INTEGER PRIME NUMBER

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ABSTRACT

Shown incomplete Gaussian number of primes. On infinite number of integers proposed finite-dimensional rows with the same (symmetrical rows) or different (asymmetric series) power on negative and positive (real) numbers. The center of symmetry of a symmetric number of the whole prime numbers concerning number 0 is reasonable. The row axis, its geometrical variations and parameters depending on number of couples of prime numbers are shown. The criticism of application of a natural logarithm for calculation of power of a number of prime numbers is given, and also the characteristic of a centuries-old psychological barrier at mathematicians and errors of approximation of ranks of prime numbers are shown. Are methods of identification of steady laws of distribution of the whole prime numbers and the analysis of the revealed wave functions of parameters of the provision of an axis at their symmetric ranks are given. The characteristic of the symmetric ranks offered by the author in comparison with a number of prime numbers of Gauss 2, 3, 5, 7, 11 is given, …. The fundamental law of distribution of the whole prime numbers is stated and its physical interpretation is given.

Keywords: Integer primes, symmetrical rows, geometry from power, kernel and center, parameters, symmetry axis, wave regularities.

INTRODUCTION

In 2200 and more years, a known number of prime numbers considered as a firm design [14]. However, as we will show further, known ranks of prime numbers appeared only special cases. Thus the mathematical description for the whole prime numbers even became simpler. There was also accurate geometrical interpretation of different symmetric and asymmetric ranks of the whole prime numbers.

It is interesting to note that to 15-year-old Gauss presented the book on logarithms with the appendix of a number of prime numbers which began with 1 [14].This series of prime numbers, starting with the unit, was shown in one of the films on the history of mathematics. But as an adult Gauss removed 1, and began to count the series since number 2. It is a simplification of series we believe the reason that long Gauss did not publish their results on the analysis of power series. Thus he walked away from the series itself, and began to count the number of prime numbers in the tens, hundreds, thousands, etc., that achieve planned by it still as age 15, well-known law of prime numbers. Subsequently Riemann this series 2, 3, 5, 7, 11, ... and we have left. The authority of the Gauss still so great that this inaccuracy of mathematics is still not taken into account. In the end, all is considering only asymmetric set consisting only of positive primes.

It is necessary to remember that Einstein was not fond of negative numbers and never used them. In the end, the psychological barrier of counter-making and also negative integers was very great. Therefore, all mathematicians have done not by a series of Prime numbers, but only the capacity of the truncated series that begins with 2.

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Criticism of the use of the natural logarithm. Gauss, Riemann, and after them other mathematicians became interested in the relative power $x/\pi(x)$ of the number of prime numbers with a truncated beginning (without 0 and 1, that is, of the series was discarded a whole system binary notation).

At that numbers always are presented only in a decimal numeral system. But, as we understood in the publications [4-9], it is necessary to pass to a binary numeral system. Thus we understood one: the person considers in decimal, and the nature – in binary numeral systems. As a result many unclear to mathematics of property of a number of prime numbers (for example, jumps of numbers in some places of a row) appeared simply on borders of blocks of binary notation.

Apparently, unconsciously, this indicator of relative power of a number of prime numbers $x/\pi(x)$ was a logarithmic with the irrational basis $e = 2{,}71...$. Here youth and Gauss's talent affected. However, thereby, upon transition from degree of ten to its natural logarithm, there was a so-called false identification. It also became the main mistake in the analysis of prime numbers when Gauss passed from the row to occurrence of prime numbers according to categories of a decimal numeral system.

Application $\ln 10$ brought in mathematical transformations to false for a number of natural numbers (and incomplete at first 0 and 1) idea. This idea assumes that in the subsequent categories of decimal system quantity of prime numbers all the time increases approximately on 2.3. Proceeding from this idea, adopted ***the law of prime numbers,*** that $\pi(x) \sim |x/\ln x|$.

The reason of such turn in studying of prime numbers was very trivial. As it is noted in article [14]: «Gauss, the greatest mathematician, discovered the law $\pi(x) \sim |x/\ln x|$ at the age of fifteen, studying the table of prime numbers, contained in given him the year before the table of logarithms». This commitment young Gauss was unshakable in the theory of prime numbers the next two centuries.

We have abandoned the use of the natural logarithm of 10. Then have passed to binary notation [7]. However it appeared that a traditional number of prime numbers is insufficiently correct at first 0 and 1. This incorrectness became more noticeable after cutting off of a so-called gain from the most prime number. The main shortcoming is that there is no negative half shaft here. Therefore a Gaussian number of prime numbers was asymmetric, located out of the beginning of a positive half shaft of natural numbers.

The contradiction between accident and regularity arises from the record of prime numbers in a decimal numeral system. Doesn't help but only confuses, transition to a logarithmic scale with the basis of number of time $e = 2{,}71...$. More precisely: the logarithmic scale of notation takes away from an essence of a number of prime numbers.

Strong psychological barrier

Gauss and its number of prime numbers long prevailed and over our thinking. But the first attempts of overcoming of a psychological barrier appeared already in [4]. Experience of inventive activity in equipment and technology, and also application in physical and mathematical researches of the strong theorem of Gödel about incompleteness, allowed to receive the first result which is stated in this article.

