

The Hardy-Littlewood prime k -tuple conjecture is false

Chun-Xuan Jiang

P. O. Box 3924, Beijing 100854, P. R. China

Jiangchunxuan@vip.sohu.com

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.

Hardy-Littlewood 论文作为数论圣经，一百年来华罗庚、王元陈景润潘承洞和一大批数论家必读，他们是靠这篇文章起家的，这是当代最高数论水平，数学天才陶哲轩拼命在学习他们论文，下一步仔细研究他们论文，到底有多少猜想是正确的，素数太复杂，蒋春暄已打开素数大门。我们用正确和错误对比形式否定他们论文，一般数学家都能看懂。当代很多数学家获得很多数学大奖，很多结果是错的。一个小问题文章长到 100 页，不知他们在说什么？只有他们自己知道。

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

We define the prime k -tuple equation

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

where $2 \mid n_i, i = 1, \dots, k-1$.

we have Jiang function [1, 2]

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

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

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

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 have the best asymptotic formula of the number of prime P [1, 2]

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

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

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

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

From (3) we have

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

Substituting (6) into (2) we have

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

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

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

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

From (3) we have

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

From (2) we have

$$J_2(\omega) = 0. \quad (10)$$

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

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

Substituting (11) into (2) we have

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

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

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

$$\pi_4(N, 2) = |\{P \leq N : P+n = \text{prime}\}| \sim \frac{27}{3} \prod_{P \geq 5} \frac{P^3(P-4)}{(P-1)^4} \frac{N}{\log^4 N} \quad (13)$$

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

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

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

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

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

From (3) and (2) we have

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

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.

蒋春暄最近才读以下论文，非常复杂，估计没有几个数学家能看懂。但他们结果到处引用。素数理论是计算问题。用他们方法计算结果都是错的。

(B) The Hardy-Littlewood prime k -tuple conjecture[3-11].

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

In 1923 Hardy and Littlewood conjectured the asymptotic formula

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

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

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

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

(20) 和 (21) 是错误的, 一百年来数学家利用 (20) 和 (21) 得不出任何有用结果, 但是所有素数理论都要重复说明 (20) 式[4—11]。因为它是 Hardy 提出来的。所以一百年来素数研究没有得出任何有用结果, 都是在瞎猜。

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

From (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

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

which is false see example 1.

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

From (21) we have

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

Substituting (25) into (20) we have

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

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

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

which is false see example 2.

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

From (21) we have

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

Substituting (28) into (20) we have

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

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

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

Which is false see example 3.

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

From (21) we have

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

Substituting (31) into (20) we have

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

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

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

Which is false see example 4.

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

From (21) we have

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

Substituting (34) into (20) we have

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

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

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

which is false see example 5.

Conclusion. The Hardy-Littlewood prime k -tuple conjecture is false. Jiang prime k -tuple theorem can replace Hardy-Littlewood prime k -tuple Conjecture. There cannot be really modern prime theory without Jiang function.

References

- [1] Chun-Xuan Jiang, Foundations of Santilli's isonumber theory with applications to new cryptograms, Fermat's theorem and Goldbach's conjecture. Inter. Acad. Press, 2002, MR2004c:11001, (<http://www.i-b-r.org/docs/jiang.pdf>) (<http://www.wbabin.net/math/xuan13.pdf>).
- [2] Chun-Xuan Jiang, Jiang's function $J_{n+1}(\omega)$ in prime distribution. (<http://www.wbabin.net/math/xuan2.pdf>) (<http://vixra.org/pdf/0812.0004v2.pdf>)
- [3] G. H. Hardy and J. E. Littlewood, Some problems of 'Partition Numerorum', III: On the expression of a number as a sum of primes, Acta Math, 44(1923), 1-70.
- [4] B. Green and T. Tao, The primes contain arbitrarily long arithmetic progressions, Ann. Math., 167(2008), 481-547.
- [5] D. A. Goldston, S. W. Graham, J. Pintz and C. Y. Yildirim, Small gaps between products of two primes, Proc. London Math. Soc., (3) 98 (2009) 741-774.
- [6] D. A. Goldston, S. W. Graham, J. Pintz and C. Y. Yildirim, Small gaps between primes or almost primes, Trans. Amer. Math. Soc., 361(2009) 5285-5330.
- [7] D. A. Goldston, J. Pintz and C. Y. Yildirim, Primes in tulpes I, Ann. Math., 170(2009) 819-862.
- [8] P. Ribenboim, The new book of prime number records, 3rd edition, Springer-Verlag, New York, NY, 1995. PP409-411. 本书作者多次蒋春暄未 email, 不要给他寄材料, 这本书也是素数理论最重要必读书。主要内容是 Hardy 和 Littlewood 的结果。
- [9] H. Halberstam and H.-E. Richert, Sieve methods, Academic Press, 1974.
- [10] A. Schinzel and W. Sierpinski, Sur certaines hypotheses concernant les nombres premiers, Acta Arith., 4(1958) 185-208.
- [11] P. T. Bateman and R. A. Horn, A heuristic asymptotic formula concerning the distribution of prime numbers, Math. Comp., 16(1962) 363-367.

到今天中国不承认蒋春暄成果, 连蒋春暄母校北航不承认他是北航校友, 和中科院北大封杀蒋春暄成果。本文一公布就收到

Diego Rapoport 祝贺信,

The author would like to thank Walter Babin to publish this paper in general science journal.

因蒋春暄否定一大批数学家结果, 支持蒋春暄的桑蒂利也害怕从而也不发表蒋春暄的论文。这篇文章应该是划时代的, 应该荣获世界数学最高奖, 但中国和

母校北航不支持。只能在网上发表让全世界所有人都能看到!