tag{17}$$

Euler proved that (14) has no rational solutions for exponent 3[8]. Therefore we prove that (17) has no rational solutions for exponent 5[1].

Theorem 1. [1-7]. Let $n = 3P$,where $P > 3$ is odd prime. From (12) we have the Fermat's equation
$$\exp(A + 2\sum_{j=1}^{3P-1} B_j) = S_1^{3P} + S_2^{3P} = (S_1^P)^3 + (S_2^P)^3 = 1. \tag{18}$$

From (3) we have
$$\exp(A + 2\sum_{j=1}^{\frac{P-1}{2}} B_{3j}) = [\exp(t_P + t_{2P})]^P. \tag{19}$$

From (11) we have
$$\exp(A + 2\sum_{j=1}^{\frac{P-1}{2}} B_{3j}) = S_1^P + S_2^P. \tag{20}$$

From (19) and (20) we have the Fermat equation
$$\exp(A + 2\sum_{j=1}^{\frac{P-1}{2}} B_{3j}) = S_1^P + S_2^P = [\exp(t_P + t_{2P})]^P. \tag{21}$$

Euler proved that (18) has no rational solutions for exponent 3[8]. Therefore we prove that (21) has no rational solutions for $P>3$ [1, 3-7].

Theorem 2. In 1847 Kummer write the Fermat's equation

$$x^P+y^P=z^P \tag{22}$$

in the form

$$(x+y)(x+ry)(x+r^2y)\cdots(x+r^{P-1}y)=z^P \tag{23}$$

where P is odd prime, $r=\cos\frac{2\pi}{P}+i\sin\frac{2\pi}{P}$.

Kummer assume the divisor of each factor is a P th power. Kummer proved FLT for prime exponent p<100 [8]..

We consider the Fermat's equation

$$x^{3P}+y^{3P}=z^{3P} \tag{24}$$

we rewrite (24)

$$(x^P)^3+(y^P)^3=(z^P)^3 \tag{25}$$

From (24) we have

$$(x^P+y^P)(x^P+ry^P)(x^P+r^2y^P)=z^{3P} \tag{26}$$

where $r=\cos\frac{2\pi}{3}+i\sin\frac{2\pi}{3}$

We assume the divisor of each factor is a P th power.

Let $S_1=\frac{x}{z}$, $S_2=\frac{y}{z}$. From (20) and (26) we have the Fermat's equation

$$x^P+y^P=[z\times\exp(t_P+t_{2P})]^P \tag{27}$$

Euler proved that (25) has no integer solutions for exponent 3[8]. Therefore we prove that (27) has no integer solutions for prime exponent P.

Fermat Theorem. It suffices to prove FLT for exponent 4. We rewrite (24)

$$(x^3)^P+(y^3)^P=(z^3)^P \tag{28}$$

Euler proved that（25）has no integer solutions for exponent 3 [8]. Therefore we prove that (28) has no integer solutions for all prime exponent P [1-7].

We consider Fermat equation

$$x^{4P}+y^{4P}=z^{4P} \tag{29}$$

We rewrite (29)

$$(x^P)^4+((y^P)^4=(z^P)^4 \tag{30}$$

$$(x^4)^P+(y^4)^P=(z^4)^P \tag{31}$$

Fermat proved that (30) has no integer solutions for exponent 4 [8]. Therefore we prove that (31) has no integer solutions for all prime exponent P [2,5,7].This is the proof that Fermat thought to have had.

Remark. It suffices to prove FLT for exponent 4. Let $n=4P$, where P is an odd prime. We have the Fermat's equation for exponent $4P$ and the Fermat's equation for exponent P [2,5,7]. This is the proof that Fermat thought to have had. In complex hyperbolic functions let exponent n be $n=\Pi P$, $n=2\Pi P$ and $n=4\Pi P$. Every factor of exponent n has the Fermat's equation [1-7]. In complex trigonometric functions let exponent n be $n=\Pi P$, $n=2\Pi P$ and $n=4\Pi P$. Every factor of exponent n has Fermat's equation [1-7].Using modular elliptic curves Wiles and Taylor prove FLT[9,10].This is not the proof that Fermat thought to have had. The classical theory of automorphic functions, created by Klein and Poincare, was concerned with the study of analytic functions in the unit circle that are invariant under a discrete group of transformations. Automorphic functions are generalization of the trigonometric ,hyperbolic,elliptic, and certain other functions of elementary analysis. The complex trigonometric functions and complex hyperbolic functions have a wide application in mathematics and physics.

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An equation that changed the universe: $\overline{F} = -mc^2/R$

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Abstract: This paper explains the behavior of the entire universe from the smallest to the largest scales, found an equation that changed the universe: $\overline{F} = -mc^2/R$, established the expansion theory of the universe without dark matter and dark energy,and obtained the expansion acceleration: $g_e = u^4/C^2R$. It shows that gravity is action-at-a-distance and that a gravitational wave is unobservable. Thus,a new universe model is suggested that the universe has a centre consisting of the tachyonic matter.

Keywords: The universe equation; the universe expansion theory

Introduction

According to Jiang idea[1],in the Universe there are two kinds of matter: (1) observable subluminal matter called tardyons(locality) and (2) unobservable superluminal matter called tachyons(nonlocality). They coexist in motion. What are tachyons? Historically tachyons are described as particles which travel faster than light. Describing tachyon as a particle with an imaginary mass is wrong[2]. In our theory[1] tachyon has no rest time and no rest mass. It is unobservable. Tachyons can be converted into tardyons and vice versa. Tardyonic rotating motion produces the centrifugal force but tachyonic rotating motion produces the centripetal force which is force of gravity. Using the coexistence principle of tardyons and tachyons it follows that

an equation that changed the universe: $\overline{F} = -mc^2 / R$. We establish the expansion theory of a universe without dark matter and dark energy. We obtain the expansion acceleration:
$g_e = u^4 / C^2 R$. We unify the gravitational theory and particle theory and explain the behavior of the entire universe from the smallest to the largest scales. In this universe there are no quarks ， no Higgs particles ,and no black holes. The geometrization of all physical fields is a mathematical guess which has no basis in physical reality, because it does not consider and understand the tachyonic theory. It shows that gravity is action-at-a-distance and that a gravitational wave is unobservable.We suggest a new universe model that the universe has a centre consisting of the tachyonic matter.

