The Universal Arrow of Time V:
Unpredictable dynamics.

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Abstract

We see that the exact equations of quantum and classical mechanics describe ideal dynamics which is reversible and result in Poincare's to returns. Real equations of physics describe observable dynamics. It is, for example, master equations of the statistical mechanics, hydrodynamic equations of viscous fluid, Boltzmann equation in thermodynamics, and the entropy increase law in the isolated systems. These laws are nonreversible and exclude Poincare's returns to an initial state. Besides these equations describe systems in terms of macroparameters or phase distribution functions of microparameters. Two reasons of such differences between ideal and observable dynamicses exist. At first, it is uncontrollable noise from the external observer. Secondly, when the observer is included into described system (introspection) the complete self-description of a state of such full system is impossible. Besides introspection is possible during finite time when the thermodynamic time arrow of the observer exists and does not change the direction. Not for all cases broken by external noise (or incomplete at introspection) ideal dynamics can be changed to predictable observable dynamics. For many systems introduction of the macroparameters that allow exhaustively describe dynamics of the system, is impossible. Their dynamics to become in principle unpredictable, sometimes even unpredictable by the probabilistic way. We will name dynamics describing such system, *unpredictable dynamics*. As follows from the definition of such systems, it is impossible to introduce a complete set of macroparameters for *unpredictable dynamics*. (Such set of macroparameters for observable dynamics allowed to predict their behavior by a complete way.) Dynamics of unpredictable systems is not described and not predicted *by scientific* methods. Thus, **the science itself puts boundaries for its applicability.** But such systems can *intuitively* «to understand itself» and «to predict» the own behavior or even «to communicate with each other» at *intuitive* level.

1. Introduction

Let's give definitions *observed and ideal dynamicses* [1-4], and also we will explain necessity of introduction of observable dynamics. We will name as ideal dynamics exact laws of quantum or classical mechanics. Why we have named their ideal? Because for the most of real systems the entropy increase law or wave packet reduction in the quantum case. These properties contradict with laws of ideal dynamics. Ideal dynamics is reversible and includes Poincare's returns. It is not observed in nonreversible observable dynamics. Whence there is this inconsistency between the dynamicses?

The real observer is always macroscopic system far from thermodynamic equilibrium. It possesses a thermodynamic time arrow which exists finite time (before the equilibrium reaching) and can change its direction. Besides, there is a small interaction of the observer with observable system which results in alignment of thermodynamic time arrows and, in case of a quantum mechanics, in wave packet reduction.

The observer describes the observable system in terms of macroparameters and corespondent thermodynamic time arrow. It also results in the difference of observable dynamics and ideal dynamics. The ideal dynamics is formulated with respect to the abstract coordinate time in terms of microparameters.

Violations of ideal dynamics are related to either openness of measured systems (i.e. can be explained by influence of environment/observer) or impossibility of self-measuring at introspection (for the full closed physical systems including both the environment and the observer). What is possible to do for such cases? The real system is either open or incomplete, i.e. we can not use physics for perdition of the system evolution? Not so!

Lots of such systems can be described by equations of exact or probabilistic dynamics, in spite of openness or description incompleteness. We name it observable dynamics. The most of equations in physics - master equations of statistical mechanics, hydrodynamic equation of viscous fluid, Boltzmann equation in thermodynamics, and the entropy increase law are equations of observable dynamics.

To possess the property specified above observable dynamics should answer certain requirements. It cannot operate with the full set of microvariables. In observable dynamics we use much smaller number of macrovariables which are some functions of microvariables. It makes the dynamics much more stable with respect to errors of initial conditions and external noise. Really, a microstate change does not result inevitably in a macrostate change. Since one macrostate is correspondent to a huge set of microstates. For gas macrovariables are, for example, the density, pressure, temperature and entropy. Microvariables are velocities and coordinates of all its molecules.

