Title: 13-Golden Pattern
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Abstract: This paper develops the divisibility of the so-called **Simple Primes numbers-13**, the discovery of a pattern to infinity, the demonstration of the inharmonics that are 2,3,5,7,11,13 and the harmony of 1. The discovery of infinite harmony represented in fractal numbers and patterns. This is a family before the prime numbers. This paper develops a formula to get simple prime number-13 and simple composite number-13
The simple prime numbers-13 are known as the **17-rough numbers**.

Keywords: Golden Pattern, 17-Rough number, divisibility, Prime number, composite number.

Simple Prime Number-13

In order to understand how simple Primes numbers work in this text, the approach is partial, only use divisible digits from 1 to 13. For a number to be considered Simple Prime number-13 by dividing it by 2, 3, 4, 5,6,7,8,9,10,11,12,13 must give a decimal result.
Simple Prime numbers-13 are those that are only divisible by themselves and by unity. Those that can be divided by other numbers from (2 to 13) are called Simple composite number-13
Positive integers that have no prime factors less than 17.

Simple Prime Number $\in \mathbb{Z}$
The simple prime numbers-13 maintain equivalent proportions in the positive numbers and also in the negative numbers.
In this paper the demonstrations are made with numbers $\in \mathbb{N}$

Introduction

This work is the continuation of the **Golden Pattern** papers published in http://vixra.org/abs/1801.0064, in which the discovery of a pattern for simple prime numbers has been demonstrated (For a number to be considered Simple Prime number-7 by dividing it by 2, 3, 4, 5, 6, 7, 8, 9, must give a decimal result.). If it resulted in integers numbers, it would be simple composite number-7.
Reference A008364 The On-Line Encyclopedia of Integer Sequences.

In this paper we continue to develop demonstrations in which it is easy to see and with very simple accounts that the simple prime numbers of the 13-Golden Pattern maintain impressive proportions and equivalences.
All the numbers are kept in a precise order, forming equivalent sums and developing an infinite harmony.

Special cases

In this text the N ° 2, 3, 5, 7, 11,13 are not Simple Prime number-13. The calculations and proportions prove it and its reductions also. We can observe in the table that these numbers are simple composite number-13 since in the following patterns they work in that way.

The number 1 is a Simple prime number-13. It is a number that generates balance and harmony, it is a necessary number, it is the first number of the pattern, but it is also the representative of the first number of each pattern to infinity.
Graph 3 and 4 of this paper demonstrate this.
A007775 Reference The On-Line Encyclopedia of Integer Sequences.

The 1 is Simple Prime Number, since the subsequent reductions in the Patterns to infinity in its place always reduce to 1 and maintain a precise equivalence and proportions.
90.091 = 1 This is the first Number of Pattern 2
180.181 = 1 This is the first Number of Pattern 3

The sums of the digits of these examples are 1.
90091=9+0+0+9+1=19=1+9=**10** =1+0= **1**
1+8+0+1+8+1=19=1+9=**10** =1+0= **1**

Construction of the 13-Golden Pattern

The product of the prime numbers up to number 13 inclusive, multiplied by 3, generates a result that indicates how many numbers there are in the 13-Golden Pattern. (The number 3 arises from the 3 different reductions that occur in each of its sequences: in A=6 * n + 1 (reductions 1,4,7) in B=6 * n-1 (reductions 2,5,8)

Example
(2*3*5*7*11*13)*3 = 30.030*3 = **90.090**

13-Golden Pattern

The pattern found is from 1 to 90.090. It repeats itself to infinity respecting that proportion every 90.090 numbers. The 13-Golden Pattern is formed by a rectangle of 6 columns x 15.015 rows.
The simple prime numbers-13 fall in only two columns in the one of the 1 (Column A) and the one of the (column B) They are painted yellow. The rest of the columns are simple composite numbers-13. These are painted by red color.

The 13-Golden Pattern is divided into three Triplet Sectors. From 1 to 30.030, from 30.031 to 60.060 and from 60.061 to 90.090 proportional. These are identical, the only variable are their reductions. Which combine to the left in combinations of 1,4,7 and to the right in combinations of 2,5,8. We can see that each sector works as a pattern with the following. The same happens with the 13-Golden Pattern.

