



GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH: A  
PHYSICS AND SPACE SCIENCE

Volume 19 Issue 3 Version 1.0 Year 2019

Type : Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4626 & Print ISSN: 0975-5896

## Chaos-Imaginary Ostensibility- Orthogonality

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*GJSFR-A Classification: FOR Code: 029999*



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# Chaos –Imaginary Ostensibility– Orthogonality

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But as long as we did not give in to computer structures in rationality (in the intellect they have already given way), we use the “key” of rationality (understanding that we are not an exception to the time dependence — a self-consistent task) to identify the particular time coordinate feature, whose presence ensures the existence of life, but absence - time has stopped - means death.

Elementary Dynamic “Point” - the point of Life of Nature, its abstract model is the Harmonic Oscillator. This model passes through all of physics and allows you to closely “see” the used Imagination of Time to distinguish it from other orthogonal (simply independent, but not polar) coordinates. And, as shown by the analysis of this model, its real Imagination is the “imaginary” properties and they are determined by the leakage of WHERE (to uncertainty - in the future) of the energy that forces FROM WHERE (from nowhere - from the past) to force. And this determines the special orthogonality of the time coordinate of the rest, spatial. And this IMPORTANCE was also reflected in the mathematical writing of the Harmonic Oscillator, and as a result, in Einstein's Theory of Relativity.

## I. PREAMBLE

**H**ow did we live up to such a life that Faraday and Lomonosov, Mendeleev and Einsteins did not, and Bill Gates in computers, Ilon Mask on a pair with Dima Rogozin in technology, Trump and Putin in economics !?

The answer to this question lies on the surface, in science itself, where, as in all of society, philistine priorities have become higher than scientific ones.

And, as a result, academic titles/awards became nothing more than a decoration for the society/government, and within the scientific environment only a hierarchical step. And in a degraded *scientific environment!* it became permissible to use the technology of porn sites for the Nobel Prize.

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And, as a result, the same innovations, or more simply, money is invested not in fundamentally new ideas / developments, but in the same money, in the area of production, where yesterday's science is used and nothing more than a colorful wrapper.

It is clear that in this situation it is necessary to treat, first of all, the science itself. And treat according to science, i.e. in the body of science itself, in the Scientific Head itself. And, as they say: Do you want to do well, do it yourself. But without a certain push it is difficult to understand if you will not become similar to those who are adapted for money = obsolete science and feel whether you have a moral right to this “treatment”. The impetus for me was the appeal to RBC (Russian Business Consulting) correspondents with a request to explain: What is a NANO? Before contacting me, they asked the Nobel Laureate Zhores Alferov with this question. And having listened to his two-hour lecture, they did not understand: NANO is a new physics or a new method of money laundering? And when I managed to explain to them what the essence of NANO-physics was, and they, after placing my answers in the article, received the Pulitzer Prize for it, they asked me to write a number of other popular science articles on the NOR website (Nanotechnology Society of Russia). Write, asked, so that it was clear even to academicians. And since the disease has gone deep into the body of science itself in a hundred years, in formulating topical scientific problems and solving them, it was necessary to “cut to the quick” - to write about essentially pseudoscientific “scientific discoveries”, introduced, at best, in devices that are already written off.

And these articles-solutions on NOR have become not only an additional education for many scientists (already about 300 thousand views), and not only in Russia, but also self-education for me. So, in contrast to the low-level popularization of outdated science, I tried to do, in the popular, but quite professional, form of the course EDUCATION of a future science.

Here is the next step of the EDUCATION-FORMATION OF SCIENCE presented in this article.

## II. DYNAMICS OF CHAOS IN NATURE, IN SOCIETY AND SCIENCE

If you take the point of view that is not inflamed by a specific theory of the mind, but build reasoning with an "eye on" Reality, with an eye on available physical experiments, then the main ANOMALY of the thermodynamic description of the universe is Thermal Death. The death of the immortal Universe goes into the category of "singularities" fashionable for "theorists of all kinds", which (like the Big Bang Theory), as has already been written more than once, in Reality are just analytical "extensions" of mental simulations and formulas beyond their applicability. And Thermal Death is just a similar asymptotics of thermostatics (in the universe as a whole, and not in the movement of individual "molecules"). And based on reality, we see that the thermostat itself is only a special case of a thermal theory that takes into account time, that is, thermodynamics proper. But, in order to fully realize this with reference to the entire Universe, it took Prigogine's look at NANO [1] to look at fast and visible "eye" violations at the level of almost molecules and at the local level "in the sky", in macroscopic thermodynamics of slow processes. Strict scientific calculations -the justifications of local thermodynamics, even the Nobel laureate Ilya Prigogine, have been in disgrace for a long time. The noted book is published by a graduate student only after his death. And he set forth his vision of Time and published it in a popular form [2].