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A number of prime numbers studied since Euclid without 0 and 1 we called a ***traditional row*** $a(n) = \{2,3,5,7,11.13.17,...\}$ with order (serial number) $n = \{1,2,3,...\}$, which was considered by Gauss, Riemann and many others. But it appeared that serial number doesn't make essential substantial sense. Most important a dissonance or compliance between ranks $a(n) = \{2,3,5,7,11.13.17,...\}$ and natural numbers $\mathrm{N} = \{0,1,2,3,4,5,6,...\}$.

Their detailed factorial and statistical analysis in the program environment CurveExpert [12] showed that there ***complete series of prime numbers*** $\mathrm{P} = \{0,1,2,3,5,7,11,13,17,...\}$ on a positive half shaft of system of the Cartesian coordinates [5], equipotent to a number $\mathrm{N} = \{0,1,2,3,4,5,6,...\}$ of natural numbers. The complete series is displayed on two unequal parts: 1) finite-dimensional number of ***critical prime numbers*** $\mathrm{P} = \{0,1,2\}$; 2) ***noncritical prime numbers*** $\mathrm{P} = \{3,5,7,11,13,17,...\}$ in the form of an infinite-series. It shares in a different way also on: 1) elements of system of binary notation 0, 1; 2) traditional row $a(n) = \{2,3,5,7,...\}$. Among the whole prime numbers these structures remain.

The confidence of new scientific results after transformation of prime numbers in binary codes allowed to approach to consideration of the main question of the new theory - physical sense of growth of relative power of a number of prime numbers [5].

Briefly about identification methodology

Basic and well-defined view of the theory of prime numbers are positive integers in area (0; ∞). If the number j of natural numbers also be taken as a number of natural numbers $\mathrm{N} = \{0,1,2,3,4,5,6,...\}$, that any natural number will be determined by the expression $N_{j+1} = N_j + 1$.

The increase in natural numbers is always equal to one. Then we notice that any rank distribution is sequence any measured or otherwise obtained quantitative data on decrease or increase certain physical (the term in a general sense) ordinates as displays of any real phenomenon or process along abscissa axis. Moreover, the abscissa axis is always becoming a full range of natural numbers.

In a general sense any ordinate concerning number n separate fragments or completely belongs to a number of natural numbers. But in this case violated the order members primes regarding the adopted order j. As a result the nonlinear order $n \neq j$ on a positive half shaft of the abscissa, not coinciding with is established by ordinate.

About numerical systems

For the hierarchy between sets of numbers known expression [2, 11]:

$$\mathbb{P} \subset \mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R} \subset \mathbb{C}. \qquad (1)$$

The first two systems (prime and natural numbers) in our case are built in third (integers). Earlier [5] we lowered a type of integers of Z, because of rejection of negative numbers, even in ***a complete series of positive prime numbers*** $\mathrm{P} = \{0,1,2,3,5,7,11,13,17,...\}$. Therefore in the statistical analysis [4, 5] from prime numbers $\mathrm{P} \subset \mathrm{N}$ in [5] there was a jump to the real (real) numbers according to the scheme $\mathrm{P} \subset \mathrm{N} \subset R \not\subset C$. Moreover, the patterns are identified without regard to complex numbers C, but necessarily irrational numbers type $e = 2{,}71...$(number of time) and $\pi = 3{,}14...$ (number of spaces). In software environment CurveExpert accepted [10] 18 decimal places. It allows to compare regularities of a complete series of prime numbers to other fundamental physical constants [6].

Complicating the theory from [5], we accept from the scheme on a formula (1) and integers Z.

Then for the whole prime numbers the hierarchy (1) is given to the look scheme

$$\mathrm{P_N}(\mathrm{P} \subset \mathrm{N}) \subset \mathrm{Z} \subset Q \subset R \not\subset C. \quad (2)$$

In the beginning there is a group $P_N \leftarrow \pm(\mathrm{P} \subset \mathrm{N})$, and then jump $\mathrm{P_N} \subset \mathrm{Z} \subset R$.

Thus ***rational numbers*** from a set Q appear automatically, in the form of the actual (real) numbers R, for example 0,5 … or 1/2 at the proof of a hypothesis of Riemann [5, 8].

Initial prerequisites of the whole prime numbers

Natural numbers $\mathrm{N} = \{1,2,3,...,\infty\}$, received at the natural account, from the basic become a supportive application. Then a known number of the ***prime numbers*** (PN) has an appearance $\mathrm{P} = \{1,2,3,5,7,11,13,17,...,\infty\}$. Thus we refuse a Gaussian number of a look 2, 3, 5, 7, 11, … .

In these systems N and P finite-dimensional traditional ranks will register as sequence $P_N = [1,2,3,5,7,11,13,17,...]$.

It is known that association of natural numbers with zero and negative numbers gives system of ***integers*** of a look $\mathrm{Z} = \{-\infty,...,-2,-1,0,1,2,...,\infty\}$.

Then number 0 becomes the center for a symmetric number of the whole prime numbers. Thus on abscissa axis the uniform scale is formed $Z = [...,-2,-1,0,1,2,...]$, always from the beginning of coordinates $z = 0$.

Then finite-dimensional symmetric ranks of prime numbers will written $P_Z = [-P_N, 0, P_N]$.
As a result ***couples of prime numbers*** identical on values, but with different signs are formed.