How to get observable dynamics from ideal dynamics? It can be gotten either by insertion to equations of the ideal equations small external noise, or insertion of errors to an initial state. Errors/noise should be large enough to break effects unobservable in reality. It is reversibility of motion or Poincare's returns. On the other hand they should be small enough not to influence observable processes with entropy increase.

For the complete physical system including the observer, observable system and a surrounding medium Observable Dynamics is not falsifiable in Popper's sense [36] (under condition of fidelity of Ideal Dynamics). I.e. the difference between Ideal and Observable Dynamics in this case cannot be observed in experiment.

However, there exist cases when it is not possible to find any observable dynamics. The system are unpredictable, because of either openness or description incompleteness. It is a case of *unpredictable dynamics* [21, 29-33], considered here.

2. Unpredictable dynamics

Let's introduce concept *synergetic models* [10]. We will name so simple physical or mathematical systems. Such systems illustrate in a simple form some real or supposed properties of unpredictable and complex (living) systems.

Unpredictable systems, as a result of its unpredictability, are extremely unstable with respect to external observation or thermal noise. To prevent their chaotization, they should have some protection from external influence.

Therefore we mainly interested in synergetic models of systems that are capable to protect itself from external noise (from decoherence in a quantum mechanics). They conserve internal correlations (quantum or classical), resulting in reversibility or Poincare's returns. Also they can conserve the correlations with surrounding world.
There are three methods for such protection:

1) The passive method - creation of some "walls" or shells impenetrable for noise. It is possible to keep also such systems at very low temperatures. An example is many models of quantum computers.

2) The active method, inverse to passive - complex dissipative or living systems, they conserve disequilibrium by the help of an active interaction and an interchanging of energy and substance with environment (metabolism). It is thought, that the future models of quantum computers should correspond to this field.

3) When correlations cover the whole Universe. The external source of noise is absent here. Origin of correlations over Universe is that Universe was in low entropy initial states. Universe appeared from Big Bang. We will name these correlations as global correlations. Sometimes it is figuratively named «holographic model of Universe»

Three facts ought to be noted:

1) Many complex systems during evolution pass dynamic bifurcation points. There are several alternative ways of future evolution. The selection one from them depends on the slightest fluctuations of the system state in the bifurcation point [5-6]. In these points even weak correlations can have huge influence on future. These correlations define one from alternative ways of future evolution specified above. Presence of such correlations restricts predictive force of the Science, but it does not restrict at all our personal intuition. Since we are an integral part of our Universe we are capable at some subjective level to "feel" these correlations inaccessible for scientific observation. No contradiction with current physics exists here.
2) In described unobservable systems the entropy decrease is often observed or they are supported at a very low-entropy state. It does not contradict to the second thermodynamics law of the entropy decrease. Really, for creation of both passive and the active protection huge negentropy from environment is necessary. Therefore the total entropy of system and an environment only increase. The entropy increase law remains correct for full system (observable system + an environment + the observer) though it is untrue for the observable system. Entropy decrease in full system can happen, for example Poincare's returns. But they are unobservable [1-4]. Therefore we can skip them.
3) Existence of many unpredictable systems is accompanied by the entropy decrease (It does not contradict to the entropy increase according to the second law of thermodynamics as it is explained above in the third item). Thus, existence of such systems correspondent to the generalized principle Le-Shatelie - Brown: the system hinders with any modification of the state caused both external action, and internal processes, or, otherwise, any modification of a state of the system, caused both external, and internal reasons, generates in system the processes guided on reducing this modification. In this case the entropy growth generates appearance of systems cause the entropy decrease.
4) Often maximum entropy production principle (MaxEPP) demonstrates correct results [38]. According to this principle the nonequilibrium system to aspire to a state at which entropy growth in system would be maximal. Despite an apparent inconsistency, MaxEPP does not contradict to Prigogine's minimum entropy production principle (MinEPP) for the linear nonequilibrium systems [38]. These are absolutely different variation principles. Though for both case the extreme of the same function (the entropy production) is looking for, but various restrictions and various parameters of a variation are thus used. It is not necessary to oppose these principles, as they are applicable to various stages of evolution of nonequilibrium system. MaxEPP means, that dissipative unpredictable systems (including living systems), being in the closed system with finite volume, accelerate appearance of thermodynamic equilibrium for this system. It means that they reduce also Poincare's return time, i.e. promote faster return to the low-entropy state. It again corresponds to the generalized principle Le-Shatelie - Brown: the entropy growth generates appearance of systems cause the entropy decrease. From all above-stated it is possible to give very interesting conclusion: *global "purpose" of dissipative systems (including living systems) is (a) minimization of their own entropy (b) stimulation of the global full system to faster Poincare's return to the initial low-entropy state.*
5) Global correlations generally "spread" over the closed system with finite volume and result only in Poincare's unobservable return [1-4]. However in the presence of objects conserving local correlations, global correlations can become apparent in correlation between such objects with each other and around world. Thus, presence of conserved local correlations allows to make global correlations to be observable, preventing their full "spreading" over the system.
6) Correct definition of thermodynamic macroscopic entropy is very difficult problem for complex physical systems without local equilibrium [39].

