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Abstract Incompleteness Theorems and Their Influence in Methodology

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Abstract:
Kolmogoroff's complexity, Chaitin and Gödel's incompleteness theorems are considered commonly relatively to a fixed coding of objects and to a standard notion of algorithms. In essence all they are independent from almost all properties of concrete theories, algorithms and codings. So stable and general results are to have deep methodological, philosophical and even theological consequences. Here we consider their abstract form and speculations which can be derived from them and partially from modern computer science, IT practice and physics. Main ones are the following:
A new proof of Kant's Third antinomy and of Parkinson's Law of committee, relations to cooperative creative activity, multi-language programming, benevolence to other's views, dilemma of deism-atheism, and finally methodological approach to theology.

Keywords:
Kolmogoroff complexity, Chaitin theorem, Gödel theorem, Kant antinomy, Parkinson law, God, Science, truth, destination.

1. Abstract Incompleteness Theorems

1.1. Abstract Structures of Computability

Gödel theorem of incompleteness and Chaitin theorem of incognizable are affecting many philosophical speculations and many branches of Western philosophy. Due to their importance it is reasonable to clarify whether they deal with one kind of precisely defined structures or with a wide class of such (and maybe not fully defined) structures. So we start with a popular outline of proof of their very common and abstract nature making them in essence basic and inevitable restrictions of precise thinking. A precise formulations and proofs are given in [1, 2]

A *system of computability* works over any finite or infinite set of atoms. It transforms lists constructed basing on these atoms. List is so general and flexible information structure that non-natural encodings of other objects (like to Gödel numbers) are not necessary.

For example string of letters 'abca' can be represented by a list (a b c a string). A logical formula can be represented by a list like to (all x (exists y ((2 * x) = y))). Natural numbers are expressed as lists of the form (Nil ... Nil) where Nil is an empty list: Nil=()=0.

In a system of computability some atoms are declared as *functional* ones. If a list ends by a functional atom it can be computed. This is like to a practice of the functional programming languages Lisp, Haskell and so on. The functional atom defines an action; other members of the list are the arguments of this action. For example ((a b c) (b a) concat) is computed into (a b c b a) if concat is a function of list concatenation. There can be only a finite list of functional atoms.

We assume only basic elementary transformations of lists. Because functional atoms are atoms also we assume also elementary operations over functions which not lead us out of the space of functions generated by expressions using elementary functions. Because those functionals can compute to functions or functionals some of resulting lists are called *functional lists*. If the last member of a list is the functional list and number of other members is equal to the number of arguments of the function then this list is called *convertible* one and can be computed. More precisely list is *convertible*, if there is a subexpression which is not functional and of the form (E1 ... En F), where number of arguments of F is n.

For example if comp is a functional of composition for unary functions and f and g are function lists then (a (f g comp)) is the convertible list which computes to a result of sequential application f and g to a.

Attention! We write "a result" because we do not assume that each function is deterministic. Our basic functions are deterministic but we allow indeterministic functions and functionals also.

We allow any finite number of additional elementary and high-order functional atoms. So a system of computability can be very week or very strong. It is not necessary Turing complete or Turing computable. The only condition is that each function has a well defined computational semantics (not necessary algorithmic). Thus we defined a kernel language for different kinds of algorithmic and non-algorithmic computations (e.g. hyperarithmetic or computations on an algebraic structure). Lists in a system of computability are also called *expressions*.

We demand the following proposition holds.

Proposition 1 (limited λ-abstraction). Let us enrich our language by variables x1, … , xn. Then for any list E[x1, … ,xn] containing variables x1, ... ,xn can be constructed a functional FT such that (E1 ... En FT)=E[E1,…, En].

Here = is understood as "sets of possible values of left and right parts are equal".

If a system of computability contains a functional atom turing it is called interpretative one, if it contains eval it is called Turing one. It is called strong Turing one if it also contains a functional atom search. Computational semantic of these two functionals is defined as follows.

(E1 E2 E3 turing) computes E2, which is to be a functional, and then performs E3 steps of its application to E1 (E3 is to have a number value) and gives a list (E4 E5), where E4=0, if computation had been finished on or before step E3, and 1 else. (E1 0 E3 turing)}=(1 E1).

(E1 E2 eval) computes its arguments, the second argument is to be a functional, and then apply this function to the value of the first argument. (F F1 search) finds such tuple of values of arguments for F, for which F is equal to 0, and applies F1 to a found value. Numbers of arguments of functions are equal.

Proposition 2. There holds a fixed point theorem in each Turing system: for each functional F there is such E that for all E1 (E1 E F)=(E1 E eval).

Proposition 3 (Turing completeness). Turing systems allow expressing any partial recursive function.

eval is definable through turing and search. It is called *a universal function*, turing is an interpreter, search is a search operator, it can be whether indeterministic or deterministic. No other dependencies hold for these three operators. Primitive recursive functions have an interpreter without search and universal function. Recursive schemata on real numbers and their lists with a signature {0.0, 1.0,=,>, +, *} have universal function and interpreter but no search. Hyperarithmetical functions on real numbers have no search and no interpreter, only a universal function. Adding search we get no interpreter. Adding search to initial elementary functions gives no interpreter and no universal function.

1.2. Generalization Of Algorithmic Complexity

Definition 1. *Complexity* of an object relatively to a system of computability is a minimal length of an expression which evaluates to our object. If a system is Turing one, complexity is called Kolmogoroff one. Complexity of an object *x* in a system Σ is denoted (x $\mathbf{K}_{\Sigma}$).

If system is defined by a context Σ is omitted. Let lh be a function computing length of an expression (small details like whether spaces are counted and so on are irrelevant here; it is sufficient that length is strictly increasing and almost additive via concatenation).

Definition 2. Let there are two computational systems Σ_1 and Σ_2. Coding CODE[a] of the language of one system inside language of other is *regular* if (CODE[a] lh) ≤ k·(a lh)+C_1. C_1 is a constant, k is a *coding factor*. Σ_1 is interpreted in Σ_2, if there is a regular coding and a function Int and there exists *n* such that (CODE[E] Int turing_2)=(0 CODE[a]) iff E=a.