Example:

13-Golden Pattern (1 to 90.090)

Sector 1 (1 to 30.030)
Sector 2 (30.031 to 60.060)
Sector 3 (60.061 to 90.090).

Red: Reduction (sum of the digits of simple prime numbers-13)

Red	Sector 1						Red
1	1	2	3	4	5	6	
	7	8	9	10	11	12	
	13	14	15	16	17	18	8
1	19	20	21	22	23	24	5
	25	26	27	28	29	30	2
4	31	32	33	34	35	36	
1	37	38	39	40	41	42	5
7	43	44	45	46	47	48	2
	49	50	51	52	53	54	8
	55	56	57	58	59	60	5
7	61	62	63	64	65	66	
4	67	68	69	70	71	72	8
1	73	74	75	76	77	78	
7	79	80	81	82	83	84	2
	85	86	87	88	89	90	8
	91	92	93	94	95	96	
7	97	98	99	100	101	102	2
4	103	104	105	106	107	108	8
1	109	110	111	112	113	114	5
	115	116	117	118	119	120	
	121	122	123	124	125	126	
1	127	128	129	130	131	132	5
	133	134	135	136	137	138	2
4	139	140	141	142	143	144	
	145	146	147	148	149	150	5
7	151	152	153	154	155	156	
4	157	158	159	160	161	162	
1	163	164	165	166	167	168	5

Red	Sector 2						Red
7	30031	30032	30033	30034	30035	30036	
	30037	30038	30039	30040	30041	30042	
	30043	30044	30045	30046	30047	30048	5
7	30049	30050	30051	30052	30053	30054	2
	30055	30056	30057	30058	30059	30060	8
1	30061	30062	30063	30064	30065	30066	
7	30067	30068	30069	30070	30071	30072	2
4	30073	30074	30075	30076	30077	30078	8
	30079	30080	30081	30082	30083	30084	5
	30085	30086	30087	30088	30089	30090	2
4	30091	30092	30093	30094	30095	30096	
1	30097	30098	30099	30100	30101	30102	5
7	30103	30104	30105	30106	30107	30108	
4	30109	30110	30111	30112	30113	30114	8
	30115	30116	30117	30118	30119	30120	5
	30121	30122	30123	30124	30125	30126	
4	30127	30128	30129	30130	30131	30132	8
1	30133	30134	30135	30136	30137	30138	5
7	30139	30140	30141	30142	30143	30144	2
	30145	30146	30147	30148	30149	30150	
	30151	30152	30153	30154	30155	30156	
7	30157	30158	30159	30160	30161	30162	2
	30163	30164	30165	30166	30167	30168	8
1	30169	30170	30171	30172	30173	30174	
	30175	30176	30177	30178	30179	30180	2
4	30181	30182	30183	30184	30185	30186	
1	30187	30188	30189	30190	30191	30192	
7	30193	30194	30195	30196	30197	30198	2

Red	Sector 3						Red
4	60061	60062	60063	60064	60065	60066	
	60067	60068	60069	60070	60071	60072	
	60073	60074	60075	60076	60077	60078	2
4	60079	60080	60081	60082	60083	60084	8
	60085	60086	60087	60088	60089	60090	5
7	60091	60092	60093	60094	60095	60096	
4	60097	60098	60099	60100	60101	60102	8
1	60103	60104	60105	60106	60107	60108	5
	60109	60110	60111	60112	60113	60114	2
	60115	60116	60117	60118	60119	60120	8
1	60121	60122	60123	60124	60125	60126	
7	60127	60128	60129	60130	60131	60132	2
4	60133	60134	60135	60136	60137	60138	
1	60139	60140	60141	60142	60143	60144	5
	60145	60146	60147	60148	60149	60150	2
	60151	60152	60153	60154	60155	60156	
1	60157	60158	60159	60160	60161	60162	5
7	60163	60164	60165	60166	60167	60168	2
4	60169	60170	60171	60172	60173	60174	8
	60175	60176	60177	60178	60179	60180	
	60181	60182	60183	60184	60185	60186	
4	60187	60188	60189	60190	60191	60192	8
	60193	60194	60195	60196	60197	60198	5
7	60199	60200	60201	60202	60203	60204	
	60205	60206	60207	60208	60209	60210	8
1	60211	60212	60213	60214	60215	60216	
7	60217	60218	60219	60220	60221	60222	
4	60223	60224	60225	60226	60227	60228	8

Graph table 1

In each **Sector** there are 5760 simple prime numbers-13. And in the Total Pattern there is the triple, Then there are 17280 Simple Primes numbers-13.
Nps= Simple Prime Numbers-13

In columns A there are composite numbers greater than 3 and simple prime numbers under the sequence $6 * n + 1$
In column B there are composite numbers greater than 3 and simple prime numbers under the sequence $6 * n - 1$

Throughout this text we will work with these two columns mainly.