Power of a number of the whole prime numbers will be equal $2n+1$, where n - order of couples and also number of members of a known number $P_N = [1,2,3,5,7,11,13,17,...]$ of prime numbers , which was known to Gauss.

In the ***whole prime numbers*** (WPN) this order changes on a scale $Z = [...,-2,-1,0,1,2,...]$ and therefore for search of regularity of distribution the structural formula is fair

$$P_Z = f(Z). \quad (3)$$

Function f is identified in the beginning on a design of one-factorial regularity [10].

Incompleteness of a traditional number of prime numbers

In the course of work on new system from the whole prime numbers we adhered to ***Gödel's strong theorem of incompleteness:*** "The logical completeness (or incompleteness) of any system of axioms cannot be proved within the system. To prove or disprove require

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additional axiom (system gain)." This theorem is the basis of our technical and scientific and technical creativity.

Incompleteness of a traditional row and, respectively, known on a positive half shaft of natural numbers of the ***law of distribution of prime numbers*** consists in the following:

1) in order $n = 1,2,3,...$ not considered zero (the truncated natural number sequence);
2) the traditional number of primes $a(n) = 2,3,5,7,...$ not consider zero and one, that is binary;
3) the assumption that "the ratio of x to $\pi(x)$ the transition from a given power of ten to follow all the time increases by about 2,3" is logically and mathematically clearly incorrect;
4) the statement that $\pi(x) \sim |x/\ln x|$, offered in 1856 by Gauss, transfers prime numbers from a decimal numeral system to a numeral system with the basis $e = 2,71828...$
5) power of prime numbers $\pi(x)$ in an incomplete number of natural numbers x on orders it is accepted in decimal arithmetics, and $x/\ln x$ relation - in system of natural logarithms.

Adhering to ideas of known French mathematicians Polya and Hadamard about ***mathematical inventions***, we decided to go beyond the known law of Gauss on prime numbers, and also Riemann's transformations in complex numbers, understanding that at equivalence of prime numbers to natural numbers will be mathematical transformations in real numbers enough. Then Chebyshev, without accepting complex numbers, it was right [5]. This conclusion remains and for symmetric ranks of the whole prime numbers. Further we will consider symmetric ranks of the whole prime numbers.

Properties PN and WPN

Prime numbers within natural numbers are known since the time of Euclid and therefore the history of studying of their properties totals more than 2200.

Thus, the prime number is the natural number $\mathrm{N} = \{0,1,2,3,4,5,6,...\}$ having two natural dividers: unit and itself [14]. In the complete series of natural and prime numbers, we use all the numbers, including 0 as the first number. In this second requirement about simplicity, i.e. division by itself, is redundant, since all integers divisible by themselves. Therefore in the most correct definition of a prime number there is the only rigid requirement – division only on unit. It removes also mathematical problem of the uncertain relation in the form of division of zero into zero.

The reason for non-inclusion in the list of zero primes in the brochure, donated by 15-year-old Gauss, is to ignore the mathematicians in Europe digit 0 as such.

Up to the XIX century in Europe didn't know number 0, and in the middle ages its even mathematicians simply didn't recognize many. Therefore it isn't surprising that figure 0 wasn't included in a row prime numbers. And that is why 1 has been excluded from a number of Gauss prime numbers? We didn't find about this fact of historical data from the biography of the great mathematician though it was known also to Gauss from the brochure presented to it that all numeral systems are based on unit and a number of prime numbers to it also began with unit.

PN properties automatically pass and to WPN. Addition is creation round zero couples of PN with signs $\pm$. Then power at finite-dimensional ranks of PN and WPN coincide on symbolical designation of couples n with different signs. Number 0 (further examples will show its special function or as a certain ***point of singularity***) doesn't get to recalculation. Therefore it is impossible to extrapolate mathematical regularities of a number of PN or WPN on zero on a scale of abscissa: there is an uncertainty.

Finite-dimensional number WPN

We will review an example of a final number of WPN (table 1). This example was made in the computational capabilities of the software environment CurveExpert [12].

Table 1 – **A finite-dimensional number of the whole prime numbers at the power** $n = 16500$ (fragment)

Left edge		Center of symmetry		Right edge	
Z	P_Z	Z	P_Z	Z	P_Z
-16500	-182057	-3	-3	…	…
-16499	-182047	-2	-2	16495	182011
-16498	-18 041	-1	-1	16496	182027
-16497	-182029	0	0	16497	182029
-16496	-182027	1	1	16498	182041
-16495	-182011	2	2	16499	182047
…	…	3	3	16500	182057

In a series of prime numbers absolute power n shows the total number of nonzero members, and in the number WPN - number of couples of whole prime numbers. Power of WPN will be equal $2n$.

At total number $2n+1$ in table 1 example together with zero is 2×16500 + 1 = 33001 whole prime numbers. Any more isn't located in memory of the program CurveExpert environment.

The beginning of coordinates accurately is defined in a point ($Z = 0$, $P_Z = 0$). This is - ***the point of singularity***, because under the existing definition of a prime number (property division by itself) is the division of a prime number to itself, i.e., 0/0. Thus division only on 1 turns this point into zero.