Σ_1 is translated into Σ_2, if there is a regular coding and a function Trans such that (CODE[E] Trans eval_2)=CODE[a] iff E=a.

Theorem 1. (Kolmogoroff theorem) If Σ_1 is interpreted or translated into Σ_2 and *k* is a coding factor, then k·(a $\mathbf{K}_1$) ≤ (CODE[a] $\mathbf{K}_2$)+C.

This theorem generalizes up to wide class of systems and codings (including Turing-incomplete and non-algorithmic) a theorem of Kolmogoroff on invariance of complexity up to additive constant.

1.3. A Generalized Chaitin Theorem

Let there is a theory **Th**, having definable predicates: unary "To be a natural number" (xε**N**) and two binary: = and <. Let **Th** has constants 0,1ε**N** and functions of natural numbers (maybe also definable) +, *, ↑. The last function is the power function. Elementary arithmetical formulas are relations of two expressions in this vocabulary. Then we say that this theory contains natural numbers.

Let there is a full Turing system Σ with functionals which can to test whether this list is a proof of a given formula in some regular coding, to extract a proved theorem from a proof code and to substitute an object of Σ (not necessarily a number) for a free variable of a formula and to compare two formulas textually.

Definition 3. A theory is Chaitin-correct w.r.t. Σ if the following notions are expressible a notion (E E1 eval)=a, a function (a lh) which computes the length of an expression; all true formulas of the form (a lh)=n are provable; all closed true elementary arithmetical formulas are provable; and no closed false formula of the form (E E1 eval)≠a is provable.

Each Chaitin-correct theory is consistent. A simplest such theory Ar_0 can be given by the following axioms:

(x+0=x); (x+(y+1)=(x+y)+1; (x*0=0); (x*(y+1)=(x*y)+x; (x↑0=1); (x↑(y+1)=(x↑y)*x.

To prove Chaitin-correctness of this minimal theory we are to use a relatively sophisticated encoding like to Smullian's or Gödel's. But this becomes not necessary in a bit less minimalistic constructions.

Theorem 2. (Generalized Chaitin theorem) There is a number **C** (Chaitin's constant) in any Chaitin-correct theory such that (a **K**)> **C** is not provable for any *a*.

Proof.

A formula expressing (E E1 eval)=a is denoted R(p,x,a). Then a statement (a **K**)>**C** can be formulated as follows: ∀x∀p (((x p) lh)<**C**+1⊃¬R(p,x,a)). If (a **K**)< **C**+1 holds, then this formula is not provable inside **Th**, because else a false statement

$$(((x0\ p0)\ lh)<\mathbf{C}+1\ \&\ \neg R(p0,x0,a))$$

would be provable and thus a false formula ¬R(p0,x0,a) for some ((x0 p0) lh)<C+1 also. Let show this and by the way construct a Chaitin's constant.

Let a functional K find for each C a proof of a formula (a **K**)>C by brute force and if such proof is found gives *a*. Let the length of a code for this functional be *k*. Let the quantity of different atoms in our system be *m*. Then there is such C_0, that $m\uparrow C_0 > k*C_0$. This C_0 can be taken as a Chaitin's constant. Let (a K)>C_0 were provable for some a. Then K would find such a_0. But really (a_0 K)≥C_0 and thus ((x0 p0) lh) <C_0+1 & ¬R(p0,x0,a_0) is not provable for some p0, x0.

But ∀x∀p((x p) lh)<(C_0+1)⊃¬ R(p,x,a0)) implies ((x0 p0) lh)<(C_0+1)⊃¬ R(p0,x0,a0). ((x0\ p0) lh)<(C_0+1) is provable by correctness, therefore is provable ¬ R(p0,x0,a0). Contradiction.

Q.E.D.

This form of Chaitin's theorem does not demand computability of a system complexity is defined w.r.t. It uses search function essentially. It can be applied also for systems with infinite basic data type but with finite base of explicitly given atoms. Then complexity of some objects can be infinite (e.g. π in a system for algebraic operations on real numbers).

1.4. A Generalized Gödel Incompleteness Theorem

Now we consider and generalize the Gödel incompleteness theorem in the form of Rosser [3]. Here are some auxiliary definitions.

Definition 4. Restricted quantifiers are formulas of the form

$$\forall x((x\ lh)<\mathbf{n} \supset A(x)),\ \exists x((x\ lh)<\mathbf{n}\ \&\ A(x)).$$

A formula P(x) is *limitedly correct* in the theory **Th** if from provability of $\exists x((x\ lh)<\mathbf{n}\ \&\ P(x))\vee B$ follows provability of P(a) for some $(a\ lh)<\mathbf{n}$ or provability of B itself.

Definition 5. A theory is *Gödel-correct*, if a predicate < is expressible for natural numbers; all closed true formulas of the form $(a\ lh)<\mathbf{n}$ are provable; there is some coding for formulas; there is a formula expressing "p is a proof of A(a)" Proof(p,CODE[A],a); there is a functional to compute code of negation of a formula by its code Neg; if A(a) is provable, then Proof(p,CODE[A],a) is provable for some p; a weak Gödel rule

$$\frac{Proof\ (p, CODE\,[A], a)}{A(a)}$$

is admissible and Proof(p,CODE[A],a) is limitedly correct for all A, a.

Theorem 3. (Abstract Gödel theorem) If a theory is Gödel-correct it is incomplete.

Proof.

Consider a formula

$\forall x((Proof(x,z,z) \supset \exists y((y\ )<(x\ lh)\ \&\ Proof(y,(z\ Neg),z))))\ \&$

$\exists x((Proof(x,(z\ Neg),z)\&\ \neg\exists y((y\ lh)<(x\ lh)\ \&\ Proof(y,z,z)))\ )$

Substitute in it its code R. Then if the formula

$\forall x((Proof(x,R,R) \supset \exists y((y\ )<(x\ lh)\ \&\ Proof(y,(R\ Neg),R))))\ \&$

$\exists x((Proof(x,(R\ Neg),R)\&\ \neg\exists y((y\ lh)<(x\ lh)\ \&\ Proof(y,R,R)))\ )$ (Rosser)

is provable, we take a_0 with provable $Proof(a_0,R,R)$. Due to limitedly correctness of Proof and by the first conjunctive subformula there is such $(a_1\ lh)<(a_0\ lh)$, that $Proof(a_1,(R\ Neg),R)$ is provable. Then by a weak Gödel rule a negation of (Rosser) is provable and our theory is inconsistent and proves everything. So it is not Gödel-correct.

