Canadian Journal on Signal Processing Vol. 2, No. 3, June 2011

Distribution of Prime Numbers

Ouannas Moussa
2 Rue BG 04345 Algeria
Phone : 00213774946941
mouannas@hotmail.com

Abstract :

In this paper I present the distribution of prime numbers which was treated in many researches by studying the function of Riemann; because it has a remarkable property; its non trivial zeros are prime numbers; but in this work I will show that we can find the distribution of prime numbers on remaining in natural numbers only.

1.Introduction :

The bone Ishango discovered there are nearly 20000 years and yet, it seems that we are only at starting point of understanding the prime numbers; we ignore how they are distributed, how they behave among themselves or in set of natural numbers.
However, you will see in this studying that there is a mean to clarify the distribution on using natural numbers only. I think all the formulas and technics to run anything in this world already exist but only hidden, simply wait for the « moment » to remove the membrane that blind us according to some special characteristics.
The resolution of the Riemann zeta function ($\xi(s) = 0$) means knowing all non trivial zeros of the function; we previously thought that they are prime numbers but according to the study done by **Harry k.Kahn: arXiv: 0801.4049 v1**; these zeros are also numbers that are the product of two primes, he has spoken that there are two lines: the first contains the multiples of seven (7) and the other multiples of eleven (11), whereas in my study I do not found only multiples of (7 and 11) but those of 13, 17,19,23,29,31,37, ...
Moreover, under **Article arXiv: 0810.0095 of Shi Huang**; as it seems "some mathematicians Have Suspected Link Between a premium numbers and secrets of creation".
A remark which led me to admire our surroundings and daily life and to whom we rarely pay attention.
In the world of bees, the natural sciences have taught us that when a bee wants to Inform its congeners that it has found a field of flowers, it begins to dance in eight (8), on the other hand there is no evidence that the human body needs eight (8) hours for rest: this is not a coded message ... ... the distribution of prime numbers is tangible proof.
This distribution already exists but only hidden, so whatever our understanding of phenomena and things; it is seemed that we are at starting point.

2.Spliting up of the natural integers :

I established a table where the first line start from 1 until 19 and the second from 20 to 38 …. in **Fig I**.
After coloring the prime numbers in blue and the non-prime in red; it appears that they are adjusted (from left to right and from top to bottom) according to two (02) oblique lines of the following formulas:
□
$19(5+6a) + 18\,k$ / $n = 5+6a$ et $n = 1+6a$ avec n et a € N
$19(1+6a) + 18k$ k € N $0 \leq k \leq 18$

It appears also that they are adjusted (from left to right and from bottom to top) according to four (04) oblique lines of the following formula:

$19n – 20k$ / n and k € N $0 \leq k \leq 18$ with $n \neq 5b$ / b € N

I noticed that the two (02) lines and the four (04) intersect in 08 points so we obtain groups of 08 numbers.
But the 08 numbers are not all prime numbers; those which are non-prime are a product of two prime numbers from 7 to infinity or the power of some prime numbers**, « 8 is the rank of 19 in set of prime numbers »** ; is it here a coincidence ?
It appears clearly that the prime numbers are distributed in groups of 08 numbers which can be obtained with the following formula:

$2x3x5\ n + 2k+3$ / n an k € N and k= {2, 4, 5, 7,8, 10, 13,14}

Thus , the numbers 2k+3 which are 7,11,13,17,19,23,29,31 constitute the basis not only for the obtention of the prime numbers but to determine their rank(rate) and also for eliminating the non-prime numbers.

FIG 1 :