1) Addition Simple Primes Number-13 by **Sector**.

Nps= Simple prime Numbers-13

$$Sector\ 1 \sum_{Nps \geq 1}^{30.030} 5.760\ Simple\ \text{prime}\ numbers - 13 = \ 86.486.400$$

$$Sector\ 2 \sum_{Nps \geq 30.031}^{60.060} 5.760\ Simple\ \text{prime}\ numbers - 13 = 259.459.200 \qquad \text{Difference } 172.972.800$$

$$Sector\ 3 \sum_{Nps \geq 60.061}^{90.090} 5.760\ Simple\ \text{prime}\ numbers - 13 = 432.432.000 \qquad \text{Difference } 172.972.800$$

Total

$$13 - Golden\ Pattern \sum_{Nps \geq 1}^{90.090} 17.280\ Simple\ Prime\ numbers - 13 \ = 778.377.600$$

Conclusion 1

Each SECTOR is multiple x3, x5 with respect to the first. Also to infinity if we are adding 30.030 next numbers (x7, x9, x11, etc.)

The differences 172.972.800 are repeated for every 30.030 numbers. The difference is equal to the sum of **simple prime number-13 of Sector 1** by two.

The total is equal to the sum of **simple prime number-13 of Sector 1** by 9.

Total 778.377.600=86.486.400 $*$ 9

2) Addition of Composite numbers-13 by Sector (only composite numbers divisible by numbers greater than 3, column A, B)

Nc= Composite Numbers-13

$$Sector\ 1 \sum_{Nc \geq 1}^{30.030} 9.530\ \text{Composite}\ numbers - 13 = \ 143.092.950$$

$$Sector\ 2 \sum_{Nc \geq 30.031}^{60.060} 9.530\ \text{Composite}\ numbers - 13 = 429.278.850 \qquad \text{Difference } 286.185.900$$

$$Sector\ 3 \sum_{Nc \geq 60.061}^{90.090} 9.530\ \text{Composite}\ numbers - 13 = 715.464.750 \qquad \text{Difference } 286.185.900$$

Total

$$13 - Golden\ Pattern \sum_{Nc \geq 1}^{90.090} 28.590\ Composite\ numbers - 13 = 1.287.836.550$$

Conclusion 2

Each SECTOR is multiple x3, x5 with respect to the first. Also to infinity if we are adding 30.030 next numbers (x7, x9, x11, etc.).

The difference 286.185.900 are repeated for every 30.030 numbers. The difference is equal to the sum of **simple composite number-13 of Sector 1** by 2.

The total is equal to the sum of **simple composite number-13 of Sector 1** by 9.

Total =1.287.836.550=143.092.950 $*$ 9

13-Golden Pattern, Simple Prime number-13

We can observe how the numbers are arranged in two columns, to the left the simple prime numbers-13 are reduced to combinations of 1,4,7 (column A) and to the right to combinations of 2,5,8 (column B). The reductions are formed by the sum of their digits.

This pattern works every 90.090 numbers. This works to infinity. If we started from 90.091 we would obtain the following table up to 180.180 in which we would find that the locations of the yellow colors (simple prime numbers-13) and red (Simple composite numbers-13) coincide in 100% of the cases.

The 13-Golden pattern keeps the colors in the same location and also the numbers match their reductions.