7) Very important facts ought to be noted. Unstable correlations exist not only in quantum, but also in the classical mechanics. Hence, such models should not have only quantum character. They can be also classical! Very often wrongly it is wrongly stated, that only the quantum mechanics have such properties **[11-12].** However**,** it is not so **[7-9].** Introduction by "hands" small, but finite interaction during classical measurement and small errors of an initial state erases the difference between properties of quantum and classical mechanics (in the presence of unstable correlations of microstates).

3. Synergetic models of local correlations

Let's consider examples of the synergetic models of unpredictable systems using the passive or active methods for protection from noise.

1) There are unusual cases for which there is no alignment of thermodynamic time arrows [12-13].

2) Phase transition or bifurcation points. In such point (some instance for evolution or some value for external parameter) macroscopic system, described by observable dynamics, can transform to not single, but several macroscopic states. That is, in these points observable dynamics loses the unambiguity. In these points there are huge macroscopic fluctuations, and used macroparameters does not result in predictability of the system. Evolution becomes unpredictable, i.e. there is unpredictable dynamics.

3) Let take quantum microscopic or mesoscopic system described by ideal dynamics and isolated from decohernece. Its dynamics depends on uncontrollable microscopic *quantum correlations*. These correlations are very unstable and can disappear as result of decoherence (entangling with environment/observer). For example, let us consider quantum system. Suppose that some person knows its initial and final state. Its behavior is completely predicted by such person. In a time interval between start and final the system is isolated from an environment/observer. In that case these microscopic correlations do not disappear and influence dynamics. However for the second person who is not present at start, its behavior is *uncertain* and *unpredictable*. Moreover, an attempt of the second person to observe some intermediate state of the quantum computer would result in destroying its normal operation. I.e. from the point of view of such observer there is unpredictable dynamics. Well-known examples of such systems are *quantum computers* and *quantum cryptographic transmitting systems* **[14-15].**

Quantum computer is unpredictable for any observer who does not know its state in the beginning of calculations. Any attempt of such observer to measure intermediate state of quantum computer during calculation destroys calculation process in unpredictable way. Its other important property is high parallelism of calculation. It is a consequence of QM laws linearity. Initial state can be chosen as the sum of many possible initial states of “quantum bits of the information”. Because of QM laws linearity all components of this sum can evolve in independent way. This parallelism allows solving very quickly many important problems which usual computer can not solves over real time. It gives rise to large hopefulness about future practical use of quantum computers.

Quantum cryptographic transmitting systems use property of the unpredictability and unobservability of “messages” that can not be read during transmitting by any external observer. Really, these “messages” are usual quantum systems featured by quantum laws and quantum correlations. An external observer which has no information about its initial states and try make measuring (reading) of "message" over transmission inevitably destroy this transmission. Thus, message interception appears *principally* impossible under physics laws.