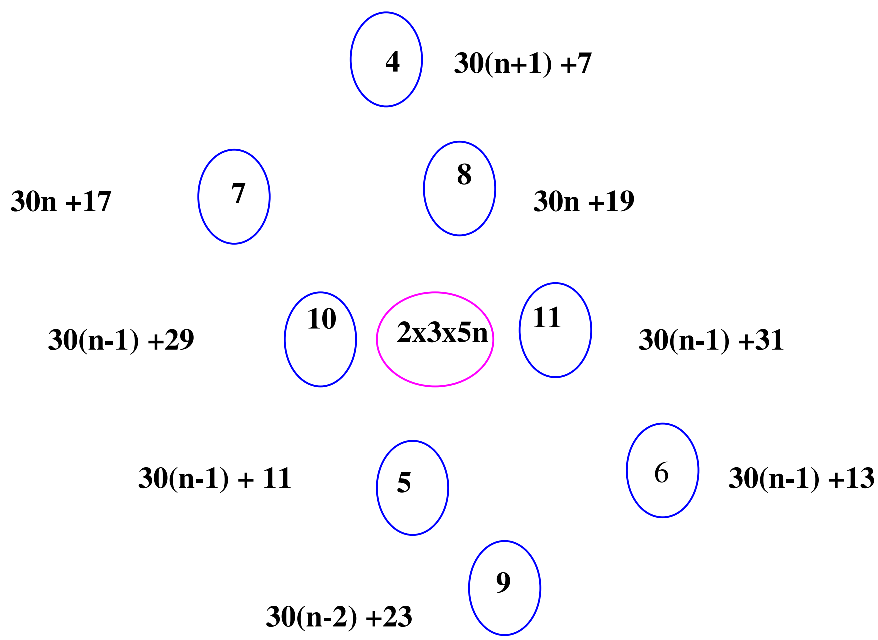
932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	
913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	
894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	
875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	
856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	
837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	
818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	
799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	
780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	
742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	
723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	
704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	
685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	
666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	
647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	
628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	
609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	19n-20b
590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	
571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	19n-20b
552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	
533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	19n-20b
514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	
495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	19n-20b
476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	
457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	
438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	
419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	
400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	
381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	
362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	
343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	
324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	
305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	
286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	
267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	
248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	
229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	
210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	
191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	
172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	
153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	
134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	
115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	19(1+6a) +18k
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	19(5+6a) +18k
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	

prime number **non prime number** **2x3x5 n**

The eight (8) numbers (prime and non prime) which belong to the Distribution can be written in this form:

X=30n+2k+3   with 2k+3= {7, 11, 13, 17, 19, 23, 29, 31}

Fig 2:



I replaced 7, 11,13,17,19,23,29,31 by their ranks P_4, P_5, P_6, P_7, P_8, P_9, P_{10}, P_{11} because it is a mean to determine the rank of the prime numbers. I also established a table of non-prime numbers periods which belongs to the distribution; those numbers are the basis of primality testing.

<u>FIG 3:</u> Table of: - Primality testing
- Periods of non-prime numbers (np) in **P_k**

n	P_k	n	P_k	n	P_k	n	P_k	n	P_k	n	P_k	n	P_k	n	P_k
1	8	2	7	2	11	3	10	4	6	5	5	6	9	7	4
2	7	3	11	4	9	6	4	6	10	8	6	10	8	11	5
2	11	4	9	5	8	7	5	8	4	9	10	12	7	13	6
3	10	6	4	7	5	9	8	10	9	12	11	16	6	17	7
4	6	6	10	8	4	10	9	11	11	14	7	18	5	19	8
5	5	8	6	9	10	12	11	14	7	16	8	22	4	23	9
6	9	10	8	12	7	16	6	18	5	22	4	27	11	29	10
7	4	11	5	13	6	17	7	19	8	23	9	29	10	31	11

Additive:

The periods of the power of : 2x3x5n+2k+3=X+2k+3=Y

X+7	Pk	X+11	Pk	X+13	Pk	X+17	Pk	X+19	Pk	X+23	Pk	X+29	Pk	X+31	Pk
Y^2	8	Y^2	11	Y^2	8	Y^2	8	Y^2	11	Y^2	8	Y^2	11	Y^n	11
Y^3	6	Y^3	5	Y^3	4	Y^3	9	Y^3	8	Y^3	7	Y^3	10		
Y^4	11			Y^4	11	Y^4	11			Y^4	11				
Y^5	4			Y^5	6	Y^5	7			Y^5	9				

To better understand the table; it suffice to say that all numbers that are not primes but the product of two primes belonging to the distribution : 30n +7; 30n +11, 30n +13, 30n +17, 30n+ 19, 30n+ 23, 30n+ 29 and 30n+ 31 have a period depending on the positioning table.

3. Test of primality:

However, these numbers non prime are the basis of the algorithm for primality testing on writing n in the form n=α+ (30n+2k+3) β according to **the table of FIG 3**.
We choose X a natural number, if its last digit number is 7, 9, 1 or 3 it may be prime, so to know if it belongs to the group of 8 , we must do a subtraction.
If its digit number is 7 we retrench 7 or 17:
a/ if X-7 is not divisible by 2x3x5 i.e. 30, X is not prime and if it is divisible we obtain n; since X belongs to the group of 8; so we verify if it is not non-prime in the table on writing n in the forms:
n=α+ (30n+2k+3) β according to **the table of FIG 3**
If it is so, X is a prime number.
b/ if X is verified with 7 we do not need to verify with 17, if not we make the same process with 17.

Thus:
If the last digit number of X is 9 we retrench 29 or 19
If the last digit number of X is 1 we retrench 31 or 11
If the last digit number of X is 3 we retrench 23 or 13
and we proceed as previously.