To some extent, such "popular creativity" seems to be the "inevitable fate" of true scientific research. And true scientific discoveries in REALITY. After all, even a "vivid example" of Dirac, who "received" a positron at the tip of a pen, is the realization of the REALITY of the second character of an electron-type particle charge. And his "tip of the pen" - the possession of the mathematical operators of Heviside simply elevated him over the philistine reality and could not dismiss him. Grisha Perelman's possession of the mathematical technique of computation forced the "mathematical mafia" not to dismiss the end-to-end solution he found, in which only fragments were available to the understanding of the "Separate Mathematical Clans" [3]. Gathering together the whole "chaos of clan mathematical representations," Grisha was able to see the general pattern of REALITY. And in this regard, the artistic creativity of the scientist Ivan Efremov gave just a different "support" for his scientific awareness of REALITY - the scientific validity of his judgments in an artistic book accessible to the philistines, including those bred in science.

But purely philistine ideas now lie at the heart of both the clan theoretical and clan experimental bans in science itself. And in order to rise above them, strictly scientifically, it is enough to carefully analyze the basics and understand what science and technology and

society as a whole have come to in a definite direction in a dead end. And false, basically, philistine "discoveries" of the graphene type lead science to a dead end even deeper, and false technical "achievements" of Ilna Mask only inhibit the creation of fundamentally new technology. But in reality, the fundamentally new in the current crisis state of science is making its way with difficulty. And there are lots of examples, starting with the creation by an enthusiast who has spent the whole legacy for the sake of creating a BOEING aircraft. And, in this regard, I am, of course, pleased with the operational attempts at "theoretical" development in popular articles of ideas from the articles "Newton's Coulomb Laws" [4, 5] and experimental attempts to build aircraft based on the ideas of the article "Physics of Flight" [6] and even on the basis of ideas from the articles "Electrostatic propulsion" [7].

Therefore, I will continue to spend my time not only on the rigorous scientific processing of the dozens of folders I have accumulated with experimental data and incomplete calculations with bringing them to scientific publications, but on their popular presentation. A rigorous scientific analysis and scientific publications I limit only to a deeper consideration of basic ELEMENTS. This is the main idea reflected in the title of the article itself as a result of the comprehension (contradiction) of the Elementary Model of the Elementary Harmonic Oscillator. Briefly about its "IMAGINARY OSTENSIBILITY" (in the physical term imaginary quantity, the English imaginary - fictitious is opposed to the Russian hue imaginary - unreal) will be discussed in the next paragraph, and I will try to publish their strict description in the scientific article "Parametric interaction of normal modes in C & BN".

And so, returning to REAL non-equilibrium thermodynamics, Mankind, the unreasonable organization of intelligent people, called Civilization, was proud of its achievements and victories (mostly over its own kind), owes its origin to "non-equilibrium processes," processes in time. The fact that Ilya Prigogine "saw" at the local level is in many ways just a manifestation of what was described by Vlasov in the Theory of Many Particles [8], where the formation of galaxies was considered as the main example. Although Vlasov touched local processes like solitons. But Prigogine's attentive glance "in depth" clearly demonstrated the logarithmic relativity of the structure of Nature on different scales [9], and supplemented this structure with new laws - dissipative structures existing on the scale of the universe, but clearly visible on local scales.

Here, as the "sun cloud" cooled, both the Sun itself and the planets formed, and the region that was optimal for the emergence of organic life migrated from the distant planet to the nearby Sun. In this region, which slowly migrates in space (along a radius), a small-scale dissipative structure has formed - life (according

to non-equilibrium thermodynamics, which is consistent with the initial gigantism of animals, the Earth was wrapped up with a cloud of asteroids). Everything is strictly according to the laws of inanimate Nature, which develops in time. So, in principle, LIFE itself, its occurrence does not introduce any paradox into our perception. Moreover, it gives a deeper understanding of "disequilibrium" and our Sphere of Conscious Knowledge [10]. Limiting the expansion of the sphere of conscious knowledge in time means nothing more than the "thermal" death of Civilization. And the Science, which is now degenerated into the Knowledge Industry, with this death, due to the destruction of the Collective Intelligence, is involved.

There is only a "small" nuance that falls out of this collective nonequilibrium thermodynamic process - REASONABILITY, originally laid in each individual in defiance of ANY THERMODYNAMICS. But it is also "compensated" by the unreasonableness of the organization of society, so much so that it returns Civilization to the bosom of inanimate Nature. This paradox now in SCIENCE is manifested in its pure form: SCIENCE - the Collective Intelligence of Mankind needs the Reasonable development of the Individual and has itself produced Education, but in its organization and its life activity it is oriented towards the philistine Values that dominate BUSINESS. And it levels and Education, and innate reasonableness. Art, however, also falling out of inanimate Nature, orienting itself mainly on emotions, judging from the whole History of Civilization, can only maintain the balance of Good and Evil [11]. In addition, the flourishing of Art apparently already behind - it is closely intertwined with computer games.