4) It should be emphasized, contrary to the widespread opinion, that both quantum computers and quantum cryptography **[14-15]** have classical analogues. Really, in classical systems, unlike in quantum systems measuring can be made precisely in principle without any measured state

distorting. However, in classical chaotic systems as well there are the uncontrollable and unstable microscopic additional correlations resulting in reversibility and Poincare's returns. Introducing "by hands" some small finite perturbation or initial state errors destroys these correlations and erases this principal difference between classical and quantum system behavior. Such small external noise from environment always exists in any real system. By isolation of chaotic classical systems from this external noise we obtain classical analogues of isolated quantum devices with quantum correlations.

There exist synergetic models of the classical computers which ensure, like quantum computers, huge parallelism of calculations **[7]**

Analogues of quantum computers are the molecular computers **[9]**. The huge number of molecules ensures parallelism of evaluations. The unstable microscopic additional correlations (resulting in reversibility and returns) ensure dynamics of intermediate states to be unpredictable for the external observer which is not informed about the computer initial state. He would destroy computer calculation during attempt to measure some intermediate state. .

Similar arguments can be used for classical cryptographic transmitting systems using these classical unstable microscopic additional correlations for information transition. "Message" is some classical system that is chaotic in intermediate states. So any attempt to intercept it inevitably destroys it similarly to QM case.

5) Conservation of unstable microscopic correlations can be ensured not only by passive isolation from an environment and the observer but also by active dynamic mechanism of perturbations cancelling. It happens in so-called physical **stationary systems** in which steady state is supported by continuous **stream of energy or substance through system**. An example is a micromaser **[16]** - a small and well conducting cavity with electromagnetic radiation inside. The size of a cavity is so small that radiation is necessary to consider with the help of QM. Radiation damps because of interaction with conducting cavity walls. This system is well featured by density matrix in base energy eigenfunction. Such set is the best choose for observable dynamics. Microscopic correlations correspond to nondiagonal elements of the density matrix. Nondiagonal elements converge to zero much faster than diagonal ones during radiation damping. In other words, decoherence time is much less than relaxation time. However, beam of excited particles, passing through a micromaser, leads to the strong damping deceleration of density matrix nondiagonal elements (microcorrelations). It also leads to non-zero radiation in steady state.

Also in the theory of quantum computers methods of the active protection are developed. These methods protect quantum correlations from decoherence. They are capable to conserve correlations as long as desired, by iterating cycles of active quantum error correction. Repetition code in quantum information is not possible due to the no-cloning theorem. Peter Shor first discovered method of formulating a quantum error correcting code by storing the information of one qubit onto a highly-entangled state of nine qubits [17].

6) In physics usually a macrostate is considered as some passive function of a microstate. However it is possible to consider a case when the system observes (measures) both its macrostate and an environment macrostate. The result of the observation (measurement) is recorded into microscopic "memory". By such a way the feedback appears between macrostates and microstates.

An example of very complex stationary systems is living systems. Their states are very far from thermodynamic equilibrium and extremely complex. These systems are high ordered but their order is strongly different from an order of lifeless periodical crystal. Low entropy disequilibrium of the live is supported by entropy growth in environment[1]. It is metabolism - the continuous stream of substance and energy through a live organism. On the other hand, not only metabolism supports disequilibrium, this disequilibrium is himself catalytic agent of metabolic process, i.e. creates and supports it at necessary level. As the state of live systems is strongly

[1] *So, for example, entropy of epy Sun grows. It is an energy source for life on the Earth.*

nonequilibrium, it can support existing unstable microcorrelations, disturbing to decoherence. These correlations can be both between parts of live system, and between different live systems (or live systems with lifeless system). If it happens dynamics of live system can be referred to as unpredictable dynamics. Huge successes of the molecular biology allow describing very well dynamics of live systems. But there are no proof that we capable to feature completely all very complex processes in live system.