An equation that Changed the Universe: $\overline{F} = -mc^2 / R$

We first define two-dimensional space and time ring[1]

$$z = \begin{pmatrix} ct & x \\ x & ct \end{pmatrix} = ct + jx, \tag{1}$$

where x and t are the tardyonic space and time coordinates, c is light velocity in vacuum, $j = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$.

(1) can be written in Euler form

$$z = ct_0 e^{j\theta} = ct_0(\operatorname{ch}\theta + j\operatorname{sh}\theta), \tag{2}$$

where ct_0 is the tardyonic invariance, and θ is the tardyonic hyperbolical angle.

From (1) and (2) it follows

$$ct = ct_0 \operatorname{ch}\theta, \quad x = ct_0 \operatorname{sh}\theta \tag{3}$$

$$ct_0 = \sqrt{(ct)^2 - x^2}. \tag{4}$$

From (3) it follows

$$\theta = \operatorname{th}^{-1}\frac{x}{ct} = \operatorname{th}^{-1}\frac{u}{c}. \tag{5}$$

where $c \geq u$ is the tardyonic velocity, $\operatorname{ch}\theta = \frac{1}{\sqrt{1-(u/c)^2}}$ and $\operatorname{sh}\theta = \frac{u/c}{\sqrt{1-(u/c)^2}}$.

The z denotes space-time of the tardyonic theory.

Using the morphism $j: z \to jz$, it follows

$$jz = \overline{x} + jc\overline{t} = \overline{x}_0 e^{j\overline{\theta}} = \overline{x}_0(\operatorname{ch}\overline{\theta} + j\operatorname{sh}\overline{\theta}), \tag{6}$$

where $\overline{x}$ and $\overline{t}$ are the tachyonic space and time coordinates, $\overline{x}_0$ is tachyonic invariance, $\overline{\theta}$ tachyonic hyperbolical angle.

From (6) it follows

$$\overline{x} = \overline{x}_0 \operatorname{ch}\overline{\theta}, \quad c\overline{t} = \overline{x}_0 \operatorname{sh}\overline{\theta}. \tag{7}$$

$$\overline{x}_0 = \sqrt{(\overline{x})^2 - (c\overline{t})^2}. \tag{8}$$

From (7) it follows

$$\overline{\theta} = \operatorname{th}^{-1}\frac{c\overline{t}}{\overline{x}} = \operatorname{th}^{-1}\frac{c}{\overline{u}}. \tag{9}$$

where $\bar{u} \geq c$ is the tachyonic velocity, $\text{ch}\,\bar{\theta} = \frac{1}{\sqrt{1-(c/\bar{u})^2}}$ and
$$\text{sh}\,\bar{\theta} = \frac{c/\bar{u}}{\sqrt{1-(c/\bar{u})^2}}.$$

The jz denotes space-time of the tachyonic theory. Both the z and the jz form the entire world but the jz world is unexploited and unstudied.

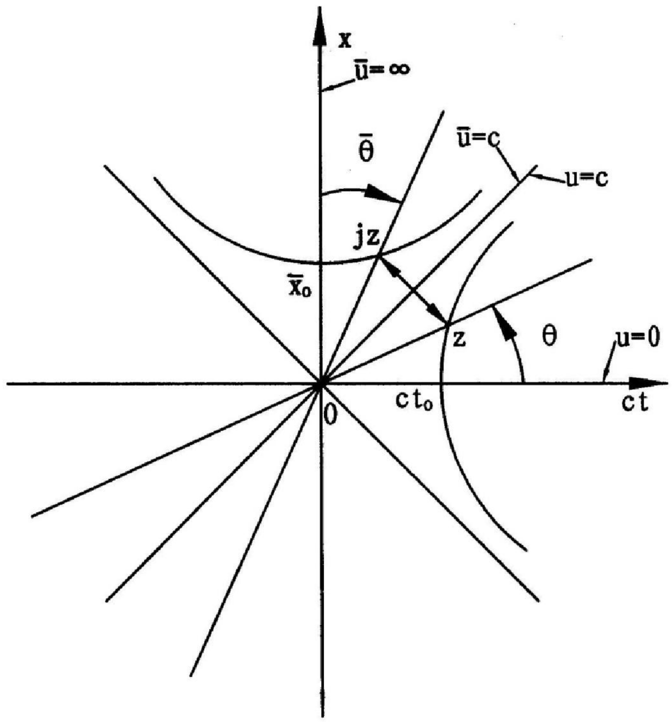

Fig. 1. Minkowskian spacetime diagram

Figure 1 shows the formulas (1)-(9). $j: z \to jz$ shows that a tardyon can be converted into a tachyon, but $j: jz \to z$ shows that a tachyon can be converted into a tardyon. $u = 0 \to u = c$ is a tardyonic velocity, but $\bar{u} = \infty \to \bar{u} = c$ is a tachyonic velocity, which coexist. At the $x-$axis we define the tachyonic string length
$$\bar{x}_0 = \lim_{\substack{\bar{u}\to\infty \\ t\to 0}} \bar{u}t = \text{constant}. \tag{10}$$

where t is the rest time.

Since at rest the tachyonic string time $t = 0$ and $\bar{u} = \infty$, it shows that the tachyon is a string which is unobservable. In the rest system the tachyonic string motion is an action-at-a distance motion. This simple thought made a deep impression on me. It impelled me toward the only string theory[1]. Other string theories all are guesses.