So almost all manifestations of the "vital activity" of Civilization strictly correspond to non-equilibrium thermodynamics. Take at least the cumulative constantly "expanding" amount of money that government governments would supposedly regulate. In such monetary pseudo-economic activity of governments, local adjustments (in space and in time) as in communicating vessels lead to opposite effects outside the local area. And the total, integral effect is strictly according to nonequilibrium thermodynamics. So all the "local rationality" of governments has a strictly local characteristic: "Here and Now." But if a mentally rational individual can overcome space-time as far as desired (this "overcoming" will most likely be erroneous, if the use of ideas beyond the boundaries of the sphere of conscious knowledge associated with real experiments occurs), then an UNREASONABLE organization of people in the form of modern civilization mortal - its cycle - "lifetime" is set by the parameters of non-equilibrium thermodynamics.

And the saddest thing is that now the Sphere of Conscious Knowledge behaves in full accordance with the non-equilibrium thermodynamics of non-living particles. Although the Sphere of Conscious Knowledge

is much wider, naturally, the philistine ideas of individuals, and its rationality is mainly determined by individual rationality, since science, as the structure of an unreasonable society also turns out (especially in a crisis period as it is now) organized unreasonably. And to overcome this all deadening tendency by purely bureaucratic means is not possible, which is well illustrated by the example of poor Russia [12]. Neither the scientific mafia, nor the state mafia at all does not care / is interested in the death of civilization as a result of the liquidation of Collective Intelligence. Although both of them, I know, are now looking into my articles in order to get enough for decoration of the scientific nature of "clever words". But I do not write for them unreasonably, but for those whom the normal, naturally inherent in man Reasonableness will move to a lesson in the Sphere of Knowledge, and to a reasonable lesson.

So, I repeat, the sphere of conscious knowledge is not limited to narrow-minded ideas and organoleptic - with the help of instruments we have learned how to "see" and measure very small and very large objects and, based on experimental vision, build not only local theories (which are more correctly called working interpretations to systematize the data), but also the Fundamental Laws allowing to peep, in principle, for any "event horizons" (and not exactly the opposite - not to look where it's not supposed to). But if the modern, "horizon boundary" reached in space, and in breadth, and in depth, is well defined, then with time, which enters as the main parameter into any dynamics, from molecule oscillations, to the emergence and development of life, the situation is more complicated. We can track / measure only the past and, based on the laws obtained in the past and on the measured instantaneous derivatives, in the present, build analytical continuations of the laws in the future.

But we have another "tool" - INVARIANCE, which, if used correctly, allows us to "look into" the future. This is precisely the manifestation of rationality, action (and in the layman and thought) not on the basis of animals, simplified reflexes, but thoughts on the basis of the Fundamental Laws (up to the limit of their applicability [13]). And in this regard, all sorts of "time compression", especially as compression to a point (the "theory" of the Big Bang), are no more than incorrect interpretations of models that have a limited range of applicability in time. Inaccurate in principle, since the incomprehensible connection between changes in the properties of matter in time is replaced by time itself. It is like compressing the spring in space to be replaced by stretching the space (which, technically, in principle, it can be useful to use in calculations). So, for example, we came to the Aborigines living according to the traditions of the past millennium, and on the basis of studying their behavior, we also talk about our ancestors in Europe, but we do not move into any past except for thought in time. So, on the one hand, Time plays the role



of both normal in the universal sense and normal in terms of the orthogonal, independent coordinates of the “geometric” space in which we live and draw a picture of Nature. On the other hand, we live in a racing train, and this must be correctly taken into account in our constructions. It is necessary to take into account, among other things, the psychological aspect (as, for example, the principle of Schrödinger's uncertainty in quantum mechanics). Here, formally, purely mathematically, the “time wasting where is it!”, In contrast to the spatial coordinates, was associated with atomicity, which I will look at later in the mental POINT.

So that we understand that, behind the formally used formulas with the imaginary value of Time, depending on Time, we do not see, and it took more careful consideration of the dynamics of the REAL POINT - Elementary (and not very) Harmonic Oscillator. It was necessary to understand what in reality the imaginary means and what it is orthogonal to. The fact that any thought, idea, including the one reflected in the title, is orthogonal to unreasonableness, I think it is not necessary to prove.

### III. IMAGINATIONS” OF THE DYNAMIC POINT - HARMONIC OSCILLATOR

The POINT of this article is rooted in real, but “anomalous” experimental results — detection of the spectral “anomalous” NON-MISSION(non-transmission) band at orthogonal modes. This, the wave leakage in “nowhere”, into orthogonal (forbidden) oscillations, is actually devoted to a purely scientific article “Parametric interaction of normal modes in C & BN” that is being prepared for a physical journal. Here, before analyzing the complex solutions of the Mathieu formula, I again, as I used to do in life, looked into the original ELEMENTARY POINT.

The fact that the harmonic oscillator POINT (dynamic) in both our classical and our quantum representations and their mathematical descriptions can be seen from any alphabetical letters on physics. But Lenin's ideas about matter: “The electron is also inexhaustible as an atom” strictly correspond to mathematical ideas: between the two points of the numerical axis you can always place a new one (and you also need to supplement rational numbers with irrational ones). So, if once I was surprised by the mistake of the leading figure Ziman [14] in the Quantum Point (and not just me - the correcting quantum description of phonons and accepted for publication in Phys.Rev., My article was made IMPRESSIVE - they were forbidden to print. So I It was made REAL after many years, published in the book [15]), now I look at the discoveries at the POINT as “Refinement and Addition of Basic Physical Models”, the publication of which in the form of the second book “delayed” the abundance of new points.