The center of symmetry is defined by seven whole prime numbers. Thus to the left the half shaft 0, -1, -2 and -3 …, and to the right - a half shaft 0, 1, 2 and 3 … goes.

Signs give as we believe, an ***arrow of time*** of Stephen Hawking from left to right and, apparently, at the same time define a chirality of biological objects (in [5] us compliance of a number sequence of Fibonacci to a complete series of positive prime numbers was proved).

We will notice also that by results of researches [5] members 0, 1 and 2 treat in a complete series ***critical prime numbers***. They didn't allow mathematics more 2200 to find the distribution law in a traditional number of PN 2, 3, 5, 7, 11, …. But Gauss one critical number 1 nevertheless cleaned, however number 2, apparently, didn't dare to exclude. In a film on the history of mathematics is one of the famous mathematicians stated that his favorite number is 2, since it is the only even number in the series of prime numbers. But now we can say that in a series of even numbers 0, 1, 2, 3, 5, ... even two - zero and deuce. And the scale of integers such even numbers even three: -2, 0, 2.

A noncritical number of prime numbers begins with number 3 [5] and it allows to reveal high-adequate mathematical regularities.

The sign doesn't change essence of numbers but only correlates them to different "worlds" (negative and positive) therefore it is symmetric on the left half shaft 0,-1,-2,-3, …, -∞ also critical prime numbers 0,-1,-2 and-3 settle down at the left. Therefore a noncritical negative row $-P_Z$ begins with number-3.

Advancing contents of the subsequent articles and sections of this article, we will note that the physical analog of the ***horizon of events*** is on border of the sphere -1, 0, +1 from within (in the table 1 ***kernel of the center of symmetry*** is allocated), that is under a condition $\pm P_Z \to 1$. And ***the rational number*** 1/2, or the valid root of dzeta-function of Riemann (on Riemann's known hypothesis or Gilbert's 8th problem) is a cross-cutting.

This root appears when transfer prime numbers from a decimal numeral system in binary system [5], and ***Riemann's critical line*** accurately is defined at shift relatively by each other of two series of the whole prime numbers. The geometry and patterns at different ranks of positive prime numbers were shown in [5].

Center of symmetry of a row WPN

In figure 1 the center schedule from seven points is shown.

The schedule was received in the program CurveExpert-1.40 [10] environment and it is unambiguously identified by simple function

$P_Z = Z$, $Z = -3,-2,-1,0,1,2,3$. (4)

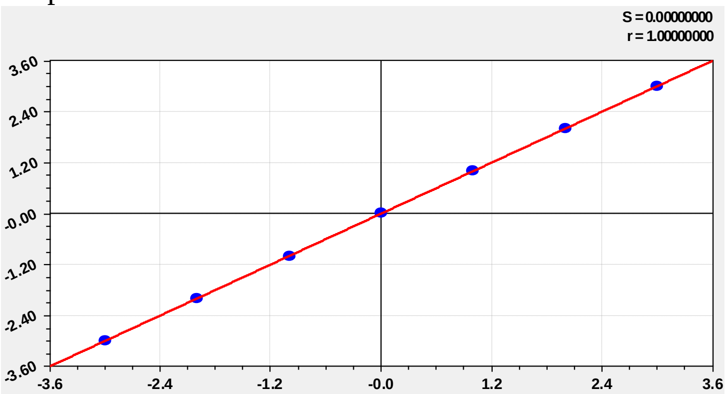

Fig. 1. Center of symmetry of a row WPN

The same proportionality is observed at the power of couples whole prime numbers $n = 1 \vee 2 \vee 3$ or the total number of members of a number of WPN $2n+1 = 3,5,7$. Thus, in the symmetry center prime numbers (their quantities also prime numbers) coincide with values of elements of a scale of integers.

This center of symmetry is invariable at any power of a number of WPN, including and a condition $n \to \infty$ at Cantor understanding of types of infinity, and it is a peculiar start of change of disproportion. Start happens from the proportionality coefficient, equal 1, and proceeds indefinitely.

In a spherical ***cover of the center of symmetry*** (1 cover is in the table behind the allocated kernel) there are three fundamental constants (harmony and time number) – a gold and silver proportion, and also Napier's number.

Thus, from a point of singularity 0 there is difficult and while mathematically an unclear expansion to border of a kernel [-1, 0, +1]. Then in a spherical cover [-3,-2, …, 2, 3] there is a jump of harmony [6] through number of time (table 2). As a result of WPN property unite achievements of physics and mathematics. The preliminary (working) hypothesis of association of four fundamental forces is given in [5, 6].

The gain of PN p_j or WPN p_Z is formed when the second row moves on one position equal 1, and then we will receive formulas:

$$p_j = P_j - P_{j+1}; \quad p_Z = P_Z - P_{Z+1}. \qquad (5)$$

Physically the gain of PN (table 2) is represented in the form of steps at Riemann's ladder when these steps are isolated from the most triangular case of a ladder.

Table 2

Increase PN

Prime number P_j	Increase PN p_j
0	1
1	1
2	1
2.41421	1.35914
2.71828	1.61873
3	2
5	2

In detail types of a gain and its geometry are shown in the book [5]. Thus for a gain a number of prime numbers becomes abscissa axis.