It is difficult enough to analyze real living systems within framework of concepts of ideal, observed and unpredictable dynamicses because of their huge complexity. But it is possible to construct simple mathematical models. It is, for example, nonequilibrium stationary systems with metabolism. It would allow us to understand a possible role of all of three dynamicses for such systems. These models can be both quantum [11-12, 18-20, 35] and classical [7-9].

7) Described above cases do not characterize all multiplicity of unpredictable dynamicses. The exact conditions at which ideal dynamics transfers in observable and unpredictable dynamics is completely not solved problem for mathematics and physics yet. Also there is not solved problem (connected to the previous problem) about a role of these of three dynamicses for complex stationary systems. The solution of these problems will allow to understand more deeply physical principles of life.

4. Synergetic models of global correlations expanded over the whole Universe.

With the help synergetic "toy" models it is possible to understand synchronicity[2] (simultaneity) of processes causally not connected [37], and also to illustrate a phenomenon of the global correlations.

Global correlations of the Universe and the definition of life as the totality of systems maintaining correlation in contrast to the external noise is a reasonable explanation of the mysterious silence of Cosmos, i.e. the absence of signals from other intelligent worlds. All parts of the universe, having the unique center of origin (Big Bang), are correlated, and life maintains these correlations which are at the base of its existence. Therefore the emergence of life in different parts of the Universe is correlated, so that all the civilizations have roughly the same level of development, and there are just no supercivilizations capable of somehow reaching Earth.

4.1 Blow up systems

Example are nonstationary systems with "blow up" **[6, 22-25],** considered Kurdumov's school. In these processes a function on plane is defined. Its dynamics is described by the non-linear equation, similar to the burning equation:

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[2] The study conducted by Russian specialists under the guidance of Valeri Isakov mathematics, which specializes in paranormal phenomena. Data from domestic flights they could not be obtained, so the researchers used Western statistics. As it turned out, over the past 20 years of flight, which ended in disaster, refused on 18% more people than normal flights. "We are just mathematics, which revealed a clear statistical anomaly. But mystically-minded people may well associate it with the existence of some higher power "- quoted Isakov," Komsomolskaya Pravda ".
http://mysouth.su/2011/06/scientists-have-proved-the-existence-of-guardian-angels/;
http://kp.ru/daily/25707/908213/
“That was Staunton’s theory, and the computer bore him out. In cases where planes or trains crash, the vehicles are running at 61 percent capacity, as regards passenger loads. In cases where they don’t, the vehicles are running at 76 per cent capacity. That’s a difference of 15 percent over a large computer run, and that sort of across-the-board deviation is significant. Staunton points out that, statistically speaking, a 3 percent deviation would be food for thought, and he’s right. It’s an anomaly the size of Texas. Staunton’s deduction was that people know which planes and trains are going to crash… that they are unconsciously predicting the future."
Stephen King, "The Stand" (1990)

$\partial\rho / \partial t = f(\rho) + \partial / \partial r\,(H(\rho)\, \partial\rho / \partial r),$ (I)

where ρ - a density, $N = \int \rho\, dr$, *r* - space coordinate, *t* - time coordinate, $f(\rho)$, $H(\rho)$ - non-linear connections:

$f(\rho) \to \rho^{\beta}$, $H(\rho) \to \rho^{\sigma}$,

These equations have a set of the dynamic solutions, named solutions with "blow up". It was proved localization of processes in the form of structures (at $\beta > \sigma + 1$) with discrete spectrum. The structures can be simple (with individual maximums of different intensity). They also can be complex (united simple structures) with different space forms and several maximums of different intensity. It is shown, that the non-linear dissipative medium potentially contains a spectrum of such various structures-attractors. Let (r, φ) be polar coordinateses.

$$\rho(r,\varphi,t) = g(t)\Theta_i(\xi,\varphi), \quad \xi = \frac{r}{\psi(t)}, \; 1 < i < N$$

$$g(t) = \left(1 - \frac{t}{\tau}\right)^{-\frac{1}{\beta-1}}, \; \psi(t) = \left(1 - \frac{t}{\tau}\right)^{\frac{\beta-\sigma-1}{\beta-1}}$$