Example
1=1
90.091=**1**

Red: Reduction (sum of the digits of simple prime numbers-13)

Red	13-Golden Pattern						Red
1	1	2	3	4	5	6	
	7	8	9	10	11	12	
	13	14	15	16	17	18	8
1	19	20	21	22	23	24	5
	25	26	27	28	29	30	2
4	31	32	33	34	35	36	
1	37	38	39	40	41	42	5
7	43	44	45	46	47	48	2
	49	50	51	52	53	54	8
	55	56	57	58	59	60	5
7	61	62	63	64	65	66	
4	67	68	69	70	71	72	8
1	73	74	75	76	77	78	
7	79	80	81	82	83	84	2
	85	86	87	88	89	90	8
	91	92	93	94	95	96	
7	97	98	99	100	101	102	2
4	103	104	105	106	107	108	8
1	109	110	111	112	113	114	5
	115	116	117	118	119	120	
	121	122	123	124	125	126	
1	127	128	129	130	131	132	5
	133	134	135	136	137	138	2
4	139	140	141	142	143	144	
	145	146	147	148	149	150	5
	Continue to 90.090						

Red	Next Pattern						Red
1	90091	90092	90093	90094	90095	90096	
	90097	90098	90099	90100	90101	90102	
	90103	90104	90105	90106	90107	90108	8
1	90109	90110	90111	90112	90113	90114	5
	90115	90116	90117	90118	90119	90120	2
4	90121	90122	90123	90124	90125	90126	
1	90127	90128	90129	90130	90131	90132	5
7	90133	90134	90135	90136	90137	90138	2
	90139	90140	90141	90142	90143	90144	8
	90145	90146	90147	90148	90149	90150	5
7	90151	90152	90153	90154	90155	90156	
4	90157	90158	90159	90160	90161	90162	8
1	90163	90164	90165	90166	90167	90168	
7	90169	90170	90171	90172	90173	90174	2
	90175	90176	90177	90178	90179	90180	8
	90181	90182	90183	90184	90185	90186	
7	90187	90188	90189	90190	90191	90192	2
4	90193	90194	90195	90196	90197	90198	8
1	90199	90200	90201	90202	90203	90204	5
	90205	90206	90207	90208	90209	90210	
	90211	90212	90213	90214	90215	90216	
1	90217	90218	90219	90220	90221	90222	5
	90223	90224	90225	90226	90227	90228	2
4	90229	90230	90231	90232	90233	90234	
	90235	90236	90237	90238	90239	90240	5
	Continue to 180.180						

Graph table 2
Reference A008366 The On-Line Encyclopedia of Integer Sequences

3) Simple Prime Numbers-13 by Pattern

Nps= Simple Prime Numbers-13

$$13 - \text{Golden Pattern} \sum_{Nps \geq 1}^{90.090} 17.280 \; Simple \; Prime \; numbers - 13$$

$$Pattern \; 2 \sum_{Nps \geq 1}^{180.180} 34.560 \; Simple \; Prime \; numbers - 13$$

$$Pattern \; 3 \sum_{Nps \geq 1}^{270.270} 51.840 \; Simple \; Prime \; Numbers - 13$$

Conclusion 3

It is repeated to infinity every 90.090 numbers. The 13-Golden Pattern is multiplied by x2, x3, x4, x5, etc with respect to the following patterns.

4) Addition Simple Primes Numbers-13 by Pattern

Nps= Simple Prime Numbers-13

$$13 - \text{Golden Pattern} \sum_{Nps \geq 1}^{90.090} = 778.377.600$$

$$Pattern\ 2 \sum_{Nps \geq 90.091}^{180.180} = 2.335.132.800$$ Difference with the **13 − Golden Pattern is** x3

$$Pattern\ 3 \sum_{Nps \geq 180.181}^{270.270} = 3.891.888.000$$ Difference with the **13 − Golden Pattern** is x5

Conclusion 4

The model continues to multiply and is repeated to infinity every 90.090 numbers. (Odd Multiples for totals, x3, x5, x7,x9, etc.)
The difference is repeated for every 90.090 numbers.
The difference is equal to the sum of simple prime number-13 of **13-Golden Pattern** by two.

