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Prime Pairs of Even Numbers

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Abstract: In this paper, the correspondence model of even numbers is established, and we solve the problem by using the correspondence model of Prime pair.

Key words: Correspondence; Correspondence model; Prime pairs

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1. AXIS CORRESPONDENCE OF THE FORM OF EVEN NUMBER

In natural number, exclude the number that can be divided by 2,3,5, even number corresponds to the sum of the two remaining number, shown in Table 1 next page.

2. CORRESPONDENCE MODEL

Correspondence (I): Figure 1 is a B_1 shaft in reverse order correspondence, if the number of upper and lower two vertical correspondence, these correspondence to only represent an even number. For example, $992 = 31+961 = 61+931 = 91+901 = ... = 961 + 31$.

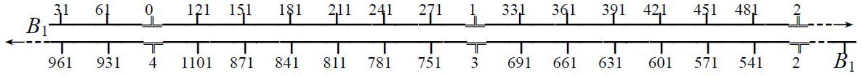

Figure 1
A B_1 Shaft in Reverse Order Correspondence

Correspondence (II): If a subsections correspondence to a subsections of whole six numbers in each of section to correspondence to only 11 even number of the same as range. Before and after combine the correspondence, correspondence for the number of is seven even number the number the correspondence.

For example, section I and section IVSection II and section III, correspondence to only 872, 902, 932, 962, 992, 1022, 1052, 1082, 1112, 1142, 1172; Section I and section III, Section II and section II, correspondence to only 662, 692, 722, 752, 782, 812, 842, 872, 902, 932, 962; Section I and section V, section II and section IV, section III and section III, correspondence to only 1082, 1112, 1142, 1172, 1202, 1232, 1262, 1292, 1322, 1352, 1382.

If section I and section IV have correspondence only in 872, 902, 932, 962, 992, 1022, 1052, then the 1082, 1112, 1142, 1172 pair should use 872, 902, 932, 962 (section I and section III correspondence) to compensate; If section I and section IV have correspondence only in 992, 1022, 1052, 1082, 1112, 1142, 1172, then the 872, 902, 932, 962 should use 1082, 1112, 1142,1172 (section I and section V correspondence) to compensate.

Table 1
The Axis Correspondence Form of Even Number
$\boldsymbol{C_M \approx \left[\frac{1}{14}\sum_{i=1}^{n} u_i u_{n-i+1}\right]}$

E_1	E_2				E_3	E_4			E_5
	1	2	3	4		1	2	3	
O_2	A_1+B_1	A_3+B_9	A_9+B_3			$5+B_7$			$6C_M$
B_2	A_3+A_9				A_1+A_1	$3+B_9$	$5+A_7$		$3C_M$
A_2	B_3+B_9				B_1+B_1	$3+A_9$			$3C_M$
B_4	A_1+A_3				A_7+A_7	$2+2$	$3+B_1$	$5+A_9$	$3C_M$
A_4	B_1+B_3				B_7+B_7	$3+A_1$			$3C_M$
O_4	A_1+B_3	A_3+B_1	A_7+B_7			$5+B_9$			$6C_M$
O_6	A_9+B_7	A_7+B_9	A_3+B_3			$3+3$	$5+B_1$		$6C_M$
B_6	A_9+A_7				A_3+A_3	$3+B_3$	$5+A_1$		$3C_M$
A_6	B_9+B_7				B_3+B_3	$3+A_3$			$3C_M$
A_8	B_1+B_7				B_9+B_9	$3+5$			$3C_M$
O_8	A_1+B_7	A_7+B_1	A_9+B_9			$5+B_3$			$6C_M$
B_8	A_1+A_7				A_9+A_9	$5+A_3$			$3C_M$
B_0	A_1+A_9	A_3+A_7				$5+5$	$3+B_7$		$4C_M$
A_0	B_1+B_9	B_3+B_7				$3+A_7$			$4C_M$
O_0	A_1+B_9	A_9+B_1	A_3+B_7	A_7+B_3					$8C_M$

Note: Table "O_i", "B_i", "A_i" denote the number divided by 3 and get remainders as 0, 1, 2 (i is units digit on digital). E_1: Category; E_2: Biaxial correspondence; E_3: A number of axes correspondence; E_4: A single correspondence (3 or 5 the numbers together another number indicates correspondence to the even number); E_5: As the quantity Prime pairs.