Assume $\theta = \bar{\theta}$, from (5) and (9) it follows that the tardyonic and tachyonic coexistence principle[1,3,4]
$$u\bar{u} = c^2. \tag{11}$$

Differentiating (11) by the time, it follows
$$\frac{d\bar{u}}{dt} = -\left(\frac{c}{u}\right)^2 \frac{du}{dt}. \tag{12}$$

$\frac{du}{dt}$ and $\frac{d\overline{u}}{dt}$ can coexist in motion, but their directions are opposite.

We study the tardyonic and tachyonic rotating motions. The tardyonic rotation produces centripetal acceleration

$$\frac{du}{dt} = \frac{u^2}{R}, \qquad (13)$$

where R is rotating radius.

Substituting (13) into (12) it follows that the tachyonic rotating produces centrifugal acceleration

$$\frac{d\overline{u}}{dt} = -\frac{c^2}{R}. \qquad (14)$$

It is independent of tachyonic velocity $\overline{u}$, only inversely proportional to radius R.

(13) and (14) are dual formulas, which have the same form. It is unique and perfect. From (13) it follows the tardyonic centrifugal force

$$F = \frac{Mu^2}{R}, \qquad (15)$$

where M is the inertial mass.

From (14) it follows the tachyonic centripetal force, that is gravity

$$\overline{F} = -\frac{mc^2}{R}, \qquad (16)$$

where m is the gravitational mass converted into by tachyonic mass $\overline{m}$ which is unobservable but m is observable.

Whether $u = 0$ or $u \neq 0$, all matter produces gravity. (15) and (16) are dual formulas, which have the same form. (16) is a new gravitational formula called an equation that changed the universe. This simple thought made a deep impression on me. It impelled me toward a theory of gravitation. It has simplicity, elegance and mathematical beauty. It is the foundations of gravitational theory and cosmology. In the universe there are two main forces: the tardyonic centrifugal force (15) and tachyonic centripetal force (16) which make structure formation of the universe.

Now we study the freely falling body. Tachyonic mass $\overline{m}$ can be converted into tardyonic mass m, which acts on the freely falling body and produces the gravitational force

$$\overline{F} = -\frac{mc^2}{R}, \qquad (17)$$

where R is the Earth radius.

We have the equation of motion

$$\frac{mc^2}{R} = Mg, \qquad (18)$$

where g is gravitational acceleration, M is mass of freely falling body.

From (18) it follows the gravitational coefficient

$$\eta = \frac{m}{M} = \frac{Rg}{c^2} = 6.9 \times 10^{-10}. \qquad (19)$$

Eötvös(1922) experiment $\eta \sim 5 \cdot 10^{-9}$ and Dicke experiment $\eta \sim 10^{-11}$ [5]. Since the gravitational mass m can be transformed into the rest mass in freely falling body, we define Einstein's gravitational mass $M_g = M_i + m$ and inertial mass $M_i = M$ [6]. It follows

$$M_g > M_i. \qquad (20)$$

Therefore it shows that the principle of equivalence is nonexistent.

The expansion theory of the universe without dark matter and dark energy

The Big Bang threw all the matter in the universe outwards. Both Newton's and Einstein's theories of gravity predict that the expansion must be slowing down to some degree: the mutual gravitational attraction of all the matter in all the galaxies should be pulling them inwards. But measurements of distant supernovae show just the opposite[7] . All the matter in the universe appears to be accelerating outwards. Its speed is picking up. There is no agreement yet about how to explain these mysterious observations. Now we explain our accelerating universe.

Using (16) we study the expansion theory of the Universe. Figure 2 shows a expansion model of the Universe. The rotation ω_1 of body A emits tachyonic flow, which forms the tachyonic field. Tachyonic mass $\overline{m}$ acts on body B, which produces its rotation ω_2, revolution u and gravitational force

$$\overline{F}_1 = -\frac{mc^2}{R}, \qquad (21)$$

where R denotes the distance between body A and body B, m is gravitational mass converted into by tachyonic mass $\overline{m}$ which is unobservable but m is observable.

The revolution of the body B around body A produces the centrifugal force

$$F_1 = \frac{M_B u^2}{R}, \qquad (22)$$

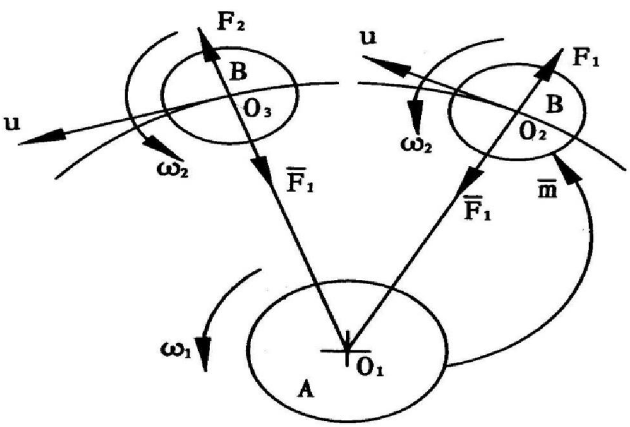

Fig. 2. A expansion model of the Universe

where M_B is the inertial mass of body B, u is the orbital velocity of body B.

At the O_2 point we assume

$$F_1 + \overline{F}_1 = 0. \qquad (23)$$

From (23) it follows that the coexistence of the gravitational force and centrifugal force.

From (21)-(23) it follows the gravitational coefficient

$$\eta = \frac{m}{M_B} = \left(\frac{u}{c}\right)^2. \qquad (24)$$

At the O_3 point the tachyonic mass $\overline{m}$ can be converted into the rest mass m in body B, it follows

$$F_2 = \frac{M_B u^2}{R} + \frac{mu^2}{R}. \qquad (25)$$

Since $F_2 + \overline{F}_1 > 0$, centrifugal force F_2 is greater than gravitational force $\overline{F}_1$, then the body B expands outwards and its mass increases. This is a expansion mechanism of the Universe. From (21)-(23) we have

$$F_2 + \overline{F}_1 = \frac{mu^2}{R} = M_B g_e \quad (26)$$

From (26) we obtain the expansion acceleration

$$g_e = mu^2 / M_B R \quad (27)$$

Substuting (24) in (27) we obtain

$$g_e = \frac{u^4}{C^2 R} \quad (28)$$

If body A is the Earth, then body B is the Moon; if body A is the Sun, then body B is the Earth; $\cdots$. It can explain our accelerating universe. In this model universe there are no dark matter and no dark energy. This simple thought made a deep impression on me. It impelled me toward a expansion theory of the universe without dark matter and dark energy.