5) Addition Simple Primes Numbers-13 by Pattern in total

Nps= Simple Prime Numbers-13

$$17.280 \text{ simple prime number in } 13 - \text{Golden Pattern} \sum_{Nps \geq 1}^{90.090} = 778.377.600$$

$$34.560 \text{ simple prime number} - 13 \ \ to\ Pattern\ 2 \sum_{Nps \geq 1}^{180.180} = 3.113.510.400$$

Difference with the **13 − Golden Pattern** is **x 4**

$$51.840 \text{ simple prime number} - 13 \ \ to\ Pattern\ 3 \sum_{Nps \geq 1}^{270.270} = 7.005.398.400$$

Difference with the **13 − Golden Pattern** is **x 9**

$$69.120 \text{ simple prime number} - 13 \ \ to\ Pattern\ 4 \sum_{Nps \geq 1}^{360.360} = 12.454.041.600$$

Difference with the **13 − Golden Pattern** is **x 16**

$$86.400 \text{ simple prime number} - 13 \ \ to\ Pattern\ 5 \sum_{Nps \geq 1}^{450.450} = 19.459.440.000$$

Difference with the **13 − Golden Pattern** is **x 25**

Conclusion 5

The model continues to multiply and is repeated to infinity every 90.090 numbers. (Odd Multiples for totals, x4, x9, x16,x 25, etc.).
The differences work with the formula x^2

Example

13-Golden Pattern $1^2 = \mathbf{1}$
Pattern 2= 2^2=**4**
Pattern 3= $3^2 = \mathbf{9}$
Pattern 4= $4^2 = \mathbf{16}$
Pattern 5= 5^2= **25**

6) Addition of Composite numbers-13 by Pattern (only composite numbers divisible by numbers greater than 3)

Nc= Composite Numbers-13

$$13 - \text{Golden Pattern} \sum_{Nc \geq 1}^{90.090} 28.590\ composite\ number - 13 = \quad 1.287.836.550$$

$$Pattern\ 2 \sum_{Nc\geq 90.091}^{180.180} 28.590\ composite\ number - 13 = 3.863.509.650$$

Difference with the 13 − Golden Pattern is x3

$$Pattern\ 3 \sum_{Nc\geq 180.181}^{270.270} 28.590\ composite\ number - 13 = 6.439.182.750$$

Difference with the 13 − Golden Pattern is x5

Conclusion 6

There is also a difference between each Pattern of 2.575.673.100. These is equal to the sum of the numbers composite-13 (13-Golden Pattern) by 2. We could keep multiplying, x7, x9, x11, etc. To infinity every 90.090 more numbers.

7) Addition of composite Numbers-13 by Pattern in total, (only composite numbers divisible by numbers greater than 3)

Nc= Composite Numbers-13

$$28.590\ \text{Composite number in } 13 - \text{Golden Pattern} \sum_{Nc\geq 1}^{90.090} = 1.287.836.550$$

$$57.180\ Composite\ number - 13\ \ to\ Pattern\ 2 \sum_{Nc\geq 1}^{180.180} = 5.151.346.200$$

Difference with the **13 − Golden Pattern** is **x 4**

$$85.770\ Composite\ number - 13\ \ to\ Pattern\ 3 \sum_{Nc\geq 1}^{270.270} = 11.590.528.950$$

Difference with the **13 − Golden Pattern** is **x 9**

Conclusion 7

The number of composite number-13 is related to the next pattern every 90.090 more numbers.
The model continues to multiply and is repeated to infinity every 90.090 numbers. (Odd Multiples for totals, x4, x9, x16,x 25, etc.).

The differences work with the formula x^2

Example

13-Golden Pattern $1^2 = \mathbf{1}$
Pattern 2= 2^2=**4**
Pattern 3= $3^2 = \mathbf{9}$
Pattern 4= $4^2 = \mathbf{16}$
Pattern 5= 5^2= **25**

Demonstration 1
Formula to get simple prime number-13

Example and demonstration of the formula is divided into 2 columns.

On the left we will calculate the simple prime number-13 located in (A), on the right we will calculate the prime numbers-13 located in (B).

