Twin prime conjecture and Goldbach Conjecture

Chun-Xuan Jiang

P. O. Box 3924, Beijing 100854, P. R. China
jcxuan@sina.com

Abstract: Using Jiang function we prove that there exist infinitely many primes P_1 such that aP_1+b is prime We prove twin prime conjecture and Goldbach conjecture.
[Chun-Xuan Jiang. **Twin prime conjecture and Goldbach Conjecture.** *Rep Opinion* 2016;8(10):105-106]. ISSN 1553-9873 (print); ISSN 2375-7205 (online). http://www.sciencepub.net/report. 11. doi:10.7537/marsroj081016.11.

Keywords: prime; theorem; function; number

Theorem

$$P_2 = aP_1 + b. (a,b) = 1, \quad 2 \mid ab, \tag{1}$$

There exist infinitely many primes P_1 such that P_2 is prime.

Proof. We have Jiang function [1,2]

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

where

$$\omega = \prod_P P,$$

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

$$aq + b \equiv 0 \pmod{P}, \tag{3}$$

$q = 1, \cdots, P-1$.

From (3) we have if $P \mid ab$ then $\chi(P) = 0$, $\chi(P) = 1$ otherwise.

From (3) and (2) we have

$$J_2(\omega) = \prod_{3 \le P}(P-2) \prod_{P \mid ab} \frac{P-1}{P-2} \ne 0. \tag{4}$$

We prove that there exist infinitely many primes P_1 such that P_2 is prime.

We have the best asymptotic formula [1, 2]

$$\pi_2(N,2) = \left|\{P_1 \le N : aP_1 + b = prime\}\right| \sim \frac{J_2(\omega)\omega}{\phi^2(\omega)} \frac{N}{\log^2 N}$$

$$= 2 \prod_{3 \le P} \left(1 - \frac{1}{(P-1)^2}\right) \prod_{P \mid ab} \frac{P-1}{P-2} \frac{N}{\log^2 N}. \tag{5}$$

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

Twin primes theorem [1]. Let $a = 1$ and $b = 2$. From (1) we have

$$P_2 = P_1 + 2 \tag{6}$$

From (4) we have

$$J_2(\omega) = \prod_P (P-2) \ne 0 \tag{7}$$

We prove that there exist infinitely many primes P_1 such that $P_1 + 2$ is prime.

From (5) we have

$$\pi_2(N,2)=\left|\{P_1\le N: P_1+2=prime\}\right|\sim 2\prod_{3\le P}\left(1-\frac{1}{(P-1)^2}\right)\frac{N}{\log^2 N}. \quad (8)$$

Goldbach theorem [1]. Let $a=-1$ and $b=N$. From (1) we have

$$N=P_1+P_2 \quad (9)$$

From (4) we have

$$J_2(\omega)=\prod_{3\le P}(P-2)\prod_{P|N}\frac{P-1}{P-2}\ne 0 \quad (10)$$

We prove that every even number $N\ge 6$ is the sum of two primes.
From (5) we have

$$\pi_2(N,2)=\left|\{P_1\le N: N-P=prime\}\right|\sim 2\prod_{3\le P}\left(1-\frac{1}{(P-1)^2}\right)\prod_{P|N}\frac{P-1}{P-2}\frac{N}{\log^2 N} \quad (11)$$

Note: This article has been published as [Chun-Xuan Jiang. **Twin prime conjecture and Goldbach Conjecture.** *Academ Arena* 2015;7(1s):1-2]. (ISSN 1553-992X). http://www.sciencepub.net/academia. 1

Author in US address:
Chun-Xuan Jiang
Jiangchunxuan@vip.sohu.com
Institute for Basic Research Palm Harbor, FL 34682, U.S.A.

Reference

[1] Chun-Xuan Jiang, On the Yu-Goldbach prime theorem (Chinese), Guangxi Science, 3 (1996) 9-12.
[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] Chun-Xuan Jiang. **Automorphic Functions And Fermat's Last Theorem (1).** *Rep Opinion* 2012;4(8):1-6]. (ISSN: 1553-9873). http://www.sciencepub.net/report/report0408/001_10009report0408_1_6.pdf.
[4] Chun-Xuan Jiang. **Jiang's function $J_{n+1}(\omega)$ in prime distribution.** *Rep Opinion* 2012;4(8):28-34]. (ISSN: 1553-9873). http://www.sciencepub.net/report/report0408/007_10015report0408_28_34.pdf.
[5] Chun-Xuan Jiang**. The Hardy-Littlewood prime *k*-tuple conjecture is false.** *Rep Opinion* 2012;4(8):35-38]. (ISSN: 1553-9873). http://www.sciencepub.net/report/report0408/008_10016report0408_35_38.pdf.
[6] Chun-Xuan Jiang. **A New Universe Model.** *Academ Arena* 2012;4(7):12-13] (ISSN 1553-992X). http://sciencepub.net/academia/aa0407/003_10067aa0407_12_13.pdf.
[7] [Chun-Xuan Jiang. **Twin prime conjecture and Goldbach Conjecture.** *Academ Arena* 2015;7(1s):1-2]. (ISSN 1553-992X). http://www.sciencepub.net/academia. 1

4/25/2015