Number of eigenfunctions:

$$N = \frac{\beta - 1}{\beta - \sigma - 1}$$

For these solutions value of function can converge to infinity for *finite* time τ. It is interesting that function reaches infinity in all maximums in the same instant, i.e. is synchronously. In process of converging to time τ the solution "shrinks", the maximums "blow up" and moves to common centre. About the moment of 0.9τ the system becomes unstable and fluctuations of the initial condition can destroy the solution. For high correlated initial condition it is possible to reduce these fluctuations to as small as desired.

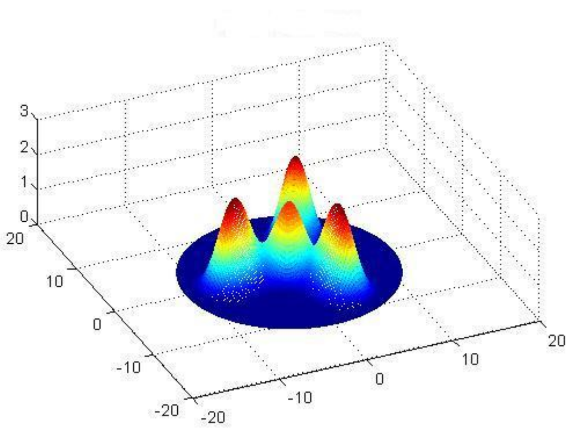

Рис. 1 From [34]. It is one from structures-attractors of the burning equation (I) in the form of the solution with "blow up".

By means of such models we can illustrate people population growth (or level of engineering development of civilizations) in megacities of our planet **[25].** Points of a maximum of function ρ are megacities, and population density is a value of the function ρ.

It is possible to spread this model to the whole Universe. Then the points of a maximum are civilizations, and population density of civilizations (or level of engineering development of civilizations) is a value of the function ρ. For this purpose we will complicate model. Let during the moment when process starts to go out on a growing asymptotic solution there is very fast expansion ("inflation") of the plane in which process with "blow up" runs. Nevertheless, processes of converging to infinity remain synchronous and are featured by the equation of the same type (only with the changed scale) in spite of the fact that maximums are distant at large intervals.

This more difficult model is possible to explain qualitatively synchronism of processes in very far parts of our Universe as a result "inflation" after Big Bang. The high degree of global correlations reduces the fluctuations result in destroying the solution structure. These global correlations model coherence of parts of our Universe.

Processes with "blow up" appear with necessary completeness and complexity only for some narrow set of the coefficients of the equation (I). ($N>> 1$, $\beta> \sigma +1$, $\beta\approx\sigma +1$ is necessary conditions for appearance of a structure with large number of maximums and their slow coming to the common center). It allows to draw an analogy with «anthropic principle» **[26].** The anthropic principle states, that the fundamental constants of the Universe have such values that a result of Universe's evolution is our Universe with anthropic «beings», capable to observe the Universe.

It is necessary to pay attention to one fact. If we want that the ordered state in model would not be destroyed at $t=0.9\tau$, and would continue to exist as long as possible then exact adjustment is required *not only for model parameters, but also for an initial state*. It is necessary, that fluctuations arising from the initial state would not destroy orderliness as long as possible. And the presence of this rare exclusive state also can be explained by the anthropic principle.

4.2 «Cellular» model of Universe.

Also it is interesting to illustrate the complex processes by means of "cellular" model. Discrete Hopfield's model [27-28] can be used as a good basis. This model can be interpreted as a neural network with a feedback or as a spin lattice (a spin glass) with unequal interactions between spins. Such systems is used for a pattern recognition.