$P_{13\ (A)}$= $S.Prime\ numbers - 13\ in\ column(A)$ $Z = numbers \geq 0$	$P_{13\ (B)}$ = $S.Prime\ numbers - 13\ in\ column\ (B)$ $Z = numbers \geq 0$
$$P_{13\ (A)} = (6 * n_{\substack{n\geq 0 \\ n\neq 1 \\ n\neq 2 \\ n\neq 4+5*Z \\ n\neq 8+7*Z \\ n\neq 9+11*Z \\ n\neq 15+13*Z}} + 1)$$ $n \neq 1,2,4,8,9,14,15,19,20,22, \dots \dots ..$ **Using values correct for:** $n = 0,3,5,6,7,10,11,12, \dots .$	$$P_{13\ (B)} = (6 * n_{\substack{n>2 \\ n\neq 6+5*Z \\ n\neq 6+7*Z \\ n\neq 13+11*Z \\ n\neq 11+13*Z}} - 1)$$ $n \neq 6,11,13,16,20,21, \dots \dots ..$ **Using correct values for** $n = 3,4,5,7,8,9,10,12,13,14,15, \dots$ **We get the following Simple prime numbers-13.**

We get the following Simple prime numbers-13. $P_{13\ (A)} = 1,19,31,37,43,49,61,67,73, \ldots.$	$P_{13\ (B)} = 17,23,29,41,47,53,59,71,83,89, \ldots$

The formula for calculating the Simple Prime numbers-13 is based on Zeolla Gabriel's paper on how to obtain prime numbers.
http://vixra.org/abs/1801.0093

Reference A008366 The On-Line Encyclopedia of Integer Sequences

Demonstration 2
Formula to get simple composite number-13

Example and demonstration of the formula is divided into 2 columns.

On the left we will calculate the simple composite number-13 located in (A), on the right we will calculate the composite numbers-13 located in (B).

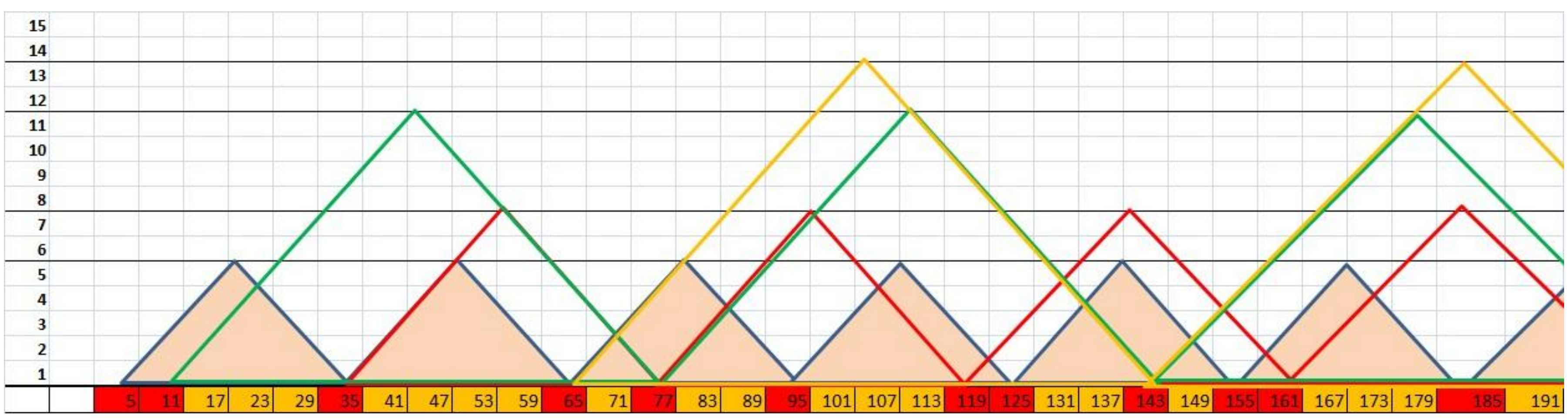
$Nc_{13\ (A)}$= $S.Composite\ numbers - 13\ in\ column(A)$ $Z = numbers \geq 0$	$Nc_{13\ (B)}$= $S.Composite\ numbers - 13\ in\ column\ (B)$ $Z = numbers \geq 0$
$Nc_{13\ (A)} = (6 * n_{\substack{n=1 \\ n=2 \\ n=4+5*Z \\ n=8+7*Z \\ n=9+11*Z \\ n=15+13*Z}} + 1)$ $n = 1,2,4,8,9,14,15,19, \ldots.$ **We get the following S. Composite numbers-13.** $Nc_{13\ (A)} = 7,13,25,49,55,85,91,115, \ldots.$	$Nc_{13\ (B)} = (6 * n_{\substack{n=1 \\ n=2 \\ n=6+5*Z \\ n=6+7*Z \\ n=13+11*Z \\ n=11+13*Z}} - 1)$ $n = 1,2,6,11,13,16,20,21, \ldots \ldots$ **We get the following S. Composite numbers-13.** $Nc_{13\ (B)} = 5,11,35,65,77,95,119,125, \ldots..$