The non-attenuating harmonic oscillator is an idealized model:

$$y''[t] + \Omega^2 y[t] = 0 \quad (1)$$

It has a single resonant frequency  $\Omega$ , which corresponds to the spectrum described by the delta function. Its single perturbation leads to INFINITE in time  $t \rightarrow \infty$  harmonic oscillations  $A \cdot \text{Sin}[\Omega \cdot t]_{A=const}$ , and a long harmonic effect on the resonant frequency leads to INFINITE increase in the amplitude of oscillations  $A[t]_{t \rightarrow \infty} \rightarrow \infty$ . Naturally, these INFINITY are violated, which means that it is impossible to use this idealized model in reality, including the impossibility to investigate it.

That is why the use of this idealized model in the fundamentals of quantum mechanics (as basic) is complemented by the Heisenberg uncertainty principle (the probabilistic nature of quantum mechanical solutions). In fact, this means that a separate electromagnetic quantum is a train of waves, having a certain finite length and a non-zero frequency band, and an increase in a narrow emission band, coupled with an increase in the length of the train, is coherent radiation. Similar conditions are imposed on both the electron wave and the minimum width of the allowed electron level.

The above idealized model in a veiled (IMPRESSIVE) way (already) concerns the IMPRESSION of Time - if zero attenuation is imagined as striving to zero small but finite attenuation, then we get quasi-chaotic walks of the oscillation phase in time. But in the analysis we will not rely on IMAGED images, but will only start from REALITY - from the FINAL magnitude of the attenuation of the Harmonic Oscillator  $\gamma$  and at the FINAL magnitude of the harmonic measurement effect on the Oscillator. At the same time, for clarity, without any loss of generality, the resonant frequency of the Oscillator and the amplitude of the measuring action are set equal to unity:

$$y''[t] + \gamma \cdot y'[t] + 1 \cdot y[t] = 1 \cdot \text{Sin}(\omega \cdot t) \quad (2)$$

Thus, the imaginary “imaginary” remained with us only in infinite Time, and all the resulting real “imaginary” solutions of equation (2), as well as the real parts of solutions, are directly related to the real, measured parameters of the Harmonic Oscillator with Damping.

With the traditional method of solving the differential equation (2), the use of which we confine in this analysis, the mathematical imagination (complexity) is introduced not in Time, but in the form allowing to single out the time independent factor of the solution by substitution:

$$y[\omega, t] = A_y e^{i(\omega t + \phi[\omega])} \quad (3)$$

$$y[\omega, t] = \frac{1}{1 + i\gamma\omega - \omega^2} \text{Sin}[\omega t] \quad (4)$$

Substitution (3) allows reducing differential equation (2) to an algebraic equation and obtaining its complex solution (private, but in principle, qualitatively reflecting the main features):

Actual *Re* and imaginary *Im* parts (terms) of this solution (given - specific, resonant frequency and amplitude of harmonic influence are equal 1) at different levels of attenuation are shown in Fig.1 and Fig.2.