This system can be featured as a square two-dimensional lattice of meshes *NxN* which can be either black, or white ($S_i=\pm 1$). Coefficients of the linear interaction between meshes J_{ji} are unequal for different pairs of meshes. They can be chosen so, that in the process of discrete evolution the overwhelming majority of initial states transfers in one of possible final states. This set of final states (attractors) can be chosen and defined "by hands".

$$S_i(t+1) = sign\left[\sum_{j=1}^{N} J_{ij} S_j(t)\right],\ \ 1 \le i \le N$$

$$J_{ij} = J_{ji},\ J_{kk} = 0\ \ 1 \le i, j, k \le N$$

Attractors correspond to energy *E* minimum:

$$E = -\frac{1}{2}\sum_{i=1}^{N}\sum_{j=1}^{N} J_{ij} S_i S_j$$

Let choose lattice attractors to be letters A or B.

There are such two initial unstable states which differ only on one mesh (*a critical element*). Thus one of them has a state as an attractor A, and another - B. Such unstable initial states well illustrates a property of the *global instability* of a complex system. This instability is inherent in a system as a whole, not in its some part. Only some external observer can change the value of the critical element and vary system evolution. Internal dynamics of the system cannot do it. *Global correlation* between meshes of an unstable initial state defines completely a final attractor (A or B) of the lattice.

It is possible to complicate model. Let each mesh in the lattice featured above is such sublattice. We will define evolution of such composite lattice going to two stages.

At the first stage large meshes do not interact. Interaction exists only into sublattices. This interaction is the same as for the one-stage model featured above. Coefficients of the linear interaction between meshes are chosen so that attractors, as well as earlier, are the letter A or B. Initial states of all sublattices can be chosen as unstable and containing the critical element. A final state A of sublattices we will perceive as a black mesh for a large lattice, and a state B of sublattices we will perceive as a white mesh.

The second stage of evolution is defined as evolution of this large lattice over the same way as in the one-stage model featured above. The initial state of the large lattice is defined by the first stage. This initial state, appearing at the first stage, is also unstable and contains the critical element. For final state of the large lattice to each black mesh we will appropriate a state A of the sublattices, to each white mesh we will appropriate a state B of the sublattices.

The initial state of the composite lattice can be chosen always so that attractor of the two-stage process will be A. For every mesh included to A the sublattice state also corresponds to A. Let's name this state of the composite lattice as «A-A». Then just such final attractor can be explained by:

a) the global correlations of the unstable initial state

b) the specific selection of all coefficients of interaction between meshes.

Let's complicate model even more. By analogy to the aforesaid, we will make this lattice not two-level, but three-level, and process instead of two-stage we will make three-stage . A final state will be «A-A-A».

Let's suppose, that before the beginning of the aforementioned three-stage process our composite lattice occupied very small field of physical space. But as a result of expansion ("inflation") it was dilated to huge size. Then the aforementioned three-stage process has begun. Thus it is possible to explain presence of the unstable correlation of the initial state of the composite lattice leading to a total state «A-A-A». Indeed, before "inflation" all meshes were closed each other. So the unstable initial correlation can be easily formed under such conditions.

This three-level composite lattice can be compared to our Universe. Its smallest sublattices «A» can be compared to «intelligent organisms». Lack of their interaction with an environment at the first stage (before forming of a final state «A») - is equivalent to the active or passive protection of internal correlations from external noise. Lattices of the second level in a state «A-A» correspond to "civilizations" organized by «intelligent organisms» («A») at the second stage. At the third stage "supercivilization" («A-A-A») is formed by "civilizations" («A-A»).

Then global correlations of the unstable initial state of the composite lattice can be analogue of the possible global correlations of the unstable initial state of our Universe existed before its inflation. Coefficients of interaction of the meshes correspond to the fundamental constants of our Universe. Initial process of the lattice expansion (before its three-stage evolutions) corresponds to Big Bang. The specific selection of interaction coefficients between the meshes leading to the asymptotic state «A-A-A» and the initial correlations can be explain by «anthropic principle». We remind here that the anthropic principle states, that the fundamental constants of the Universe have such values that a result of Universe’s evolution is our Universe with anthropic «beings», capable to observe the Universe.

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