The formula for calculating the Simple composite numbers-13 is based on Zeolla Gabriel's paper on how to obtain prime numbers and composite numbers. http://vixra.org/abs/1801.0093

Graphics

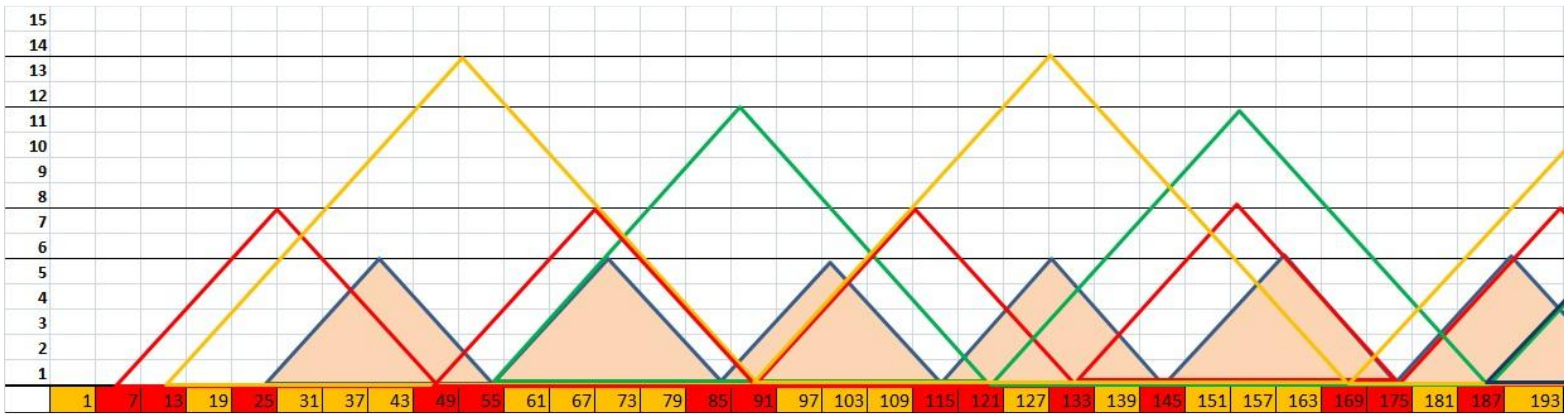
In the vertices of the triangles on the line are the composite numbers-13. The rest are Simple Prime numbers-13
The base triangles 5 form composite numbers multiples of 5.
The base triangles 7 form composite numbers multiples of 7.
The base triangles 11 form composite numbers multiples of 11.
The base triangles 13 form composite numbers multiples of 13.

Sequence $B = 6 * n - 1 \quad n > 0$



Graphic 3
Reference A016969 (The On-line Enciclopedia of integers sequences)

Sequence $A = 6*n+1 \quad n \geq 0$



Graphic 4
Reference A016921 (The On-line Enciclopedia of integers sequences)

Final conclusion

The 13-Golden Pattern is the confirmation of an order to infinity in equilibrium, each column is in harmony and balance with the other, the demonstration of the inharmony of 2, 3, 5, 7, 11, 13 is very great. The number 1 is necessary and generates balance. Simple Prime Numbers-13 are a family prior to the Classical Prime Numbers.
The sum of the composite numbers-13 and the simple prime numbers-13 demonstrate incredible proportions that indicate that they have a fractal behavior.
The reductions of the 13-Golden Pattern are infinitely repeated every 90.090 numbers.
The proportions of the 13-Golden pattern are exactly equal and proportional to the 7-golden pattern. (http://vixra.org/abs/1801.0064), and other patterns with different prime numbers.
The formula for obtaining the simple Prime numbers-13 and composite number-13 works successfully, we only have to condition (n) to obtain the expected results.
I can affirm that there are infinite different patterns with different prime divisors, which maintain a great harmony between columns A, B, they are always in balance, they present infinite proportions, fractal symmetries, All patterns have the same procedure. They are all different and they are very linked.

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