We will enter the following fundamental physical constants:

- time number (Napier's number) $e = 2{,}71828...$;
- number of harmony (golden ratio) $\varphi = (1+\sqrt{5})/2 = 1{,}61803...$.
- number of harmony of beauty (silver section) $1+\sqrt{2} = 2{,}41421...$;
- half of number of time (Napier's number) $e/2 = 1{,}35914...$.

After parametrical identification of the ***law of achievement of a limit*** or the known law of distribution of Weibull in the form of a formula

$$y = y_{\max} - a\exp(-bx^c) \qquad (6)$$

was obtained (Figure 2) binomial statistical regularity

$$p_{j\min} = 2 - 1{,}02402\exp(-0{,}00025750 P_{0,1,2,3,5}^{\;8,39705}). \qquad (7)$$

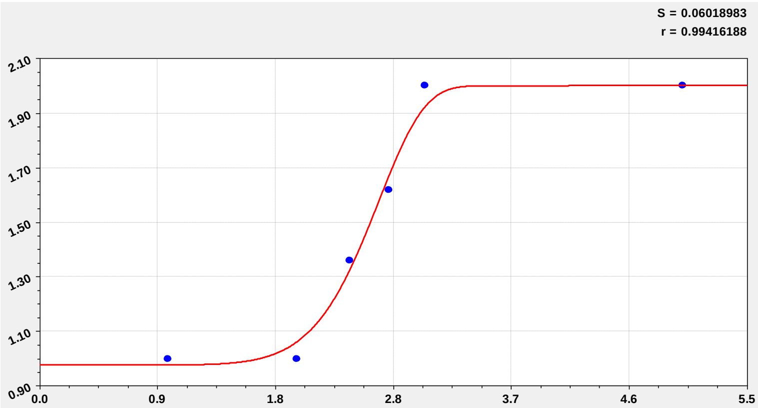

Figure 2. Gain jump from 1 to 2 in a complete series positive prime numbers

The same formulas in a general view are valid, at the accounting of the sign "minus" and repeated parametrical identification, and for a negative half shaft of a number of the whole prime numbers.

Then harmony at any ranks of the whole prime numbers begins with ± 3.

This spasmodic transition gives anomaly in the mathematical equations of the law of distribution of prime numbers. Rejections of the schedule from points in figure 2 on a formula (7), as well as in other examples of modeling by identification of steady laws, occur because of the accuracy of acceptance of irrational number $e = 2{,}71828...$ (only 18 signs in the mathematical CurveExpert-1.40 environment) and other fundamental physical constants. For an illustration in a formula (7) and others it is enough to specify values of parameters of model with 5 significant digits.

Due to the complexity of formalizing the core and the periphery of the centre of symmetry Gauss, followed by Riemann and other mathematicians, refused analysis alignments, and proceeded to recount them in decimal digits.

All went on the way of detection of the law of change of quantity at prime numbers in categories of a decimal numeral system. For this purpose passed into a numeral system with the basis of a natural logarithm, thus process of studying of prime numbers finally came to a standstill scientific progress in the theory of numbers.

It is a craze of linearization of obviously nonlinear ranks of statistical data. Therefore there was Gilbert's which hasn't been solved still 23rd problem when from Gauss's "easy" hand was created the mathematical statistics on the basis of the so-called normal law of distribution ….

A series of WPN easily overcomes mathematical obstacles of two jumps (from number 0 to 1 and then from number 2 to 3) that in process of growth of power of couples of prime numbers there is in the beginning a recession of adequacy of identification by [10] steady laws, and then the coefficient of correlation increases, coming nearer under a condition $n \to \infty$ again to 1.

Periphery of a series WPN

In this article, we consider only one ***series of integers prime numbers.*** If a symmetry center is a group of seven simple integer numbers in a finite series $P_{Z0} = [-3,-2,-1,0,1,2,3]$, then the entire infinite series WPN contains two private infinite-dimensional sequences - left semi-row $-P_{Z\leq 3}$ and right semi-row $P_{Z\geq 3}$. The linearity of the basic law distribution of a series WPN any power geometrically interpreted as follows. The left and right private ranks of the whole prime numbers form a peculiar core of all design of distribution, passing special characteristics of the sphere -1, 0, +1 and spasmodic transition to harmony in a cover -3, -2, …, 2, 3. In a triad -1, 0, +1 are while distinctive signs unknown to us. In a spherical cover [-3, -2, …, 2, 3] there is a quantum leap from singularity for harmonious distribution from a prime number ± 3 in two noncritical rows $\pm P_{N=3,5,7,11,\ldots}$.

Power influence couple of WPN

Schedules of ranks of WPN are given in figure 3 at the power of couple prime numbers of 10, 100, 1000 and 10000.