If the body A is the Sun and body B is the planet. We calculate the gravitational coefficients η as shown in table 1.

Table 1:Values of the gravitational coefficients η

Planet	u (km/sec)	$\eta(10^{-10})$
Mercury	47.89	255.2
Venus	35.03	136.5
Earth	29.79	98.7
Mars	24.13	64.8
Jupiter	13.06	19.0
Saturn	9.64	10.3
Uranus	6.81	5.2
Neptune	5.43	3.3
Pluto	4.74	2.5

Since gravitational mass m can be transformed into the rest mass in body B, we define Einstein's gravitational mass $M_g = M_i + m$ and inertial mass $M_i = M_B$ [6]..

It follows

$$M_g > M_i \quad (29)$$

Therefore it shows that the principle of equivalence in the Solar system is nonexistent. Of all the principles at work in gravitation, none is more central than the principles of equivalence[5], which could be wrong.

The tachyonic mass $\overline{m}$ can be converted into electrons and positrons which are the basic building-blocks of elementary particles [8,9]. In this universe there are no Higgs particles. They have not been produced at the Large Hadron Collider and other particle accelerators.

From (21) it follows Newtonian gravitational formula. The m is proportional to M_A, which denotes inertial mass of body A, in (24) m is proportional to M_B, is inversely proportional to the distance R between body A and body B. It follows

$$m = k\frac{M_A M_B}{R}, \quad (30)$$

where k is a constant.
Substituting (30) into (21) it follows Newtonian gravitational formula[3,4]

$$\overline{F}_1 = -G\frac{M_A M_B}{R^2}, \tag{31}$$

where $G = kc^2$ is a gravitational constant.
We have Einstein's gravitational mass

$$M_g = M_i + m = M_i(1+\eta). \tag{32}$$

Substituting (32) into (31) it follows Newtonian generalized gravitational formula

$$\overline{F}_1 = -G\frac{M_A(1+\eta_A)M_B(1+\eta_B)}{R^2}, \tag{33}$$

where η_A and η_B denote gravitational coefficients of body A and body B separately.

Assume ρ_A and ρ_B denote the densities of body A and body B separately. In the same way from (21) it follows unified formula of the gravitational and strong forces [4]

$$\overline{F}_1 = -G_0\frac{\rho_A M_A(1+\eta_A)\rho_B M_B(1+\eta_B)}{R^2} \tag{34}$$

where $G_0 = 5.2\times10^{-10}$ cm^9/g^3 • sec^2 is a new gravitational constant.
In the nucleus exists the strong interactions. It follows[4]

$$\frac{\text{Strong interaction}}{\text{Gravitational interaction}} = \frac{G_s}{G_g} = 10^{38} \tag{35}$$

where $G_g = 6.7\times10^{-8}\ \text{cm}^3/\text{g}\cdot\text{sec}^2$ and $G_s = 6.7\times10^{30}\ \text{cm}^3/\text{g}\cdot\text{sec}^2$

In the nucleus we assume $\rho_A = \rho_B = \rho$. From (34) it follows

$$G_s = G_0\rho^2 \tag{36}$$

From (36) it follows the formula of the particle radii

$$r = 1.55[m(\text{Gev})]^{1/3}\ \text{jn}, \tag{37}$$

where 1 jn=10^{-15} cm and m (Gev) is the mass of the particles.
From (37) it follows that the proton and neutron radii are 1.5 jn[4,10].Pohl et al measure the proton diameter 3 jn[11].
We have the formula of the nuclear radii[12]

$$r = 1.2(A)^{1/3}\ \text{fm}, \tag{38}$$

where 1 fm=10^{-13} cm and A is its mass number.
It shows that (37) and (38) have the same form. The particle radii $r < 5$ jn and the nuclear radii $r < 7$ fm.
Similar to equation (10) we define the tachyonic momentum of a string length $\overline{x}_0$ [1,4].

$$\overline{P}_0 = \lim_{\substack{m_0\to0\\ \overline{u}\to\infty}} m_0\overline{u} = const, \tag{39}$$

where m_0 is tachyonic string rest mass.
Since $\overline{u}\to\infty$ and $t = 0$, tachyonic string has no rest mass and no rest time, it shows that tachyon is unobservable, that gravity is action-at-a-distance and gravitational wave is unobservable. If quantum teleportation, quantum computation and quantum information are the tachyonic motion[13], then they are unobservable.
A new universe model

From above we suggest a new universe model. The universe has no beginning and no end. The universe is infinite, but it has a centre consisting of the tachyonic matter, which dominates motion of the entire universe. Therefore the universe is stable…..In the sun there is a centre consisting of the tachyonic matter, which dominates motion of the sun system. In the earth there is a centre consisting of the tachyonic matter, which dominates motion of the earth and the moon. In the moon there is a centre consisting of the tachyonic matter, which dominates motion of the moon. In atomic nucleus there is a centre consisting of the tachyonic matter, which dominates motion of the nucleus. Therefore atomic nuclei are stable.

Conclusion

Special relativity is the tardyonic theory. Einstein pointed out that velocities greater than that of light have –as in our previous results-no possibility of existence [14], which could be wrong. But gravitation is the tachyonic theory and an action-at-a-distance.

What is gravity? Newton wrote, "I have not been able to discover the cause of those properties of gravity from phenomena, and I frame no hypotheses …". Einstein's theory of general relativity answered Newton's question: mass causes space-time curvature which is wrong. Gravity is the tachyonic centripetal force.

