A SET（GAIISUU） of generalizing Prime number

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ABSTRACT : So far, Prime numbers have been good material of research for people who like Mathematics. And, they consist of infinite numbers, and we can obtain Prime numbers by the sieve of Eratosthenes, and Moreover, we have found some large Prime number which is called Mersenne Prime number expessed by 2^n-1(n=6972593), using Computer. For example, 2^107-1 =162259276829213363391578010288127

On the other hands, Prime numbers make composite numbers using multiplicator among two or more pairs of Prime numbers. And their numbers are all different numbers and are different from Prime numbers. This property can be extended to define a set which is called GAIISUU.

Here, we define GAIISUU as a extention of Prime number like this.
So far, We obtain Some examples of GAIISUU, and some properties and an expectation of G.
And we show a table of GAIISUU-IKI with Evaluation number 2 on ADDITION, etc.

1. TEXT

1.1 Definition of Gaiisuu

［**DEFI 1**］

On any two elements gi, gj of a subset G in Natural Numbers, we make the sum（Sij）of gi and gj. Then, Sij（=gi+gj） are all different numbers for different pair（i, j）,（i<=j）of Natural number, at the same time, Sij are not contained in G.

G is called GAIISUU-IKI with Evaluation number 2 on ADDITION, and an element of G is GAIISUU, and Sij is called as GAISUU, and the SET of Sij is called GAI-IKI.

［**Exp 1**］(1) {1,2^2,3^3,4^4,........ }
{∵ n^n+j^j<（n+1）^n}

(2) {2^j-1}
{∵ 2^j-1+2^j-1 ≠ 2^k-1+2^l-1}

［**Prop 1**］ Differences between arbitraly two elements in a set GAISUU are different from each other.

{∵ $gi+gj \neq gk+gl \Rightarrow gi-gk \neq gl-gj$}

［**Exp 2**］

One method to generate GAIISUU with Eno. 2 on ADDITION

Table 1

外異数 域 G	$g_1=1$	$g_2=3$	$g_3=7$	$g_4=12$	・・・gi	・・・gj
$g_1=1$	(1+1)=2					
$g_2=3$	(3+1)=4	(3+3)=6				
$g_3=7$	8	10	14			
$g_4=12$	13	15	19	24		
	GAIIKI（WAIKI） 外域（和域）		GAISUU （外数）			
gj	gj+g1	gj=g2	gj+g3	・・・・・・・・	gj+gi	gj+gj

［**process of generating table**］

In the case of g1=1, the GAISUU is 1+1=2 and considering smallest number 3 except 1 and 2, this time GAISUU 4（3+1）and 6（3+3）apear. AS the result, all of 1,2,3,4,6（GAIISUU and GAISUU）are different.THen considering 5 which is not included among them, 5 does not become GAIISUU in that case from the fact of 5+1=6. If smallest number 7 except 1,2,3,4 and 6 is assumed as GAIISUU, then from the calculation 7+1=8, 7+3=10 and 7+7=14, all the obtained numbers of 1,2,3,4,6,8,10 and 14 are different number from each other. Then sequence of GAIISUU 1, 3, and 7 are generated. After then, 12 is taken as g4. In a similar way, this process proceeds. By manual calculation,g13=181 was obtained. Using Basic program based on algorithm of that process, g50=5122 by our computer, and g300=524306 was obtained by fortran code on NEC Value star V13

［**Expectation**］

（1）This sum area（WA-IKI）in table1 is included in difference region（SA-IKI）.

（2）The UNION of sets being GAIISUU-IKI or SA-IKI coincides with the whole of Natural numbers.

外異数和差表.txt

［**DEFI** ２］

When G has the condition of DEFI-1, and also has following condition, then we call G GAIISU-IKI with Eno. 3 on ADDITION.

The condition mentioned above is following

CONDITION

On arbitraly three elements gi, gj,gk of a subset G in Natural Numbers, we make the sum（Sijk）of gi ，gj ，gk. Then, Sijk（=gi+gj+gk） are all different numbers for different pair（i, j, k)，（i<=j<=k）of Natural number, at the same time, Sijk are not contained in G.

［**Exp 3**］｛1,10^1,10^2,10^3,・・・・・・｝

1.2 About Operator

When , on the definition of［Defi 1］, we use MULTIPLICATION instead of ADDITION as operator, then another G set can be defined. As same as［DEFI 2］, we can define G concerning of MULTIPLICATION. And we can also define other G , using other OPERATOR.

1.3 Prime Number as GAIISUU

we can define formar Prime number as GAIISUU , using MULTIPLICATOR and Evaluation number infinity（∞）, and making Maximum set.

Sincerely yours

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