Examples:
X=917
* X-7= 910/30 =30,333 not divisible by 30, it does not belong to the distribution.
* X-17 = 900/30 = 30 =n divisible by 30, so X belongs to the distribution and its position is P_7, now we give the forms of n=30:
n=2+7k →np in P_7 and in P_{11}
n=11+19k→ np in P_{11}
n= 4+13k→ np in P_9
Since X is in the position P_7 so it is not prime.
NB:
We can also form prime numbers as great as possible
Examples:
We choose n = 1600, so the eight (8) numbers are:
In
2 P_4 → 2x3x5x1600+7 = 48007
3 P_5→ 2x3x5x1600+11 = 48011
4 P_6 → 2x3x5x1600+13 = 48013
5 P7 → 2x3x5x1600+17 = 48017
6 P_8 → 2x3x5x1600+19 = 48019
7 P_9 → 2x3x5x1600+23 = 48023
8 P_{10} → 2x3x5x1600+29 = 48029
9 P_{11}→ 2x3x5x1600+31 = 48031
Now we give the forms of n:
1600=4+7k →np in P_6; n=4+19k→np in P_6
1600=5+11k n=13+23k→np in P_6
1600=9+43k→np in P_{11}; n=166+239k→np in P_5
1600=2+17k n=19+31k→np in P_8 ; 1600=14+61k→np in P_4
So numbers in P_4, P_5, P_6, P_8, P_{11} are non-prime, only numbers in P_9, P_{10}, P_7
48023, 48029 and 48017 are primes.

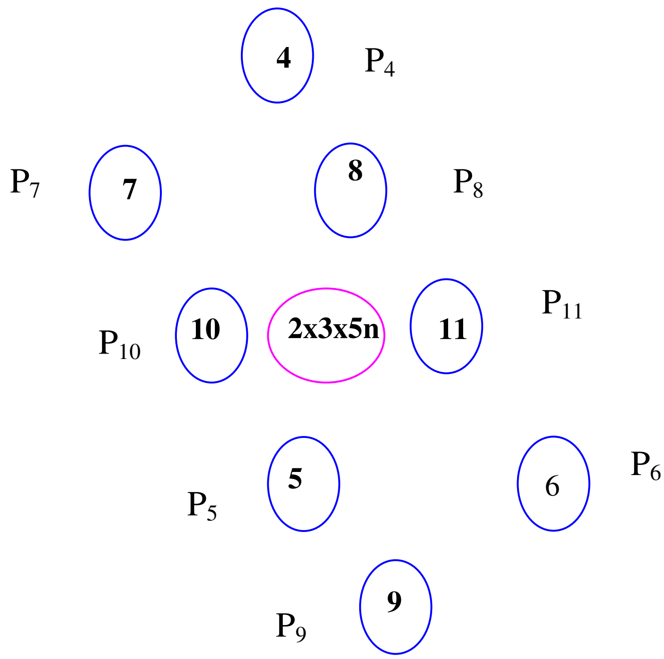
4. Determination of the rank:

$$\mathbf{R_n = 8\ n + P_k - np}$$

* $\mathbf{R_n}$ is the rank
* $\mathbf{P_k}$ is the position of the prime number with {4,5, 6, 7, 8, 9, 10, and 11}
* **np** the number of the non-prime numbers belong to the distribution before this prime number.

In this formula the only obstacle is the number of non-prime (np) which I will disclose in my next articles.

FIG 4:



Conclusion:

As a conclusion to this studying, I think that I clarified the distribution of prime numbers and found a mean to calculate them by splitting up the natural integers on using 19 and we can obtain this result only with 19 and 11.
On the other hand, it is not necessary to look for the density of prime numbers since we can talk about ranks.
In fact I have not found this distribution by coincidence, but just remove the membrane which blinds us, **on extracting from the Quran.**
In addition to that, I want to tell that I have found other mysterious secrets of prime numbers which I cannot disclose now.
All what I can say therefore that the primes are the cause of many phenomena that I shall reveal in my upcoming articles.

References.

1. Quran: Chapter 74 "Al Moddathir" verse "30; 31"

2. Legendre " Essai sur la théorie des nombres", Paris : Duprat, 1798

3. Hadamard, 1896, « sur la distribution des zéros de la fonction ζ(s) et ses conséquences arithmétiques. Bull.Soc.Math.France, XXIV, 199-220

4. Arxiv: 0801.4049v1: « About the logic of the prime number distribution »; submitted on 28 Jan 2008

5. Arxiv: 0801.0095v1: « Modeling the creative process of the mind by prime numbers and a simple proof of the Riemann Hypothesis »