Where did we come from? Where are we going ? What makes up the universe? These questions have occupied mankind for thousands of years. Over the course of history, our view of the world has changed. Theologians and philosophers, physicists and astronomers have given us very different answers. Where did we come from ? We answer this questions this way $\overline{m} \rightarrow m$,tachyons $\rightarrow$ tardyons, that is gravitons can be converted into the electrons and positrons which are the basic building-blocks of particles. In this model Universe there are no quarks and no Higgs particles. Where are we going? We answer this question this way $m \rightarrow \overline{m}$, that is the tardyons produce tachyons. The tardyons and tachyons make up the Universe.

Jiang found a gravitational formula[3] : $\overline{F} = -\overline{m}c^2/R$, where $\overline{m}$ is the tachyonic mass. In 2004 Jiang studied the Universe expansion and found $\overline{F} = -mc^2/R$, where m is gravitational mass converted into by tachyonic mass $\overline{m}$.

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Beyond the Newtonian Gravitational Theory and Deny the Einstein Gravitational Theory
超越牛顿引力理论打倒爱因斯坦引力理论
(找到一个新引力公式)

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牛顿并没有说明引力是什么？因此他的引力理论仅是一个猜想。爱因斯坦引力理论基础是惯性质量等于引力质量，这是不成立的，引力速度是光速,，因此他的广义相对论引力理论是 100%错的。1933 年爱因斯坦说：“可是创立(广义相对论) 的基本原理蕴藏于数学之中，因此，在某种意义上来说，我认为纯粹推理可以掌握客观现实，这正是古人所梦想的。”20 世纪所有理论物理学家沿着这思路研究物理，例如微分几何，从广义相对论得出黑洞暗物质暗能量，这些都不存在。1905 年爱因斯坦指出超光速不存在，到今天国内外没有多少人研究超光速理论，得出一个错误结果：超光速粒子是虚质量。1975 年蒋春暄建立亚光速和超光速统一理论,1976 年证明引力是超光速转动产生向心力，并得出新引力公式。牛顿引力公式是新引力公式一个特例。本文重写 1976 年论文。如有人研究和合作这种理论三十年前就完成，今天公布中国也不会有人支持，仍不会有人承认。蒋春暄国内外都知道他，仍遭到国内外封杀，连蒋春暄母校北京航空航天大学不承蒋校友，成果献给母校被拒绝，中科院死死抓住北航不放，派干部控制北航。这样整个中国都被中科院控制，中国就没有任何人和单位支持蒋春暄，完成整个中国对蒋春暄封杀，中科院就放心了。国内外联合起来对付蒋春暄一个人,不允许有人支持他,不允许发表他的论文，但现在有网络，本文已在国外广泛传播。国外已有三个网站传播，最有意义是报道题目:Deduction of new gravitational formula 即新引力公式推导，突引力公式,http://www.vixra.org/pdf/1204.0085v1.pdf;http://www.vixra.org/pdf/1204.0085v2.pdf.

文化大革命中蒋春暄写一文<用毛泽思想创立一门新型数学>,1968 年发表在清华大学井岗山出版社<理论批判>上，中科院物理所吴咏时来信，这种数学可研究相对论，蒋春暄开始学习相对论，建立亚光速和超光速时空统一理论，蒋春暄参加中科院相对论批判讨论会，本文被何祚庥否定，后来国外也发表类似结果,< 物理>同意在 1975 年发表本文,数学所刘易成和科大张家铝写两篇否定文章同时发表，世界上第一篇划时代的论文就这样发表了，如在今天这样文章完全不可能发表，因为当时中科院专家没权说话。秦元勋当时也是反相对论的，他爱人在北京天文台工作，蒋春暄发明新引力公式于 1976 在内部杂志<北京天文台台刊>上发表.这篇论文是人类第一次给引力一个真正说明，国内外都看不到，但非常清楚，所以决定重写. 中国创新多难,60 年来中国没有重大创新成果，不是没有重大成果，而是中国不支持，不允许发表。最后把重大成果封杀掉。这就是中国现况。中央指示中科院组织专家评定，向国外宣布这新引力公式，国外才承认这新引力公式。中科院不干，他们组织国内外人不承认这公式，不允许发表这公式。国外来信我想把这有趣文章上我们网你同意吗？将来会承认这个新引力公式. 这公式在国外广泛传播。它是天文宇宙物理学的基础，开创超光速新时代。最近国内外大力研究量子通信，量子计算机，量子纠缠它的基础是超光速，这些都不存在。2012 年是找上帝粒子年代，上帝粒子根本不存在。正负质子对撞只产生正负电子，不会得出任何有用结果。当代西方基础研究例如数学物理研究都是吓猜，没有多少创新成果。中国应该重视国内这方面人才。西方著名杂志发表文章有很多是错的，以这些杂志发表文章就算人才也不对的，中国有这么多人肯定有很多创新思维，中国政府应该有单位和政策支持这些人才。中科院何祚庥方舟子等把这些成果定为伪科学到处打假。蒋春暄在数学和物理作出这么大贡献，被中科院定为伪科学，到今天在中国无立足之地。

Gravity is a great mystery. No one has since given any machinery. In this paper we give a simple machinery. Gravity is the tachyon centripetal force.

Anybody may understand gravitation.Using the tardyon and tachyon coexistence principle [1]

$$u\overline{u}=c^2 \tag{1}$$

where c is light velocity in vacuum, $u \le c$ tardyon velocity and $\overline{u} \ge c$ tachyon velocity.

We deduce the new gravitation formula: $\overline{F}=-\dfrac{mc^2}{R}$.

Figure 1 shows that the rotation ω of body A emits tachyon mass $\overline{m}$, which forms the tachyon and gravitation field and gives the body B revolutions u and $\overline{u}$.