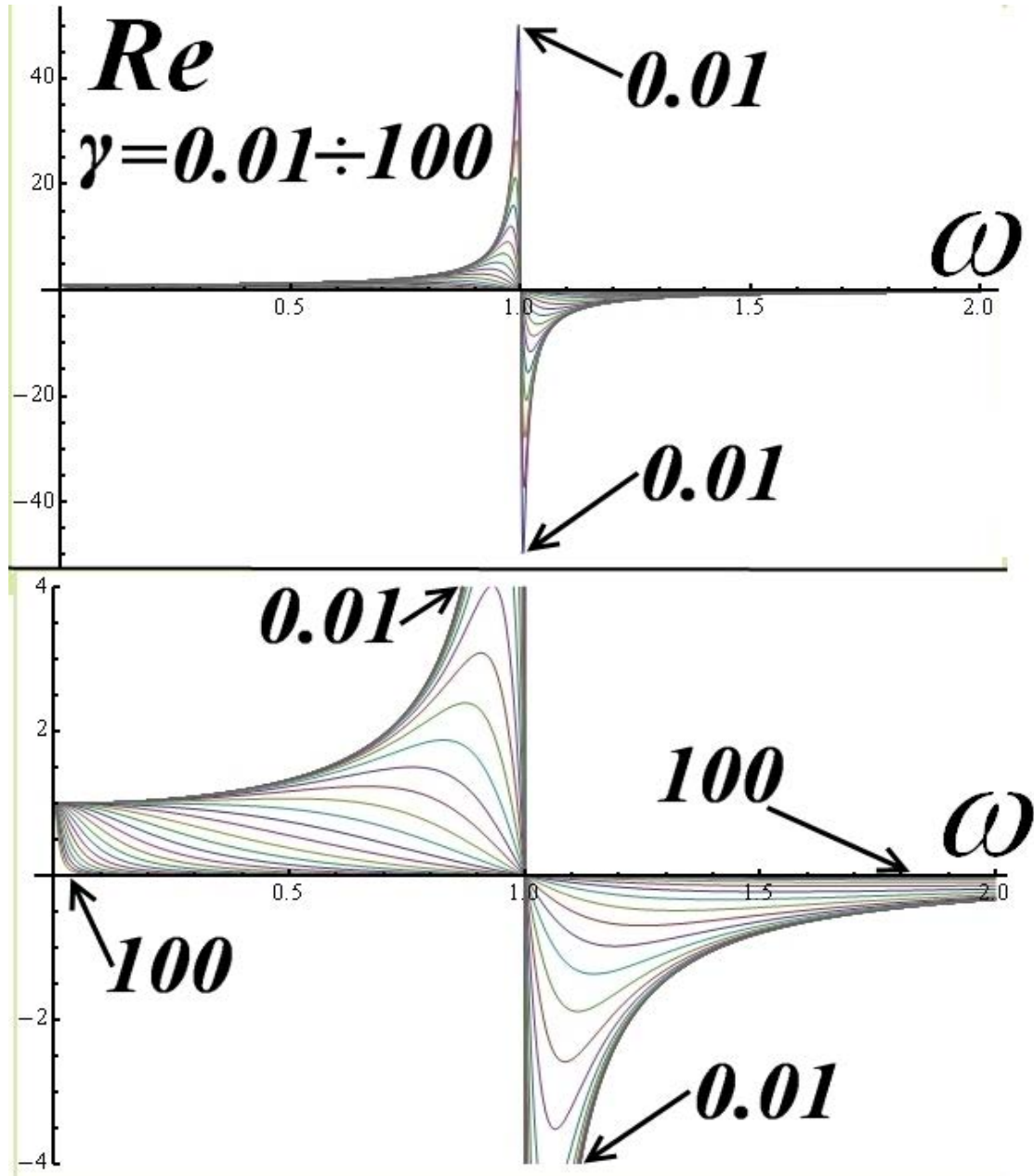


Fig. 1: Reducing the height and frequency of the positive maximum and its tendency to unity for a constant value of the specific displacement with increasing attenuation

The dependence shown in Fig. 1 is a real "reality", since agrees well with the real part of the impedance of any resonant oscillations and is manifested in the reflection spectra. Including optical, it is consistent with the real part of the dielectric constant both for dielectrics and for metals, if we consider that

the plasma resonant frequency is zero, then the frequency dependence of the dielectric constant and its reduction to minus infinity at zero frequencies is completely are consistent with the right, negative wing of the dependence shown in Fig. 1.