On these ranks from figure 3 the private equations of the ***law of prime numbers*** were received:

- for a row WPN $n = 10$ couple of prime numbers

$$P_{Z10} = 1{,}98182Z\,; \quad (8)$$

- for a row WPN $n = 100$ couple of prime numbers

$$P_{Z100} = 4{,}87381Z\,; \quad (9)$$

- for a row WPN $n = 1000$ couple of prime numbers

$$P_{Z1000} = 7{,}53273Z\,; \quad (10)$$

- for a row WPN $n = 10000$ couple of prime numbers

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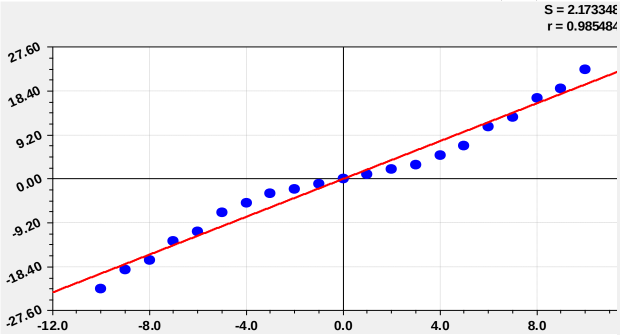
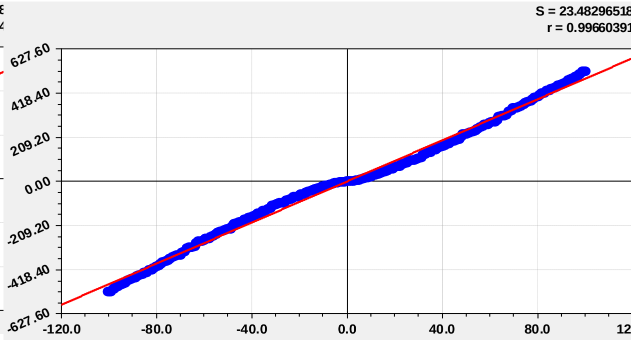
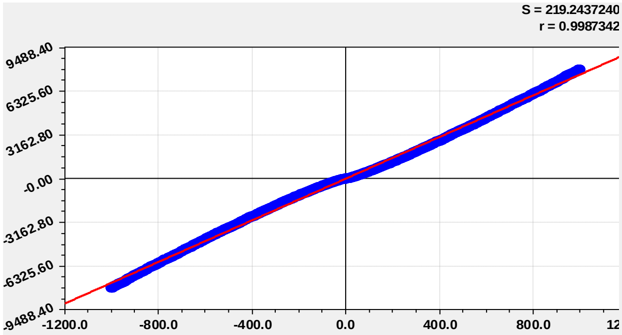
$$P_{Z10000} = 10{,}10516Z \,. \qquad (11)$$



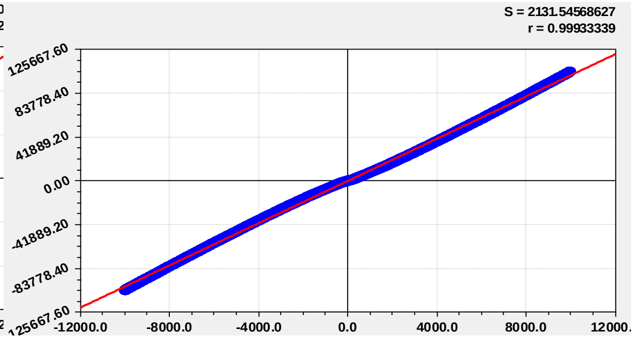
Power of row WPN $n = 10$ couple of prime numbers



Power of row WPN $n = 100$ couple of prime numbers



Power of row WPN $n = 1000$ couple of prime numbers



Power of row WPN $n = 10000$ couple of prime numbers

Figure 3. Schedules of finite-dimensional ranks of the whole prime numbers (in the right top corner: S - dispersion; r - correlation coefficient)

Adequacy of which were detected linear patterns is very high, in excess of the correlation coefficient (a measure of closeness of the connection, given automatically) over 0,999.

Fundamental law of distribution of WPN. On the basis of induction on a set of partial examples generally it is possible to submit the ***law of distribution of WPN*** in the form of mathematical expression

$$P_Z = a(n)Z \,, \qquad (12)$$

where $a(n)$ - ***coefficient of an inclination of an axis of symmetry*** of a series of power n couple WPN.

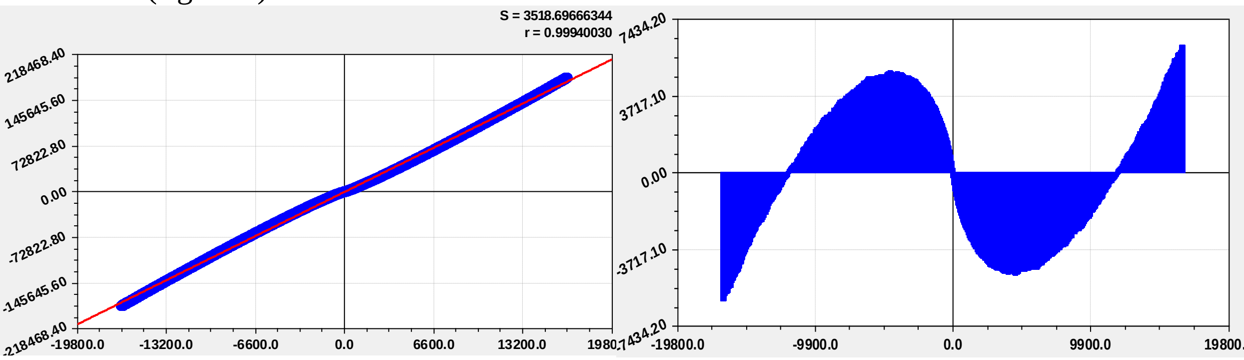
This basic parameter any series of WPN has a clear geometric meaning. The relation of a prime number (ordinate) to the integer (abscissa) gives a tangent of ***angle of an inclination*** α of an axis of symmetry at any number of WPN to abscissa axis Z on a formula