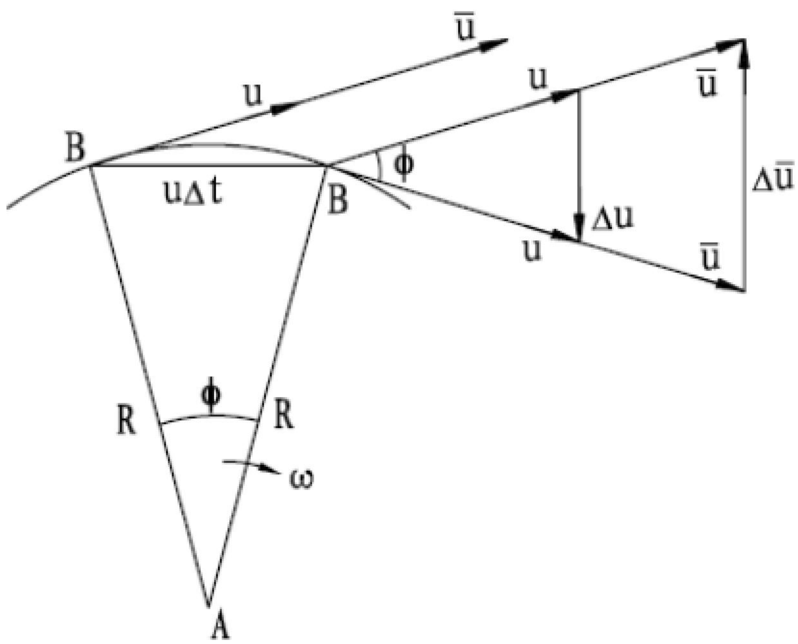

Fig.1. On body B $\frac{du}{dt}$ and $\frac{d\bar{u}}{dt}$ coexistence [2].

图 1 物体 A 转动 w 发射引力子产生引力场使物体 B 转动

From Fig. 1 it follows 从图 1 得出

$$\frac{u\Delta t}{R} = \frac{\Delta u}{u} . \quad (2)$$

From (2) it follows the tardyon centripetal acceleration on the body B [2-6], 从(2) 得出物体 B 向心加速度

$$\frac{du}{dt} = \lim_{\substack{\Delta u \to 0 \\ \Delta t \to 0}} \frac{\Delta u}{\Delta t} = \frac{u^2}{R} . \quad (3)$$

From Fig. 1 it follows 从图 1 得出

$$\frac{u\Delta t}{R} = -\frac{\Delta \bar{u}}{\bar{u}} . \quad (4)$$

From (4) and (1) it follows the tachyon centrifugal acceleration on the body B [2-6], 从(4) 得出物体 **B** 引力**离心加速度,(它与引力速度无关，这点很重要，**因为我们不知引力速度多大,1976 年我们发现这一点，促使我们建立新的引力理论)

$$\frac{d\bar{u}}{dt} = \lim_{\substack{\Delta \bar{u} \to 0 \\ \Delta t \to 0}} \frac{\Delta \bar{u}}{\Delta t} = -\frac{u\bar{u}}{R} = -\frac{c^2}{R} . \quad (5)$$

On body B $\frac{du}{dt}$ and $\frac{d\bar{u}}{dt}$ coexistence.From (3) it follows the tardyon centrifugal force on body B [2-6], 从(3) 得出物体 B 的离心力，这点是我们推导出来人们都知道的离心力公式

$$F = \frac{M_B u^2}{R} , \quad (6)$$

where M_B is body B mass.From (5) it follows the tachyon centripetal force on body B, that is gravity [2-6], 从(5) 得出物体B超光速向心力公式即引力公式, 这是1976年发现的, 向心力公式(5) 和离心力公式(4)有相同形式

$$\overline{F} = -\frac{mc^2}{R}, \tag{7}$$

其中 m 是引力质量, 这个公式是宇宙学的基础。这对爱因斯坦质能公式一个新的解释. 引力能量公式。where m is the gravitation mass converted into by tachyon mass $\overline{m}$ which is unobservable but m is observable. $\overline{m}$ give all particles mass which replace the Higgs bosons. 这可代替上帝粒子,Elusive Higgs bosons have not been produced at the Large Hadron Collider at CERN. 欧洲核子研究中心不可能找到上帝粒子, 因为它不存在。 On body B F and $\overline{F}$ coexistence.

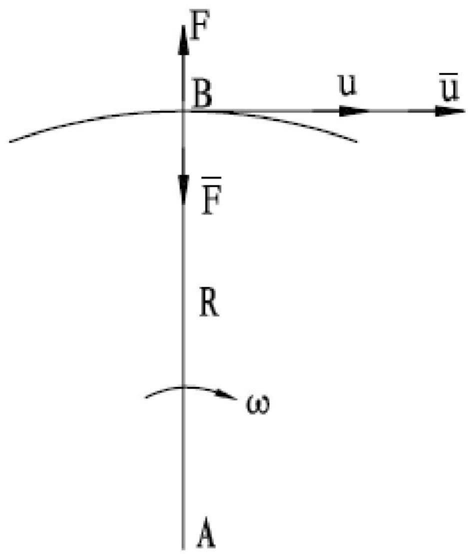

Fig.2. On body B F and $\overline{F}$ coexistence[2].

图 2 说明星体在运动中有两种力,离心力和向心力都是由转动速度产生的. 亚光速转动产生离心力, 这点大家都知道, 而超光速转动产生向心力, 大家都不知道, 这是 1976 年蒋春暄发现的 ,它们都是惯性力,本质都是一样.From Fig. 2, it follows, 从图 2 得出

$$F + \overline{F} = 0. \tag{8}$$

From (6), (7) and (8) it follows

$$\frac{m}{M_B} = \frac{u^2}{c^2}. \tag{9}$$

Body B increases mass m and centrifugal force is greater than gravitation force, then body B expands outward. [5,6]

From (7) it follows Newtonian gravitation formula. The m is proportional to body A mass M_A, in (9) m is proportional to M_B, is inversely proportional to the distance R between body A and body B. It follows, 引力质量 m 正比物体 A 和物体 B 的质量, 反比他们之间距离 R, 得出

$$m = k\frac{M_A M_B}{R}, \tag{10}$$

where k is constant

Substituting (10) into (7) it follows the Newtonian gravitation formula [2-6], 把(10) 代入(7) 得出牛顿万有引力公式

$$\overline{F}=-G\frac{M_A M_B}{R^2}, \qquad (11)$$

where $G=kc^2=6.673\times10^{-8}\ \mathrm{cm}^3/\mathrm{g}\cdot\sec^2$ is gravitation constant. 其中 G 是引力常数，这是人类第一次推导出这个公式，牛顿万有引力公式是(7) 一个特例。

This paper is the first human to a true description of gravitation.Anyone can understand gravity.