If a negation of (Rosser)

$\exists x\ ((Proof(x,R,R)\ \&\ \neg\exists y((y\ lh)<(x\ lh)\ \&\ Proof(y,(R\ Neg),R))))$

$\vee\ \forall x((Proof(x,(R\ Neg),R) \supset \exists y((y\ lh)<(x\ lh)\ \&\ Proof(y,R,R))))$

is provable then there is such b_0 for which $Proof(b_0,(R\ Neg),R)$ is provable.

From first disjunctive part follows $\exists x((x\ lh)<(b_0+1)\ \&\ Proof(x,R,R))$. Applying limitedly correctness we get provability whether (Rosser), which is contradictory, or the second disjunctive part. Then we get a contradiction analogously to the first part of proof. Q. E. D.

So to exclude almost all positive assumptions in incompleteness theorem it suffices only to improve a construction of an indecidable statement.

2. Philosophical And Methodological Consequences

2.1. Algorithmic Randomness and Kant's Third Antinomy

The Kant's Third Antinomy (of Freedom) can be substantiated precisely if complexity of a human is lower than complexity of the Universe. We have stated that any formalism has limits such that upper them it cannot state a complexity of an object and thus cannot correctly comprehend and

understand it. Thus any argumentation with complexity upper than Chaitin's limit for a person is treated as completely chaotic and illogical. But this is not the worst case. If such a person tries to comprehend the arguments by cutting out all which cannot be placed in his/her head he/she gets an illusion of understanding together with completely wrong image of the percept.

Chaitin [5] noted out that now existence of unknowledgeable is well substantiated and even proved. Each position based on supposition that human mind is omnipotent in principle is not even an opinion now. Our generalization of Chaitin theorem shows how weak premises are sufficient for Chaitin's limit is existent. We do not need here a claim that human is a finite system which had been used in earlier demonstrations. This together with an observed harmony of the world substantiated deism in very high degree [6]. In the same time this shows that it is impossible to prove or to refute existence of God.

For finer methodological consequences it is reasonable to accept finiteness of a human (as for example in [9]). The Universe is incognizable as a whole because complexity of the Universe is much higher than one of a human and of the humanity (even in supposition that joining humans join only knowledge but not their ignorance). But incognizable can sometimes be partially appreciated. It is known that objects with big Kolmogoroff complexity are comprehended as random.

Kolmogoroff studied algorithmic randomness for infinite sequences (complexity of initial segment of a sequence will be same as its length up to additive constant). We are to define randomness of a finite object from the point of view of Chaitin's limit and his considerations in [6,7]. This is randomness relative to a concrete object or subject processing information.

An object is random for a processor if its complexity is larger than processor's Chaitin's limit.

Now we'll prove a proposition equivalent to Kant Third Antinomy [10] and even in more strong form, expressing it in the language of current science.

Human cannot state whether our Universe is deterministic or there is a necessary randomness in it.

Let the Universe be deterministic. Then a complexity of the algorithm initialized during world's creation is higher than Chaitin's limit of humanity. Thus humanity cannot comprehend a Word's idea as a whole and complete entity. Deterministic world is understood as random one.

We must state a warning here. We are not creationists. World creation could be a natural process for example as garbage of a super-civilization during re-creation or transformation of its own World (S. Lem: ***From the Einsteinian to the Testan Universe***. In [11]).

Let our World be indeterministic. If we were proved this we were proved that complexity of our World is higher than Chaitin's limit of our civilization. This is a contradiction.

Thus problem whether our Universe is deterministic is a pseudo-problem from the point of view of pure exact knowledge. We are free to choose a theory which in the moment is a best fit for «practice» and is a better representation of objects in view.

Therefore it is inacceptable to advertise results of our science as «scientific truths». They are to be re-verified by an alternative theory. This is a strong opposition for postmodernistic «tyranny of truth». We cannot lay our responsibility on arms of Science or God.

2.2. Parkinson's Law

Parkinson's law of committee (decision of committee is more moronic than decision proposed of its stupidest member) can be proved precisely. Let there is a committee which is to work out a decision understandable for all its members for each could meaningfully vote *yea* or *not*. In this case Chaitin's limits of committee members are to be reduced to minimal one because else some of members cannot understand a proposal. So a weak Parkinson's principle is substantiated:

Weak Parkinson's law:

Decision of a committee is no more adequate that one which could make the least competent of its members himself

But the reality is cruder. Each committee member has different competentions in different domains. So we need to introduce a matrix of limits. If two limits of persons are C_i and C_j, complexities of translations from one system of notions into another are $\mathbf{K}_{ij}$ and $\mathbf{K}_{ji}$, then maximal complexity of a decision of each of them understandable by both is $C_{ij}=\min C_i-\mathbf{K}_{ji}, C_j-K_{ij}$: a limit of i-th person for understanding of j-th. Thus even not taking into account non-uniformity of knowledge inside a Chaitin limit we get the following upper bound: $\min_{i,j} C_{ij}$.

We substantiated the following

Strong Parkinson's law:

Decision of a committee is more moronic that a decision which could make the most moronic of its members himself

In Venice and Rome important decisions were delegated to a truthful person which had been made fully responsible for its realization and consequences…

2.3. Chaitin Limit and Paradox of Inventor (Orevkov Theorem)

There is at least one more quality of mind orthogonal to brute force which can lead to relatively large Chaitin's limit. This is ability to master complex notions.

Orevkov theorem (1968):

An indirect proof in logic can be in the tower of exponents times shorter than any direct one.