$$tg\alpha = P_Z / Z = a(n) \,. \qquad (13)$$

From expression (12) and graphics in figure 1 we notice that the lower bound of a tilt angle of an axis of symmetry becomes 45^{o} or $\alpha_{\min} = \pi/4$. Under a condition $n \to \infty$ will be also $P_Z \to \infty$, therefore $\alpha_{\max} = \pi/2$. Then the interval of change of coefficient of an inclination at an axis of symmetry will be equal $a(n) = \{1, \infty\}$, and the interval of a tilt angle of an axis will change in limits $\alpha = \{\pi/4, \pi/2\}$.

Limit of the program environment on the power of the WPN

The program environment allows to contain only slightly more than 33000 values (lines) of basic data (figure 4).



The schedule of a formula (4.7) rows of WPN at $n = 16500$ The remains (absolute error) after a formula (14)

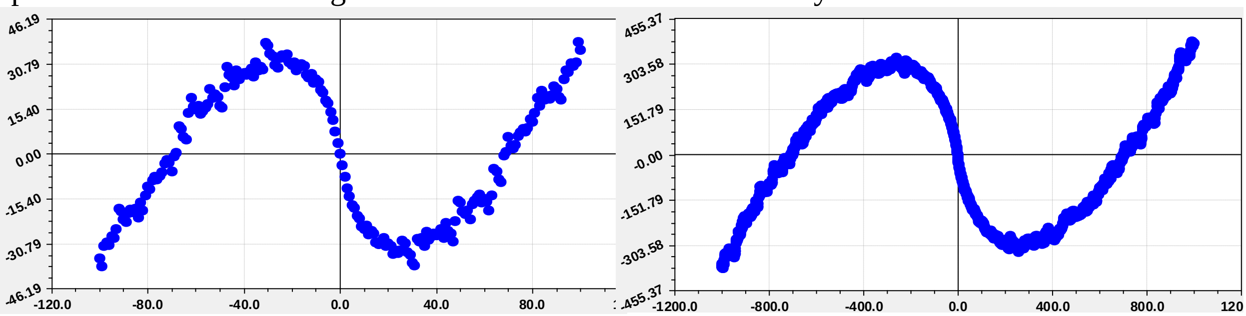
Figure 4. Schedules of a finite-dimensional number of the whole prime numbers on a limit of memory of the program environment

In figure 4 schedules of a formula of an axis of symmetry of a row and the remains (an absolute error) at the whole prime numbers numbering 16500 couples are shown. After parametrical identification the formula was received

$$P_{Z16500} = 10{,}65994Z \,. \quad (14)$$

Physical interpretation

Point distribution of the remains (fig. 5) shows similarity to pair sleeves of spiral galaxies. But such comparison demands search of statistical regularities in concrete measurements of parameters from a set of galaxies. Such basic data are necessary to us.



The schedule of the remains (9) rows of WPN at $n = 100$ The schedule of the remains (10) rows of WPN at $n = 1000$

Figure 5. Schedules of the remains from formulas of the law of an axis of symmetry at ranks of distribution of the whole prime numbers

Therefore [5, 6], prime numbers are functionally connected with complexes from fundamental physical constants and harmony numbers (a gold and silver proportion). Any symmetric WPN on the remains from the fundamental law of distribution contains couple of opposite located sleeves.

This property opens ample mathematical opportunities of statistical modeling of a set of the measured parameters at concrete galaxies. Thus the ideal galaxy is created by a set of prostons with different turns in system of coordinates from the galaxy center. Therefore on the basis of the theory of the whole prime numbers there is a practical possibility of identification of astronomical parameters of a galaxy and comparison with symmetric ranks of the whole prime numbers. Further we will show methodology of identification of steady laws.

CONCLUSION

The well-known physicist Stephen Hoking supports idea of leaving from a mathematical formalism. The exit after all is, and it besides follows from work of Bristol group. Their analysis shows that the quantity of the mathematical formulas placed in appendices to biological articles, doesn't influence in any way their quoting. Hence their recipe - less formulas in the main body of the article, but more explain text, allowing the reader to understand the basic ideas of the theory and its applications [3].

And we arrived, having provided in article a large number of illustrations and detailed explanations.

At information and technological level Gilbert's 23rd problem (development of methods of calculus of variations) was solved by us long ago. Us, students and graduate students were modeled to hundred thousand examples from different areas of science and equipment.

Therefore ***the variation of functions*** is reduced to conscious selection of steady laws and designing on their basis of adequate steady regularities. But the technology of identification still completely wasn't published. The matter is that each example of tabular model has the specifics. So and software environment is not adapted to the process of identifying the generalized formula (18).

To attract the attention of the scientific community, had to tighten the selection of examples for statistical modeling. It turned out that the technological and socio-economic statistical data have a very large error, and biological tabular data is not enough. It is difficult to persuade biologists to wave oscillatory perturbations of natural objects. So we gradually came to the 8-th Hilbert problem and decided famous Riemann hypothesis about the root of 1/2 [5, 8].