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1. Chun-Xuan Jiang, A theory of morphisms between the tardyon and tachyon, Wuli(physics), (Chinese), 4. (175)119-125.
2. Chun-Xuan Jiang, On nature for gravitation, J. Beijing observatory (Chinese), 7(1976)32-38.
3. Chun-Xuan Jiang, An approach on the nature of attractive force, Potential science (Chinese), 4(1982)19-20.
4. Chun-Xuan Jiang, A unified theory of the gravitational and strong interactions, Hadronic J., 24(2001)629-638. 我们完成量子和引力统一，它们都是非定域的，超光速的，这是当代最大问题我们解决了．量子纠缠是非定域的,超光速的，超距的，我们证明不能直接测量量子纠缠更不能应用量子纠缠,.牛顿猜想引力是超距的，这是对的，即我们观察引力以无限大速度传播。所以我们不能观测引力传播。
5. Chun-Xuan Jiang, An equation that changed the universe: $F=-mc^2/R$ http://www.wbabin.net/ntham/xuan150.pdf http://vixra.org/pdf/1007.0018v1.pdf
6. Chun-Xuan Jiang, All eyes are on the elusive Higgs and neutrinos, http://vixra.org/pdf/1203.0040v2.pdf

这应该是世界上最短一篇论文也是最重要一篇论文,也是一般人都能理解的论文。图 1,2 是真正引力模型,从这得出结果是正确的简单的。

整个宇宙是由可观测亚光速物质和不可观测超光速物质组成的。我们只研究亚光速物质，没有研究超光速物质。但超光速世界存在，人们用亚光速手段研究超光速世界，只能得出错误结果,对引力研究就是一个明显例子。上帝粒子,超弦论，万有理论,大爆炸，黑洞，夸克，引力波，暗物质，暗能量，量子通信，量子纠缠等都是猜想，不可观测的和不存在的,美国 Physical Review Letters and Phys.Rew 发表大量错误的论文，许多错误成果还获得诺贝尔奖，这就是当代物理学和天文学现状。本文在国际很快传播,我们相信他们能够理解本文，会对当代物理学提出质问？

从伽利略牛顿爱因斯坦研究万有引力都是从实验出发，没有从理论深入研究，所以他们结果都是猜想，有时猜对，有时猜错，引力子是不可直接测量的超光速粒子。这么大成就在中国无人理睬的。13 亿人没有一个人关心这件大事,真不可理解，中国就这么落后不需要真正科学。中国没一位领导出来说话支持蒋春暄，让中科院对蒋春暄这样野蛮封杀。唯一办法用网络在国内外猛宣传,中国对蒋春暄打压封杀一点不会改变，白春礼更加疯狂打压封杀不承认蒋春暄的工作.

2012-04-23 送 Nature，马上来信非常重视这篇论文，过两天来信我们不进一步考虑这篇论文，这可能是中科院在起作用．如中科院推荐,nature 一定会马上发表,nature 认为这是一篇非常重要论文，因 nature 是高级科普杂志，蒋春暄用图 1,2 为 nature 读者写这篇论文，一般读者都能理解引力。 中国成果中国不支持，外国人不会承认，蒋春暄证明费马大定理这么大成就中国不需要送给怀尔斯,2012-04 中国科学院院刊席南华宣布费马大定理是 1995 年被怀尔斯证明。蒋春暄证明费马大定理在中国家喻户晓,但中科院死命不承认。中科院目的就是不支持不承认蒋春暄所有成果,不允许中国任何单位和个人支持蒋春暄，不允许任何媒体再报道蒋春暄成果。中国没有一个大学校长出来支持蒋春暄伐时代成果，如你出来支持，可把你大学提高为世界第一流大学，你的大名将和蒋春暄成果流芳百世。今年是北航建校 60 周年，蒋春暄研究工作是在北航开始的，把本文献给北航 60 建校周年，北航是否接受？等待母校回答！网络已把本文复盖整个世界。我们都熟悉引力但我们都不理解引力。因为引力是超光速运动，在静止系我们看不见引力，只看到引力作用物体下降,过去人们对引力机制提出各种各样猜想．但没有一个满意解释。图 1,2 是 1976 年用中文发表，但非常清楚，2012-04-19 决定重写，所有人都能理解引力。本文给出引力一个真正说明，已超越牛顿引力理论打倒爱因斯坦广义相对论引力理论。己在国外上网 http://www.vixra.org/pdf/1204.0085v1.pdf，引起很多专家恐慌，许多物理问题将要重写，国外网马上转载，证明引力是超光速转动惯性向心力，亚光速转动惯性离心力，这两种力都是惯性力。核心中力也是

这种力。用图表示更有说服力，引力是超光速粒子的向心力，过去爱因斯坦把它看作数学问题，图 1 把引力看作超光速问题，就变成非常简单，牛顿引力是猜想，他没有说明引力是什么？ 欧洲核子研究中心(CERN) 主要任务找上帝粒子,证明夸克模型是正确的．上帝粒子根本不存在，正负质子对撞只产生正负电子，那末 CERN 应关门，所有加速器也应关门。2012 年世界第一件大事就是寻找上帝粒子，本文就是否定上帝粒子不存在，在国内外宣传这短文。蒋春暄研究任何问题中国科学院都不支持，这个问题中国也不支持，他们什么也做不出，中国又如何发展科学,20 世纪是爱因斯坦广义相对论思路，纯数学可解决所有物理问题，弦论黑洞都是在玩数学例如微分几何规范场理论。无人研究占宇宙半边天的超光速世界，目前国外没有正确超光速理论，国外研究量子通信，量子计算机，量子纠缠，理论基础都是超光速问题，都是不可测量的.