Orevkov's theorem is a precise partial case of a general paradox of inventor formulated by Gy. Polya:

To prove a simple statement we are often to use complex intermediate notions. To prove a weaker and "simpler" statement can be much harder than to prove more strong and complex one. Gy. Polya pointed out and partially explained this paradox w.r.t. inductive proof. Orevkov substantiated that it is a fundamental property of thinking.

Interrelation of Chaitin and Orevkov theorems yields that high level person can make things which cannot be understood by plain thinkers but to implement his/her insights plain thinking is often necessary. Using high order notions we can jump far away behind Chaitin's limit of crawling persons. This substantiates a genial insight of D. Hilbert that ideal notions are necessary to obtain non-trivial practical (real) results.

American scientist M. Furman wrote (private communication discussing my preliminary notes on Chaitin's limit):

"Non-equivalence (not considering purely theoretical notion of Kolmogorov complexity, but from the point of view of real application) is defined by resources: size of memory and execution time.

Theoretically we have two binary properties: is memory finite or is time finite. But seeing one step deeper we understand that there is a uniform restriction for some class of examples".

These arguments do not disturb our basic considerations and only show that real situation is even more fine and interesting. It is known that primary resource of human defines his/her logic (linear logic is logic of money, intuitionistic one is logic of knowledge, nilpotent one is logic of time and so on). Of course it can restrict Chaitin's horizon even more substantially than Kolmogoroff complexity.

M. Furman also proposed an example showing interconnections of Chaitin's limit with inventor's paradox. If a person mastered a high-level method he can say something like to Furman's objection: "It is very easy to construct a translator having the precise definition of a language" But method of formal semantics itself cannot be treated as a simple one. And it is known how hard is to write out a formal definition of a semantic.

Evgeny Kochurov pointed out (private communication) that usually those who cannot comprehend complex notions but have a big operative memory can build long and relatively complex first-order compositions. Those who excellently appreciate methods can find excellent critical points but poorly analyses a crawling process how to go from one critical point to next one. So those two are complementary and can excellently assist one another if each person is used according to his/her strong sides. So we transferred to a problem how to avoid Parkinson's law.

2.4. Consequences for Organization of Creative Work: How to Avoid Parkinson's Law?

There is an interesting example which seems to be a strong counterexample to Parkinson's Law. Each bee, termite or ant acts like to finite automaton with a fixed program and low memory. Nevertheless a general behavior of nest becomes very complex and adaptive. Moreover ants for example demonstrate more complex forms of integration and system behavior. Remember ant empires joining in the single net thousands of nests which have intensive exchange of information, people and genetic material (trade points and exchange of nymphs).

We apply here an analogy from logic. Von Neumann's theory of self-reproducing automata shows how to compose an upcoming system from uniform units with extremely simple behavior. Thus a good organization of morons which cannot understand even loops can generate recursions and high level constructions. How is it possible? It is because cooperation itself is performed by strict simple automata rules.

This analogy is used in neuron nets in such domains as pattern recognition in cases when there are no precise algorithms. Well trained neuron net mistakes sometimes but rarely. And nobody knows why.

Ideology of crowdsourcing tries to transfer this experience into human society. But as for neuron nets here we get no creativity[1]. How to introduce it?

As usually direct and obvious decision --- to make automata stochastic or indeterministic --- fails here. Such approach to creation process is fantastically ineffective.

So we come to a tough consequence for human collectivities. Committee consisting from equal and free creative persons is impotent. Potent can be at least two-level structure. Interactions are strictly formalized on first level and for connections between first and second level. In contrary interactions on second level are bounded by clear and ruthless rituals but never formalized. They are diminished to a reasonable minimum. Upper level is responsible for creative decisions and lower for their realization. It is often possible to implement an idea inside a rigid structure but never is possible to get a new idea here.

We have here another “counterexample”: freesofters. This seems to be a conglomerate of free creative individuals which interact very informally. But this is not the case. They curse and laud one another very informally but their interactions in coding, bug processing, and documentation and so on follow strict rules. So I cannot say that they are “free persons” in vulgar sense of this word. They are free individuals having real goals and values and voluntarily sacrificing some “freedoms” for those high valuables. They can be an embryo of a structure which can save humanity and some real achievements of current ill civilization after its inevitable death.

And now dive in cold water. A community of freesofters can be so effective because almost all they are involved into really non-creative problems of coding according to existing algorithms and architects, debugging and developing earlier projects. But this community has also an ecological niche for really creative persons.

Warning. A society based on freesofters-like libertarian principles will ruthlessly apply “measures of humanitarian defense” (see e.g. a social fantasy of A. A. Rosoff “Confederation Meganesia” [11]) and suppress minorities which wish to claim their rights in manner restricting other people's rights and common values. It may be necessary to survive against mindless hordes of “free vultures”.

Furthermore collective intellect of best algebraists allowed solving a problem of classification of finite groups [12]. But interaction of professional pure mathematicians is so deeply ritualized[2] that this example is a verifying example for us.

These examples allow us to make principle of committee more precise. Committee must elaborate a decision. Such decision will inevitably be a compromise e.g. a mixture of unpleasant and useless. Creative persons try to find a solution. They do not try to cut it according to lower level of their understanding. In contrary, people develop a nice idea of other’s even they do not appreciate it as a whole and often find new aspects of it. So a good organized creative storming can lead to valuable results. High level people know how useful is a discussion of equal in spirit and mind persons (but not those nominated by an institution).

Collective creative work is development and transformation of new ideas without “full comprehension”. How to increase effectiveness of this storming?

1. Sacrifice sacred cows.
2. Make hidden conceptual contradictions visible.
3. Don't pronounce “universal and indisputable truths” (Благоглупости in Russian; I don't know an analogy in English).

All these three points contradict to politcorrectness and other liberal taboos.

2.5. Three heads of stupidity

In preceding discussion we have used three terms characterizing main sources of “high-minded stupidity” which we can often observe. A person who has a well developed reasoning power makes completely inadequate and often horrible and deadly propositions and claims when applying his/her mind to living situation [16].