Therefore we decided to change radically and a number of prime numbers, having made it symmetric or asymmetric concerning a scale of integers $-\infty < Z < +\infty$. Critical points of an asymmetric traditional Gaussian series of the prime numbers located on an axis of natural numbers, were in the center of symmetry of a series of the whole prime numbers.

Thus the fundamental law of distribution of WPN was so simple on proportionality coefficient that much increased adequacy of statistical regularities. To compare to formulas of power of quantity of the prime numbers which are in decimal categories, became even inconvenient: known formulas of distribution of prime numbers in categories of a decimal numeral system are so rough on an error.

Perhaps now mathematics, physicists, biologists and others will pay attention to this article?
The answer to the question of why mathematics is not engaged directly by the distribution of prime numbers, and carried away the centuries of the largest prime number identification and study of relative abundance (power set) of prime numbers among the natural numbers, convincingly explained Don Zagier [14].

Rejection by mathematicians 0 and 1 ahead of a traditional series $a(n) = \{2,3,5,7,...\}$of prime numbers made a powerful psychological barrier. Besides it is very strongly stirred to the Gaussian order $n = \{1,2,3,4,5,6,7,...\}$ of a prime number beginning only with unit. Sorting Euclid's [14] proof, became clear that timely recognition of zero by Europeans and, respectively, achievements of mathematics from Indians, would allow, on a last and large measure, to reduce creation of the new theory of prime numbers by two thousand years. After all in Ancient Egypt already knew about binary notation. About it was well shown in a cycle of films on the history of mathematics.

Mathematicians made two large oversights

1) didn't recognize 0, and some and 1, for prime numbers and didn't understand that the beginning 0, 1, 2 and 3 at a complete series of prime numbers undertakes from a series of natural numbers;

2) in formulas of decomposition didn't understand binary notation.

A traditional series of prime numbers is artificially complicated by refusal of inclusion of elements 0 and 1 of a series of natural numbers. Tendencies of centuries-old non-recognition in Europe of zero for natural number were very strong. In a series of natural numbers ***0, 1, 2,*** **3**, 4, **5**, 6, **7**, 8, 9 there are six prime numbers, three of which (0, 1, 2) critical, and three more numbers (3, 5, 7) - noncritical.

In the zero block of the whole prime numbers there is "wall" of dzeta-function of Riemann, it is geometrically evident, and this wall grows with increase of number of couples of whole prime numbers.

The maximum absolute error of relative power (the number of prime numbers in decimal digits) a traditional Gaussian row more than three times is higher than quantity of prime numbers in comparison with a complete series of [5, 7] prime numbers and is 30 times more rough in comparison with a number of the whole prime numbers.

REFERENCES

[1] N.M. Astafieva, “Wavelet-analysis: fundamentals of theory and examples of the application.” *The successes of the physical sciences,* vol. 166, no 11 (1996): 1145-1170.
[2] S.B. Gashkov, “Number systems and their applications.” M. MCCME, 2004. 52p.
[3] S. Hoging. “The mathematics brakes ideas. The mathematics complicates perception of new ideas society.” URL: http://www.gazeta.ru/science/2012/06/26_a_4640149.shtml.
[4] P.M. Mazurkin, “Wavelet Analysis of a Number of Prime Numbers.” *American Journal of Numerical Analysis,* vol. 2, no. 2 (2014): 29-34. doi: 10.12691/ajna-2-2-1.
[5] P.M. Mazurkin. Patterns of primes. Germany : Palmarium Academic Publishing, 2012. 280 p.
[6] P.M. Mazurkin, “Stable Laws and the Number of Ordinary.” *Applied Mathematics and Physics,* vol. 2, no. 2 (2014): 27-32. doi: 10.12691/amp-2-2-1.
[7] P.M. Mazurkin, “Series Primes in Binary.” *American Journal of Applied Mathematics and Statistics,* vol. 2, no. 2 (2014): 60-65. doi: 10.12691/ajams-2-2-2.
[8] P.M. Mazurkin, “Proof the Riemann Hypothesis.” *American Journal of Applied Mathematics and Statistics,* vol. 2, no. 1 (2014): 53-59. doi: 10.12691/ajams-2-2-1.

[9] P.M. Mazurkin, "Increment Primes." *American Journal of Applied Mathematics and Statistics*, vol. 2, no. 2 (2014): 66-72. doi: 10.12691/ajams-2-2-3.
[10] P.M. Mazurkin, A.S. Filonov, "Mathematical modeling. Identification univariate statistical regularities: tutorial." Yoshkar-Ola, Mari State Technical University, 2006. 292 p.
[11] Number. URL: http://ru.wikipedia.org/wiki/%D0%A7%D0%B8%D1%81%D0%BB%D0%BE.
[12]. "CurveExpert", URL: http://www.curveexpert.net/.
[13] Signal. URL: http://ru.wikipedia.org/wiki/%D0%A1%D0%B8%D0%B3%D0%BD%D0%B0%D0%BB.
[14]. D. Zagier "The first 50 million prime numbers." URL: http://www.ega-math.narod.ru/Liv/Zagier.htm.