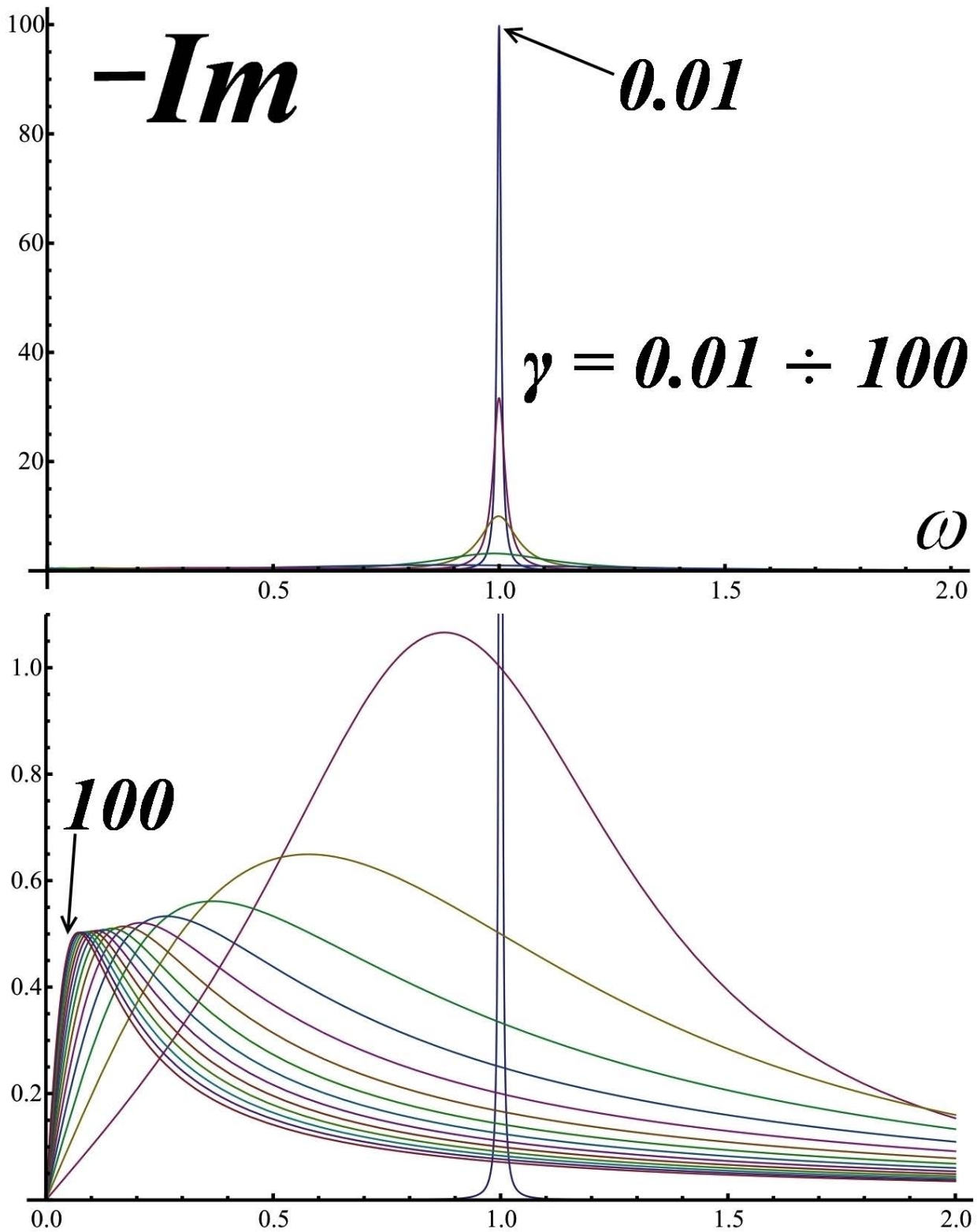


Fig. 2: Decreases the amplitude and frequency of the maximum negative impedance with increasing attenuation

The dependence shown in Fig. 2 is real "imaginary", since its exponent directly corresponds to the spectrum of attenuation of the amplitude of the driving oscillations (absorption spectrum - Fig. 3).

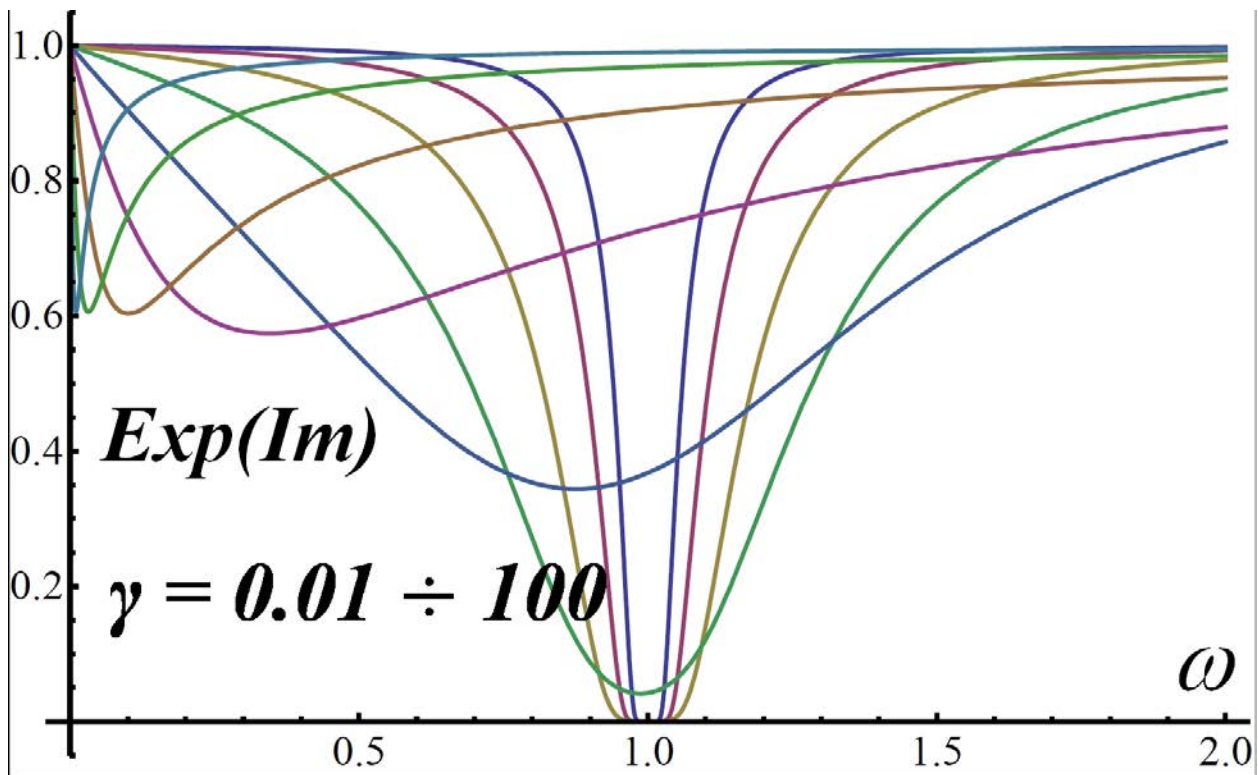


Fig. 3: Attenuation by the Harmonic Oscillator of the amplitude of the forcing oscillations at its different attenuation