First of all we must point out that any living notion and any living system are informalizable. This effect usually is ignored and hidden by “sweet and politcorrect” term “hardly formalized”. But really the living notion simply breaks borders of any its formalization.

For example many people tried to give a precise definition of love. If this definition becomes precise then love becomes reduced to courtesy. This notion allowed such phenomena as court of Marguerite de Navarre resulting in statement: “There cannot be love of husband and wife.” William Shakespeare brilliantly refuted this in his “Romeo and Juliet”.

N. Belyakin (Novosibirsk mathematician and logician) approx. in 1976 pointed out that any formalization of a complex, important and living humanitarian notion immediately tends to be refuted by artists and writers. And they always succeeded in this “destructive action”. Moreover a like situation arose in Mathematics. Any formalization of (say) arithmetic helps us to construct an example of statement which is not covered by this formalism (see Gödel theorem earlier in this text).

So any formalization turns notion into precise but dead terms (corpses of notions). It is adequate only when its numerous explicit and implicit suppositions are valid. Thus *it is adequate only in some state of world, for some goals and when some values are accepted as main ones*. It is to be replaced by other formalization or elsewhere lead us into a mortal deadlock. Moreover in cool and clever society this change is to be done when the current formalism is as yet effective but leads to negative cumulative effects. For example such two formalisms as the system of scientific grants and world of virtual money and consumerist economics thinking society is to replace today (if not yesterday).

Different formalisms are mutually inconsistent. So we are to make choice and not seek a quasi-compromise. Theoretically all possible formalizations of a system of notions form a system of theories in which each theory except the trivial one has alternatives and extensions. When we try to go through this system in a way of extensions without changing alternatives we will result in a deadlock (though theoretically we can expand infinitely but in non-computable manner).

Благоглупость (good stupidity). This thing is in principle very good. But in real world its small violations lead step by step to horrible consequences. Examples: tolerance, politcorrectness, communism, liberalism, democracy. This phenomenon can be revealed and studied by means of classical mathematics (non-stability of systems; divergence of effects in linear models and more deep second order models and so on).

Conceptual contradiction. Two things are non-contradictory but prevent development one another (poorly consistent). This effect was displayed in the theory of informalizable notions. It was observed but not recognized (maybe) first time in Programming. **Go to** and structured programming was classified by E. Dijkstra as mutually inconsistent ([17], 1968). Because there was no idea of informalizability at those times Dijkstra classified structured programming as good and **go to** as harmful. Later there was developed a method of automata programming alternative to structured programming and using explicit transition operators. Now there are a lot of examples of conceptual contradictions. For example such are “sanctity of human life”, “the right to life” and necessity of

death, finiteness of our life.

Classical mathematics is almost useless in searching and solving conceptual contradictions.

Sacred cow: it stands openly, obstructs many things, but nobody risks to see it and to remove it. For example the demand that all actions of programming language statements are to have the uniquely determined computational effect is a sacred cow. A whole herd of sacred cows was produced by formal equality, politcorrectness and tolerance. We cannot study in which extents some people, religions or races are better or worse.

In informatics and mathematics (and in formal philosophy) the unique method to find sacred cows is now to try formalizing something *constructively*. Because these creatures hinder real actions, they cannot be placed into a constructive logic or theory.

2.6. Chaitin limit and programming languages

One of paradoxes arising while applying precise Computer Science to real Informatics can be solved form the point of view of Chaitin's limit. It is known than Kolmogoroff's complexity is invariant up to additive constant L. It follows then formally the complexity of programs in the different program languages is equivalent up to additive constant (Kolmogoroff theorem) and there is no reason to use different languages. Practice shows the opposite: program written by adequate tools can be 50 times shorter than in "universal" Java or C#. Why?

Theorem 1 states that $(k \cdot a\ \mathbf{K}_1) \leq (\mathrm{CODE}[a]\ \mathbf{K}_2) + C$ where k is equal to 1 if we consider standard programming codes. Constant C is a length of a translator program for the second language written in the first language. To write it eats almost all Chaitin's limit of a programmer.

Therefore we have an excellent and precise demagogic answer on a moronic and demagogic question very often posed to ones who did something by «exotic» language: "Is it possible to write the same in C# or Java?":

— Of course. It is possible to write all in the language of Turing machines, if you prefer.

Thus theoretical equivalence sometimes means practical incomparability.

This analogy works in other domains also. If we do not master a language of a concrete domain we can *in principle* to understand constructions and arguments but it is necessary to build in our mind a *translator* into our paradigm. Its complexity can be so high that it leaves almost no resources to analyze the argumentation.

Another warning. If you know many languages but have no background fundamental knowledge in your head you work worse that blind coder. Multi-tool method is effective only when a person masters a meta-knowledge, meta-method and a basis of notions.

So a fundamental knowledge is that which forms a system in a brain. Foundation of a system must be stable. It consists of a basis of relatively simple notions (keystones) amalgamated by a lot of relation and properties which show their interrelations gains, shortcomings and restrictions. It is ideal if in result a person sees restrictions of his/her system as a whole.

And there is one more bad side. Many people simply cannot appreciate complex (algorithmic) constructions such as recursions and even loops. They have no universal algorithm in their head. Here Chaitin's limit is 0 and this person simply cannot see something.

Final remark

It is false that clever one works faster than more stupid one. A stupid person never can understand what does a clever one and never can make the same work.

2.7. Benevolence to Other's Views

A problem of co-existence of different views is madly contaminated by "tolerance" originated in the fundamental mistake of J. S. Mill: he declared freedom of opinions instead of freedom of argumentation. He simply could not imagine that every irresponsible and moronic cry will demand rights and honors because it is an "opinion of a free person".

This goes deeper to Благоглупость of Voltaire: "I hate your opinions, but I would die to defend your right to express them". We see that there are too much people who accept no counter-

arguments against their opinions but are ready to kill each who criticize them. We see that there are too much people and institutions which substantiate their opinions not by argumentation but by direct lie, violence and manipulations (e.g. neo-liberals, neo-cons, fundamentalists, juvenile justice…)

Principle of benevolence to other's views.

Remember that The Truth is inaccessible to you and to any other human. So say confronting other views.