Correspondence (III): u_i is the number of primes on the ith section, denoted by Correspondence (II), the number of Prime pair $\frac{1}{2}\sum_{i=1}^{n} u_i u_{n-i+1}$ correspondence to u_i and u_{n-i+1} is only 7 even numbers' correspondence number.

The probabilities of prime numbers in n subsections $1 \sim 6$ are equal, that is, the probabilities of the corresponding Prime pairs are equal. Thereupon, in the single axis correspondence, the prime pairs of even number are $C_M \approx \left[\frac{1}{14}\sum_{i=1}^{n} u_i u_{n-i+1}\right]$ ($[x]$ is the largest integer not greater than x).

For example, on B_1 axis, $u_1 = 5,\ u_2 = 2,\ u_3 = 6,\ u_4 = 2,\ u_5 = 3,\ u_6 = 5$.

$$C_M \approx \frac{1}{14}\sum_{i=1}^{6} u_i u_{n-i+1} = [(5\times 5 + 2\times 3 + 6\times 2 + 2\times 6 + 3\times 2 + 5\times 5)] = 6.$$

$C_{1292} = 5,\ C_{1322} = 6,\ C_{1352} = 6,\ C_{1382} = 7,\ C_{1412} = 6,\ C_{1442} = 7,\ C_{1472} = 6;\ C_{1412} = 6,\ C_{1442} = 7,\ C_{1472} = 6.\ C_{1502} = 6,\ C_{1532} = 5,\ C_{1562} = 8,\ C_{1592} = 6.$

Such a subsections correspondence to subsections of the overall (that adds two numbers) even prime pairs correspondence model is called *the correspondence model of even numbers.*

3. PRIME PAIRS OF EVEN NUMBER

3.1. Axis by the even number of M the form know, the maximum number single correspondence represents is at most 1, there is no need to discuss it; By the correspondence model, single-axis correspondence $C_M \approx \left[\frac{1}{14}\sum_{i=1}^{n} u_i u_{n-i+1}\right]$; Biaxial correspondence $C_M \approx \left[\frac{2}{14}\sum_{i=1}^{n} u_i u_{n-i+1}\right]$. Prime pair numbers of "B_i", "A_i" are less than those of "O_i", so the calculation formula for Prime pairs of even number is:

$$C_M \approx \left[\frac{1}{14}\sum_{i=1}^{n} u_i u_{n-i+1}\right] + \left[\frac{2}{14}\sum_{i=1}^{n} u_i u_{n-i+1}\right] \approx \left[\frac{3}{14}\sum_{i=1}^{n} u_i u_{n-i+1}\right].$$

3.2. From an overall point of view, $u_1,\ u_2,\ ...,\ u_{n/2}$ are not less than $u_{n/2+1},\ ...,\ u_n$. $\pi(M) = \dfrac{M}{\ln M}$ represents the prime numbers in M range, $n = \dfrac{M}{210}$. Because $\dfrac{\pi(M) - \pi(\frac{1}{2}M)}{8} > \dfrac{\pi(M)}{32}$,

$$C_M \approx \left[\frac{3}{14}\sum_{i=1}^{n} u_i u_{n-i+1}\right] \geq \left[\frac{3}{7}\sum_{i=n/2+1}^{n} u_i^2\right] \geq \left[\frac{6}{7n}\left(\sum_{i=n/2+1}^{n} u_i\right)^2\right]$$

$$= \left[\frac{180}{M}\cdot\left(\frac{\pi(M)-\pi(M/2)}{8}\right)^2\right] \geq \left[\frac{180}{M}\cdot\left(\frac{M)}{32\ln M}\right)^2\right] = \left[\frac{45M}{2^8(\ln M)^2}\right].$$

$$\lim_{M\to\infty} C_M = \lim_{M\to\infty}\frac{45M}{2^8(\ln M)^2} = \lim_{M\to\infty}\frac{45M}{2^9(\ln M)} = \lim_{M\to\infty}\frac{45M}{2^9} = \infty.$$

For even numbers greater than 2, each has prime pair in a smaller range; From an overall perspective, the larger the even number is, the more the quantity of even numbers' Prime pairs when scope is larger. Thus any even number greater than 2 can be represented as the sum of two primes.

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