New prime K-tuple theorem (3)
$P, jP+j+1 (j=1,\cdots,k)$

Jiang, Chunxuan (蒋春暄)

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

Abstract: Using Jiang function we prove that for every positive integer k there exist infinitely many primes P such that each of $jP+j+1$ is prime.

[Chun-Xuan, Jiang. **New prime K-tuple theorem (3)** $P, jP+j+1 (j=1,\cdots,k)$**.** *Academ Arena* 2016;8(2s): 5-5]. (ISSN 1553-992X). http://www.sciencepub.net/academia. 3. doi:10.7537/marsaaj0802s1603.

Keywords: new; prime; *k*-tuple; theorem; Jiang Chunxuan; mathematics; science; number; function

Theorem

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

For every positive integer k there exist infinitely many primes P such that each of $jP+j+1$ 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

$$\prod_{j=1}^{k}(jq+j+1)\equiv 0 \pmod P, \tag{3}$$

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

From (3) we have

If $P\le k+1$ then $\chi(P)=P-2$, if $k+1<P$ then $\chi(P)=k$.

From (3) and (2) we have

$$J_2(\omega)=\prod_{k+1<P}(P-k-1)\neq 0. \tag{4}$$

We prove that for every positive integer k there exist infinitely many primes P such that each of $jP+j+1$ is prime.

We have the best asymptotic formula [1, 2]

$$\pi_{k+1}(N,2)=\left|\{P\le N: jP+j+1=prime\}\right|\sim\frac{J_2(\omega)\omega^k}{\phi^{k+1}(\omega)}\frac{N}{\log^{k+1}N}. \tag{5}$$

The author takes a day to write this paper.

References

1. 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)
2. Chun-xuan Jiang, The Hardy-Littlewood prime k-tuple conjecture is false. http:// www. wbabin.net/math/xuan77.pdf

4/27/2016