I do not agree with your views but you argue in their favor honestly and earnestly. I will defend your right to proclaim them, to substantiate them and to distribute them. In the same time I declare full and unrestricted right of me and of any other person to criticize them, to find weak points in your argumentations and maybe lie and manipulations.

This obligation is ended when your sights become refuted or you are caught on lie or manipulations (sophistic or psychological).

In the first case you remain an honest person for me and I will defend you against any attempts to punish you for error itself (but not for its consequences). If you will be so brave to recognize you have been mistaken I will help you to correct it and its consequences and you will become greater in my eyes.

If you would be caught on dishonored tricks all my responsibility would end. I will support the toughest of possible legal punishments for you because spiritual poison is more mortal than material.

3. Methodological Approach to Theology

3.1. Why Theology Can Become Applied Science and Other Reasons for New Approach

Informatics[3] is a very unusual topic in a human kind activity. We found ourselves that we are able to create whole worlds by power of our mind and imagination (fantasy, ideas…). Computer plays here a role like to one of tongue and larynx in pronouncing our thoughts. So traditional engineering oriented towards material implementation is not very applicable in this domain.

Where worlds created by power of mind and will was considered earlier? This appears only in theology. So we are forced to return to theology enriched by experience of dreadful worlds created by ravings and ignorance of their architects and implementers.

If we consider Genesis as an example of programming of a complex system (our World) we can see that this was a well organized top-down process beginning from abstract objects (light and darkness) and finished by transfer this system to end user. This system was attempted to have a maximally friendly interface (the Paradise). But as usually it was invaded by a tester (or hacker) leading to temptation of Eve and to a critical error. Then system was debugged by adding functionality of death, making interface less friendly but more stable and even by full re-engineering (the Deluge).

Italo Calvino pointed [13] that initial project (as described by Hebrew priests) was conceptually contradictory and wicked. Immortal and innocent creatures having no notion of Good and Evil will occupy the entire world and behave extremely brutally counting only with rational and aesthetical arguments. They will have their felicity as the unique goal and the unique value.

This analysis once more proves that authors of Holy Bible were human beings but not God. They tried to understand His ideas and really appreciated them on very high level w.r.t. their time. So they described real HUMAN construction and implementation of very complex system. So people speaking that Holy Bible is God inspired are more precise than they would be. Its main ideas are inspired by God but were understood by restricted mind of humans and moreover after that transferred through several “disseminators” vulgarizing and distorting them.

There are other conceptions of worlds in different religions. Buddhist and Jainist worlds are natural ones, lawfully arising and collapsing. Jains also explicitly stated that there are many different worlds (some branches of Hinduism also).

But I know no religion in which the following is taken into account.

Any implementation of "In the beginning was the Word" (John 1:1) is partial and imprecise (because the Word is implemented in the unideal matter). Considering perfect creation of necessarily imperfect worlds leads us to a conception of perfect collection of worlds each of them is the best in some extents and their collection does not miss any positive property. Because usually a positive property is accompanied by a negative one (good by evil and so on) those worlds are alternatives covering the space of all best realizations. They give all possible ways to develop capabilities of souls and of beings as their implementations.

3.2. Methodological Argument for Deism

Chaitin's theorem showed that Kant was right stating that our intellect cannot solve a problem of God's existence.

So we have the following consequences.

1. Existence of God is a pseudoproblem from scientific point of view and you must take your own decision here.
2. It is unacceptable to cry that science rejects God (and equally that science proves God's existence).
3. It is inadmissible to make any scientific consequences from existence or non-existence of God.
4. It is acceptable to analyze this problem methodologically.

So, the problem of deism or atheism is a *methodological* problem. Stating a rational definition of God as *The Truth*, as *the unified highest Law of both nature and spirit which is beyond all worlds and all times*, as *the single Will which creates all laws and their realizations*[4] we are inspired to find unity in difference, high level unifying notions and principles for realizations which seem to be not connected for plain thinking, or even contradictory for it, though both existing. It inspires us to develop ourselves both intellectually and spiritually and to keep these different sides and our material being in harmony. It inspires us to recheck our "precise and fully proved" results when applying them to real life.

In contrary atheism motivates us to idolize and adore our imperfect plain reasoning and our restricted knowledge and not to see ideal unifying beyond specialized "quasi-truths".

This is a reason why a deist can easily be a non-religious person while atheists almost inevitably degrade to a fanatic quasi-religion. There is a simple criterion to recognize atheistic fundamentalist. *If a person begins to squirm and spew invectives seeing religious people or hearing a name of God he/she is really not an atheist but a Devil adorer*.

3.3. God as an ideal notion

Any description of a complex system begins to grow, to lose a form and in result to dilapidate if we use only "necessary entities". To describe something meaningful and non-trivial is possible only through *ideal notions* (term of D. Hilbert). For example real numbers arose as idealization of physical measurement processes and different well coordinated scales of different devices. *Principle of Least Action* results in many particular principles and algorithms in different domains often very far from Newton mechanics in which it was discovered by P. de Maupertuis.

When ideal high level notions are used length of proofs and length of expressions shortens drastically. This effect can compress our calculation and speculation in tower of exponents times (as mentioned in section 2.3.) Moreover introducing ideal notions can often open new possibilities (Hao Wang).

When level of notions increased that what seems earlier completely unconnected surprisingly but naturally becomes different realizations and concretizations of single abstract ideal notion. For example logical conjunction, direct product in algebra, lower bound in lattices, and data record in

programming is all realizations of the same categorical construction. Main criterion whether unification is possible is a structural proximity but not a «background concrete stuff». The higher is level of notions the higher is level of their demands to harmony and the higher is their conformity. Roughly speaking we can pay almost no attention to conformity of knowledge and rules on level of direct pragmatic recipes and direct generalization of empirical facts (Horn formulas). It suffices that are not contradictory in small number of steps. But on higher levels each small conceptual inaccuracy results in a big problem (or in a swarm of "light" problems solving any of them we get at least two others[5]).

