Research and Development in Mathematics

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THE AGUILAR-ACHA PRIME NUMBERS

INTRODUCTION

By definition an ordinary prime number is a positive integer that cannot be expressed as a product of two or more smaller factors. Its only divisors are 1 and itself The set or succession of primes is infinite and apparently does not follow any role, order or simple law. So the enigma and problem is such that the model, density, structure and distribution of the absolute prime numbers continue to be extremely complicated, as well as the factorisation problem and the so called Riemann's hypothesis. Those are the great problems and challenges in number theory; still open to the study and research throughout the world.

BACKGROUND

Historically, a legion of professional and amateur mathematicians had put their best efforts to unveil intuitive1y or formally any method to solve these and other problems, within the framework of the decimal or ordinary system of numeration. Thousands of conjectures, hypotheses and theorems have been formulated, beginning with the most simple and incredible, up to the most complicated and even curious. Many have been proved, but the great majority not yet. They are in that respect known as the Fermaf s primes, the Mersenne' s primes, the Sophie Germain' s primes, the Factorial primes, the Twin primes, etc. We have also asked ourselves, How do you find the giant primes?, what is the formula?, Is there any efficient algorithm? How many primes are there up to any $n \in \mathbb{N}$? How do you identify methodically, systematically and mathematically the primes of pseudo-primes? Which are the roles and operators for those and other goals? How can you partition them for an efficient grid processing?

THE AGUILAR-ACHA'S PRIME NUMBERS

Our creative and unpublished research about the primes is based on the study and investigation of the inner properties and relations of the numbers themselves. So, that applying the deductive inductive method and the systematic and abstract reasoning of the mathematical logic, we could discover and prove a set of theorems, departing from 2,3,5, 7, ...n... ∞, which let us close a finished, logic and structured theory about the prime numbers. Following that innovative idea we have to generate what we call the Aguilar - Acha' s prime numbers. A special class of absolute primes endowed with some characteristic and unique properties, which allow us to formalize the generation of all the primes in a strict and logical manner.

So, avoiding to give technical details, such as formulas and algorithms in this scientific article whose purpose is most of all to divulge the discovery following a remarkable and fully proved

pattern we define as Aguilar Acha's primes, (¿Aguilar Acha's pseudoprimes?) for example the five following absolute prime numbers:

a) 83206188165605210378137

b) 126538706926124807309569391193189904083051 7

c) 44619154012697354916874972804312121957361090119

d) 450094620862682215953169056804394023557088230914503061621591

e) 518877112138033546772074939480389536215648591778864911544116363488791891897520593881 57

f) 552583969546453112013038027352330114437758481747916027067563572214691362080176780185 37
245997220083795039350306735969 61

g) 126318552719747637660147623919311653153406167899859505045731007015081794348338345064 90
567360888943871598306288538569848230486784949778275319844334140077246850487646271988 04
232176369907567163522587907551890826692284901281948816461867758117098659348852908613 11
71

h) 184814016794311834934630746353109481116141081500806079916163426711211049211107933640 64
280504069405944114740560930768278341061113213367112735061071368043915820512126064062 78
372406104416613881277081628262413608870811504120683721813806186081086436138040810933 88
079493050612067678564050693948034878081940837351072081210636278061080979119408367307 82
938280285430837221078061381377936061773394420779378087691806108370812081110761431121 38
787837238835064878120619479430835116950915108701923881123167811689918 7

i) 124647806117111210743510837435082220139467127062129805094533735110778816285847 9
167361692133751194086746186888069251588371041282751735880654652812453472825584 0
788718925537627071658484471744541353554488181073628255363480718187208101919192 0
991808080818818818810721010892919108289798908080891119183371835512889182553731 3
692808271282737069171718938911919116361061708085819288369169171729355282653718 9
745282019182790707171810291919108280717188171729191918109097720711928757171717 1
727287172928127045116264513716134615262640453587388371272647162626365872817386 3
627355556262611636371537289306554554359364292649471734630784641271810392644881 6
504626447182709830558407182562818834071735628188355452826142817355281972563891 8
301821634719287445537255458506862640437190891282163444429219587282646162654379 3
988289090906545367253710514868462889140546277644177044441389091984112658645383 0
612143712512811537210512104940655931787587185109938523868686958781385965836581 8
548454951043713661444719565251585687362825217367837 7

CONCLUSION

It is an extraordinary and outstanding discovery of $\mathbb{P} \subset \mathbb{N}$. With it, it has been unveiled an important set of mathematical relations that rule the Law of the Primes, based on our formulated and proved theorems, which have been rigorously proved by other national and international mathematicians.

APPLICATIONS

It has been said that they are surprising discoveries, which perhaps have been neglected by other mathematicians, because they are no other thing that numerical and recurrent patterns of new

order and style, from which we extract a kind of recipes or new operational algorithms in acceptable and competitive timing; which can be programmed more efficiently via supercomputers. With that in mind - since the required numbers are quite long - you end up requiring the most potent tools and batteries of processing power, to generate the prime numbers as big as-desired, including those that are truly world records of different types for a variety of industrial, technical and technological uses, as well as for theoretical and applied scientific ends.

FUTURE VISION

It is necessary to fully generalize this theory discovering and proving some other theorems unifying in the process the theory of numbers with the algebraic theory of numbers, the analyt:ic theory of numbers and the algebraic geometry, which will be undoubtedly a landmark in the advancement of its ruling law, and máybe the solution of important problems as the so called strong and weak Goldbach' s Conjectures, or the Riemann' s Hypothesis, the most important of the contemporary mathematical problems.

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First 990 prime numbers (**36 Kb**) (**10 Kb**)