The given harmonic formula (4) and the graphs of the spectral dependences of the components of its solution presented in Figures 1 ÷ 3 well describe the real oscillations of both macroscopic and microscopic objects, and even atoms-ions, from mechanical-acoustic-electric oscillations, then plasma-lattice- spin. Such a high INVARIANCE of this abstract model makes it an ELEMENT of dynamics, which, in each of the above cases, is only "weighed down" by the corresponding coefficients relating to the measured values of characteristic parameters and forces. But I will not be distracted by the specific rewriting of the real and imaginary parts of the solution for the harmonic oscillator in, for example, the real and imaginary parts of the dielectric constant (although there is something to be corrected in their standard records). I will return again to the analysis of this invariant "dynamic point" itself.

Imagination of the real part of the amplitude of oscillations near the resonant frequency (Fig. 1) is apparent, since the absolute value of the amplitude *Abs* does not change during the passage of resonance (Fig. 4), and the phase *Arg/π* from in-phase at low frequencies to antiphase at frequencies higher than the resonance(fig.5).



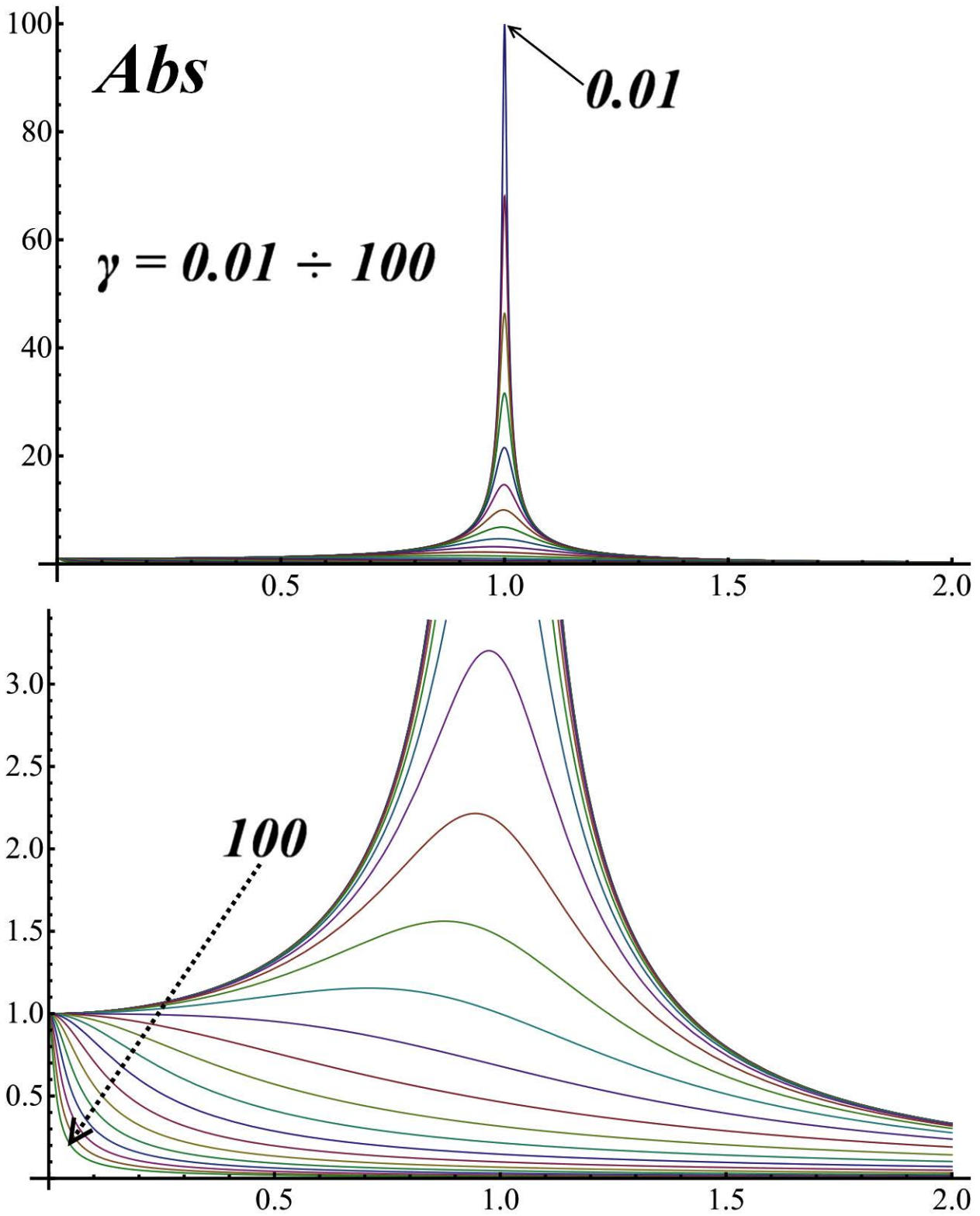


Fig. 4: The dependence on the oscillation frequency of a single force that forces the absolute magnitude of the amplitude of the oscillations of the Harmonic Oscillator at different attenuations