Thus practice step by step forces a human creator to conclude: ***there is no freedom of creation***. If you feign something (or somethink) this is a delirium. If you sorely master to see High Ideas and after that tormenting mastered to develop their adequate realization as precise and perfect as you could — this is a real creation. Life and happiness cannot be easy. Easy are existence and cheap enjoyment.

We result in single unifying idea, containing all common which is in its different realizations as harmony, knowledge, good, light: God.

After that we clarify for ourselves three derivative ideas. **First**: it is wrong to think on God as on the highest being. He is out of all worlds and all times. If we lower Him down to being we supplant Him by an idol of good lord. **Second**: the question whether God exists is a pseudo-question. **Third**: problem of God is not ontological but methodological in its essence. It is why the brilliant minds of Leibnitz, Newton, Schrödinger, Einstein, Spinoza, Lyubiscchev, and Pavlov resulted in deism, in firm assurance in idea and notion of God.

There are scientific "arguments" both for existence and for non-existence of God. Each of them becomes demagogic and sophistic after accurate critical analysis. The unique fair decision for a scientist is to recognize that this question cannot be solved rationally and this is a choice of a thinking person. Nobody can lay his burden of responsibility here to "objective scientific truth" or to religious authorities. Each human is to make this hard choice personally.

And one more ruthless consequence. God is beyond all religions and each religion claiming a monopoly in access to Him is a blasphemy[6]. Atheist stating: "I have no need in the hypothesis of God" or "There is a hard choice for each human which cannot be substantiated and made rationally/ I made my choice" is more honest and clean person that those who replaces faith by rituals and customs.

At all times a human stepped into in a great sin of pride. That people who first (or second after Ikhnaton and a handful of Egyptians) understood that nobody under sky is worth to worship (idols, human mind, human wishes which are worshiped by many atheists) immediately claimed itself as chosen one. All Abrahamic religions are restricting themselves by one small piece of one of worlds and by one of times treating it as the single existing. This is rejected by modern physics. They treated a human as a crown of creation which contradicts to biology, ecology and ethology. This is the same pride as "the chosen people" though extended on a bit larger area. Thus all these religions are really based on an original sin[7].

Religions where this pride was rejected (Buddhism and Jainism) absolutize first-level knowledge which without an ideal notion in its background leads to emptiness (nirvana). They consider life as an encumbrance and a decline not as a gift and a value. It is necessary to remember that in initial Buddhism and Jainism higher beings are not gods or deities but teachers. They can show the way but it is meaninglessly to pray to them, to praise them and to ask their help because even the question "Does Buddha exists after para-nirvana?" is a quasiquestion.

3.4. Godly Inspired Ideas and Their Realizations: a Connection with Platonism

Mathematical and informatical practice shows us that high level ideas can be applied only after their concretization. The higher is level of an idea the higher (and incomparable stronger) is it potential might, the wider and more heterogeneous is its scope of application. This scope seems to be unlimited but an attempt to consider it as unlimited, aversion to understanding a person's knowledge limits in a moment kills its positive effect and leads to discrediting the idea itself. See as

example writings of genial physicist R. Penrose on informatics [19]. In the same time high level idea loses an attractive and useful property of empirical and direct recipes: possibility to apply immediately. The higher is a level of an idea the more steps are needed to realize it in a concrete circumstances and the higher is the effect of its application if this severities are overcome.

Say many people are frustrated if a recipe is equivalent to a Horn formula

$\forall x(A1(x)\& \ldots \& An(x) \Rightarrow B(x))$

They demand: "Say me directly what to do and not puff my brains by your *ifs*".

So a realization of a high order idea generates low level ideas which are easily applicable, more intelligible by majority but not adequate when a situation is changed. This is a reason why vote of majority is mistaken in any complex situation: they "understand" not ideas but their vulgarizations and common vulgarizations do not work here.

Now we reconsider Platonic view that things are realizations of highest and absolute Ideas. This view is in some sense the same as in the Gospel of John: in the beginning there was a Word< or< more precisely, an Idea of our world. This Idea goes directly from God. But each high idea is implemented through a chain of concretizations. Each concretization is not absolute and highest but they become more materialized and understandable. *Realization of an absolute Idea cannot be ideal*. This process become (objectively) beyond frame of Plato considerations.

This led us to tough but inevitable conclusion.

Highest absolute Platonic Ideas are not accessible by a human, Even mathematical notions are their incomplete, one-party, simplified and unideal realizations.

This conclusion is supported in high grade by Chaitin's theorem on incognizable. All things exceeding some limit of complexity are perceived as random and absolutely systemless. Nevertheless we can get an imagination that there is something beyond Chaitin's limit if we master several ideas and essences near to our limit. A common harmony which is existent in them and which cannot be explained and understood intellectually and rationally shows existence of more high essences beyond limits of our plain reasoning. I can add my and some other scientists' experience of introspection. In the state of divine inspiration (creative ecstasy, Samadhi fire) a person can see elusive outlines of much higher entities and can understand that they also are not absolute Ideas and there is something higher beyond them. This happens only if a person is not a fanatic of one idea and one method (unfortunately in the most cases it is so). This is why religious inspiration usually leads to absolutization and further to idolization of found issues and ideas. But scientific inspiration does the same too often…

Moreover non-classical mathematic showed that even objects which were considered as absolute (for example numbers) arise as a realization of the general idea in context of a couple of implicit suppositions. One of them for real numbers is an abstraction that our computations and measurements in principle can be absolutely precise. Moreover, last decade investigations show that there is one more dimension: main value and main resource. They are almost unknown to Western society because all attempts to publish them in Western journals broke due to ideological censorship: it is known that linear logic which is the logic of money is the logic for all resources. Last year a book containing main results on constructive logics was published in Germany but in Russian language [19].

Logics of static fully knowledgeable world (classical logic), pure knowledge (intuitionist logic), money (linear logic), time (nilpotent logic) and soul (reversive logic) are very different from the beginning and mutually inconsistent.

So it is a mortal trick to accept that persons with logic of money can develop society, science and so on.

All above considerations lead us to the conclusion:

Each realization of the Idea must have alternatives.