国内外物理学家不相信本文，引力就这么简单。

Deduction of New Gravitational Formula: $\overline{F}=-\dfrac{mc^2}{R}$

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Gravity is a great mystery. No one has since given any machinery. In this paper we give a simple machinery. Gravity is the tachyon centripetal force.

Anybody may understand gravitation.

Using the tardyon and tachyon coexistence principle [1]

$$u\overline{u}=c^2 \qquad (1)$$

where c is light velocity in vacuum, $u \le c$ tardyon velocity and $\overline{u} \ge c$ tachyon velocity.

We deduce a new gravitation formula: $\overline{F}=-\dfrac{mc^2}{R}$.

Figure 1 shows that the rotation ω of body A emits tachyon mass $\overline{m}$, which forms the tachyon and gravitation field and gives the body B revolutions u and $\overline{u}$.

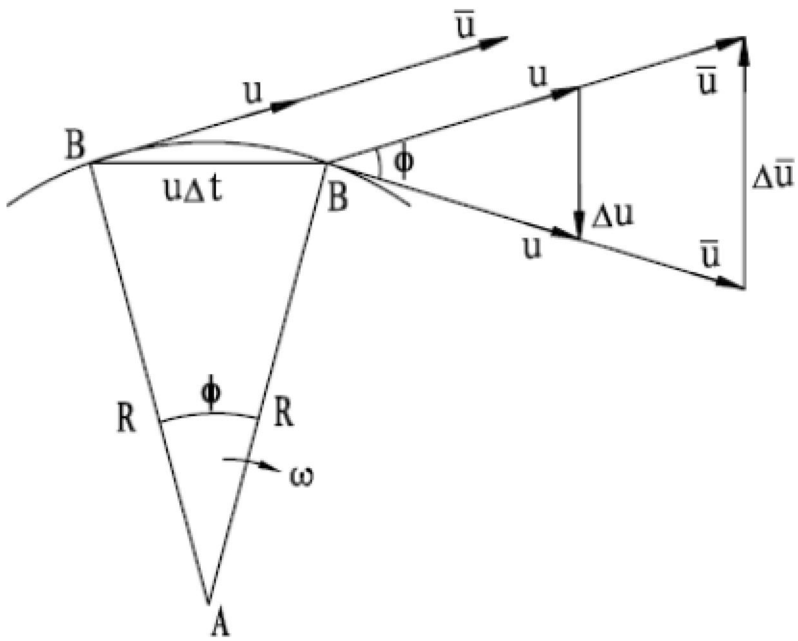

Fig.1. On body B $\frac{du}{dt}$ and $\frac{d\overline{u}}{dt}$ coexistence [2].

From Fig. 1 it follows

$$\frac{u\Delta t}{R}=\frac{\Delta u}{u}. \tag{2}$$

From (2) it follows the tardyon centripetal acceleration on the body B [2-6],

$$\frac{du}{dt}=\lim_{\substack{\Delta u\to 0\\ \Delta t\to 0}}\frac{\Delta u}{\Delta t}=\frac{u^2}{R}. \tag{3}$$

From Fig. 1 it follows

$$\frac{u\Delta t}{R}=-\frac{\Delta\overline{u}}{\overline{u}}. \tag{4}$$

From (4) and (1) it follows the tachyon centrifugal acceleration on the body B [2-6],

$$\frac{d\overline{u}}{dt}=\lim_{\substack{\Delta\overline{u}\to 0\\ \Delta t\to 0}}\frac{\Delta\overline{u}}{\Delta t}=-\frac{u\overline{u}}{R}=-\frac{c^2}{R}. \tag{5}$$

On body B $\frac{du}{dt}$ and $\frac{d\overline{u}}{dt}$ coexistence.

From (3) it follows the tardyon centrifugal force on body B [2-6],

$$F=\frac{M_B u^2}{R}, \tag{6}$$

where M_B is body B mass.

From (5) it follows the tachyon centripetal force on body B, that is gravity [2-6],

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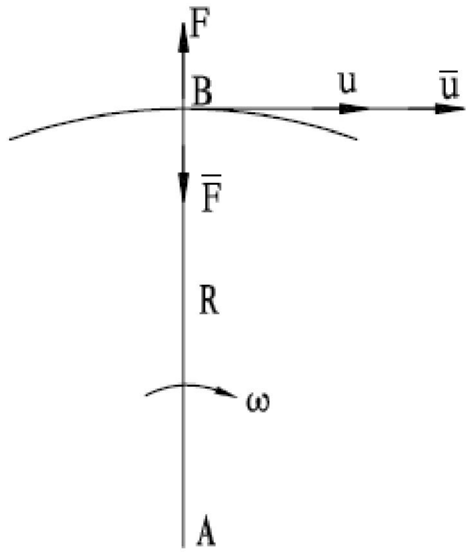
where m is the gravitation mass converted into by tachyon mass $\overline{m}$ which is unobservable but m is observable. $\overline{m}$ give all particles mass which replace the Higgs bosons. Elusive Higgs bosons have not been produced at the Large Hadron Collider at CERN. On body B F and $\overline{F}$ coexistence.



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From Fig. 2, it follows

$$F + \overline{F} = 0. \quad (8)$$

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Body B increases mass m and centrifugal force is greater than gravitation force, then body B expands outward. [5,6]

From (7) it follows Newtonian gravitation formula. The m is proportional to body A mass M_A, in (9) m is proportional to M_B, is inversely proportional to the distance R between body A and body B. It follows

$$m = k\frac{M_A M_B}{R}, \quad (10)$$

where k is constant

Substituting (10) into (7) it follows the Newtonian gravitation formula [2-6]

$$\overline{F} = -G\frac{M_A M_B}{R^2}, \quad (11)$$

where $G = kc^2 = 6.673\times10^{-8}\ \mathrm{cm}^3/\mathrm{g}\cdot\sec^2$ is gravitation constant.

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