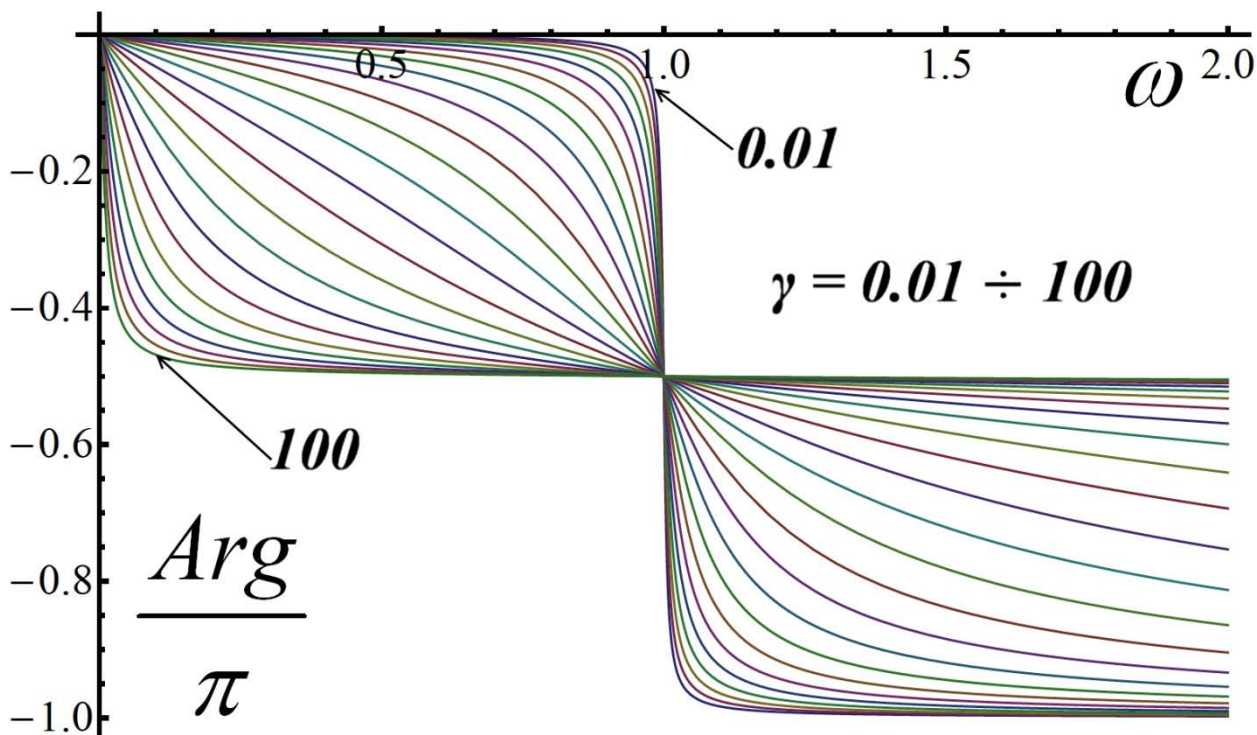


Fig. 5: Dependence on the oscillation frequency of the forcing unit shear force in the phase of the forced oscillations of the Harmonic oscillator at different dampings

Naturally, from decomposition of a complex number into terms or factors, it does not change at all, which reflects the Kramers-Kronig relation for optical constants, and the justification by referring to the causality principle can be read and vice versa - the causal relationship is that they are different same.

#### IV. CONCLUSION

And so, as the analysis showed, the real Imagination is not Time, but the time dependence of some properties of the Elementary Harmonic Oscillator. This real Imagination means nothing more than the "leakage" in time of the excitation energy and is described by the introduction of an imaginary unit into the equations. Those the real Imagination is the very dissipation of energy that Ilya Prigogine considered.

Moreover, the analysis of a slightly non-elementary harmonic oscillator shows that, strictly speaking, one imaginary unit for describing its motion is indispensable - instead of complex numbers one should use quaternions, since there may be several weakly coupled or strictly independent "channels of leakage" of the excitation energy (like the disproportion of purely geometric in crystals [15]).

And the real Imagination of Time itself, the real difference between normal (in the sense of independent) coordinate Time from geometric coordinates in the originality of the values of this polar coordinate - invariance in time is real, according to the causality principle, the repeatability of certain real processes in

the future and unreal, mental, imaginary repeatability in the past processes occurring now. And about the future, and about the past, we can only speak in terms of probability.

So the real Imagination of Time is that it is in itself unobservable neither in the past nor in the future. If we imagine that the light picture from our Earth has flown around the floor of the universe and returned to us, then we will see WHAT happened with us a long time ago, but not THAT Time itself. But the formal equating of Time to one of the additional geometric coordinates, the Imaginary of Time itself is thrown out of consideration, which leads to scientific errors [16], unraveling which you see that "common anomalies" are from primitive, non-elementary analysis of the Laws of Nature [17, 18].

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