Let us continue to conclude. Each ideology, religion or theory which claims its own truth is wrong and leads to death. If there are questions which are "not to be discussed" that society is in a state of cruel disease. But alternatives cannot be discovered easily. *Negativism is one of forms of conformism*. To find an alternative a person is to be orthogonal to common views and prejudices.

This is a highest form of non-conformism where there can be issues conforming to general views of common society; there can be issues simply out of comprehension of majority; but the main distinction of this person is that he/her has a conceptually consistent system of knowledge and values in contrary to mosaic and chaotic common one.

Questions arise due to possible "regressus ad infiniti" when searching the highest Ideas. They can be removed by a simple analogy. Even in programming and informatics it is often more efficient to estimate finite entities (say number of steps in recursion) by infinite ordinals because they lead to result through a finite step of concretizations (calls).

3.5. Informalizability and God

The negative theology is considered by mature Orthodox Christianity as the most adequate for analysis of God. It states what cannot be God and what is not peculiar to Him. It refrained from positive statements about God. For example we can substantiate precisely that God is not a being, that He is not submitted to laws of Physics. We cannot state precisely whether He obeys logical laws and so we are to keep silence here. In contrary, to say that God is omnipotent is more like to unworthy flattery. Moreover notion of omnipotence itself is logically contradictory. Attempts to avoid this contradiction (say universal Turing machine) lead with necessity to possibility of failure this "omnipotent" device.

Because logic itself is also not absolute any attempts to describe God inside of classical logic (as in [20]) leads to substituting a term instead of the notion. The term "God" is rejected from the very beginning in our approach.

Thus any positive assertion considering God which is not derivable from negative ones is a hypothetical as almost all statements in [20]. Say we cannot assert that God is omniscience and Boolean understanding of "omniscience" is contradictory: non-classical leads to possibility of failures. But we can assert that God is infinite essence because assumption that He is finite can be easily refuted by *reductio ad absurdum*. Therefore we can accept a theorem of Nicolas Cusanus that trinity is not a contradictory notion [21]. So precise results in theology are possible but there are a small number of them and all they are to be examined carefully.

This is a reason why Spinoza rational definition of God as the substance with infinite number of infinitely prefect attributes remains the best one.

In the relation to God informalizability acts very ruthlessly. Each attempt to formulate precisely how to understand God and how to serve Him very easily leads to prejudices, worshiping of rituals or a book instead of God, fundamentalism, fanaticism and so on.

True religions in their best parts have some cures for these diseases. For example Islam theologists treat different branches of Islamic theology which are formally mutually contradicting as equally faithful because no human can understand Allah completely. Analogous but less clearly stated situation is in Judaism.

Therefore dogmatic theology can be useful first of all by its results which are independent from concrete dogmas. But there is one more possibility of its application. Because theology considered our world as an artificial object created by Mind of God and governed by Him it can be very useful in informatics because its models are much more elaborated and conceptually perfect that recipes of programmers. For example Christianity treats world as a program in beta-testing stage: this program works independently from Creator; there are some powerful testers the main of them is Devil and others include imperfect, arrogant and chaotically acting humans; Creator very rarely makes miracles to correct founded by testers bugs and in the perspective we see a full re-engineering of the whole system (Last Judgment). Islam treats the world as being under step-by-step debugging by very active Supervisor: in some branches of Islamic theology Allah re-creates the world at every moment; this is an excellent attempt to solve a contradiction of free will of human and full divine predestination.

Impossibility to prove rationally existence of God often leads people idolizing their poor mind and "rational thinking" directly into the embraces of Prince of this world. So, faith completely cleaned from fanaticism is for a scientist an excellent complement and a powerful tool of self-

testing.

And as a last remark. I wish to remember that in the theory of informalizable notions was proved that it is unacceptable to deduce precise and real corollaries from quasi-questions. So it is unacceptable to argue in a scientific work based both on existence and on non-existence of God. We cannot directly use in science neither deism nor atheism. And atheism in the form «I need no hypothesis of God» behaves so. It is correct as a scientific ideology and is much more correct in any aspect than religious or atheistic fundamentalism. But this does not prevent us to analyze methodologically whether this ideology is effective.

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Notes

1. In Russian there are two words for English “creativity”. “Креативность” (creativity) means invention something new only to be new without real values and goals. “Творчество” (creation) means creation of new and useful things. This is why “creative class” is appreciated by Russians as a collection of uppity, spiritually and really impotent egocentric persons.
2. And not formalized, in contrary to common prejudice.
3. The European name `informatics' seems much more reliable here than American one `computing' because information is not in all case numerical.
4. This definition does not contradict to definition of Spinoza: “Per Deum intelligo ens absolute infinitum hoc est substantiam constantem infinitis attributis quorum unumquodque æternam et infinitam essentiam exprimit.” ([15], Definition VI) and can be considered as its complement due to current needs of constructive science.
5. This is even treated as an “objective law” for complex informational systems. A moment when small bugs begin to bread is considered as a moment when full re-engineering of a system is needed otherwise it will slowly and grievously die.
6. **Warning**. This does not mean anti-religious views. True religions collected a huge luggage of useful spiritual and psychological practices. They have a colossal experience in recognizing and curing mental, spiritual and psychological corruptions. To throw away this experience is a teenager thinking and arrogance. To accept the experience of a light and mature religion and be integrated into it is pragmatically one of the best decisions for those who has no will and forces to pass a way marked by Kierkegaard. Who is able to do this is following by his/her way to his Destiny and is performing his/her Mission. He takes on his own breasts all negative consequences of his actions.
   And the most terrible heresy in each religion and in each ideology is fanaticism and fundamentalism.
7. The original sin can have a rational background in our conception (which is independent from myth on Eve and an apple). Approximately a half of all information which a human processes during life this creature gets in the womb. Thus a newly-born child is infected by sins, prejudices, vices and often by diseases of parents (especially of mother). This leads to a tough consequence. Pregnancy is a honorable (not shameful) state. To train and to develop a child is necessary from the womb of mother and treat an embryo as a human being. Right to abortion is logically equivalent to right of parents to kill their child (this right existed, say, in Rome).