Mein Kampf

or solutions to Millennium Problems

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Chapter 1

$P \neq NP$

There are can be made up an unbounded number of tasks, so the probability, what every one of them has exactly $P = NP$ is zero.©

Moreover. You are trying to brake an ISIS computer site. If you are given a password (true or false), then you enter it and check it out for n seconds. But if you are trying to find the true password, you need to enter the very first one. And the probability for it to be true is very low. Therefore, on average, the $P \neq NP$.

For, sure, at least some tasks will for ever have $P \neq NP$. Here are the simplest examples.

1) Person has a password for his bank account. There is meaningless small probability, what Hacker's very first try will match the password of the person. In the long run, the total time of success will be less, than of failer: $P \neq NP$. Hackers' universal keys are all ignored by ignoring all incoming files.

2) The quadratic equation $x^2 + b\,x + c = 0$, where $b = 34$, $c = 12$. The solution is $-(b/2) + \sqrt{b^2 - 4\,c}/2$, $-b/2 - \sqrt{b^2 - 4\,c}/2$. Note, what there are two solutions. But even, if the chosen is $-(b/2) + \sqrt{b^2 - 4\,c}/2$, the CPU time for its calculation is 3 times more, than for finding $x^2 + b\,x + c$ if is known $x = -0.35668302$. Thus, $P \neq NP$.

The quantum computer will also have $P \neq NP$ in this situation, because some tasks can not be computed in instant: the case with determinant has 7 CPU unit of times (because at first CPU step the operations: b^2, $-b/2$, $4c$ are made, at second and third CPU steps of time the Determinant is calculated, then it is divided by 2 and the final addition is made). But the $x^2 + b\,x = -c$ has only 3 CPU units of time (1: to find x^2, $b\,x$; 2: to add these two $x^2 + b\,x$; 3: to compare result with $-c$).

Chapter 2

The Poincare Conjecture Reproved

It is amazing to see, how the problems find their solutions. Even such extremely long as the 1200 pages of the ABC-hypothesis proof of the "Japan Perelman", which is needed to be consumed by the most brilliant men to come. And like the first PCs were huge but became compact, the large proofs can turn into very compact ones. ©

2.1 Alternative to Ricci flow

Is known, that by three functions of a general coordinate transformation one eliminates all three independent metric components, which were undiagonal.

Let us now have the following general form of spacetime

$$ds^2 = f_1\, dr^2 + f_2\, d\theta^2 + f_3\, d\phi^2$$

with regular (ie. the functions and their derivatives are less than infinity) positive functions of space coordinates. Then let's apply following deformation $f_1(\kappa) = a^2 + \mathrm{e}^{-\kappa}\,(f_1(0) - a^2)$, $f_2(\kappa) = a^2 \sin^2 r + \mathrm{e}^{-\kappa}\,(f_2(0) - a^2 \sin^2 r)$, $f_3(\kappa) = a^2 \sin^2 r \sin^2 \theta + \mathrm{e}^{-\kappa}\,(f_3(0) - a^2 \sin^2 r \sin^2 \theta)$. The $a = \mathrm{const}$ is the radius of the resulting Sphere in the 4 dimensional space. As you see, the functions for any deformation parameter κ (the κ is not the time, and is not a space coordinate) remain regular. Please note, what if initially the metric function was not zero, at the given point, then it remains non-zero during all the deformation process $\kappa \to \infty$.

Is easy to see, what the Scalar Curvature R, which is easy to calculate using the standard formulas of General Relativity in my program MapleV (however the Einstein Equation is swiched off during the progress of the deformation) is finite, because the functions (f_i) remain regular. By this the Poincare Conjecture is proved once again. Q.E.D.

The metric above does not have uncrossable edges, because in every point of space the motion in all three coordinate directions is allowed. Because the metric above does not distinguish the simple from multiply-connected manifold, then, in the end, all manifolds are homeomorphic to the sphere. An example of multiply connected manifold are two mouths of a wormhole, connecting two distant areas of our Universe.

It is much more, than that of what the Poincare has dreamed about.

2.2 On zero of determinant

The problem with the metric above could be the zero determinant, and, thus the coordinate singularity, which is only possible in certain space positions, namely at $r = 0$ and $\theta = 0$. The following quantity $\sqrt{R}\sqrt{g}$ remains the scale-invariant. Thus, it should be consider as measured curvature of the spacetime. And this does not suffer from the coordinate singularities. Indeed, the $1/\sqrt{R}$ is proportional to the radius a of the resulting sphere and the measured volume $\sqrt{g}\, dr\, d\theta\, d\phi$ is coordinate-invariant.

2.3 Discussion

The simple-minded people think, what if the Fields medal as well as the Clay Millennium prize were attributed to Perelman, then there are the Prizes. But he refused them both, and, so, his extremely complicated proof has no Prize attached to it. The deal with Prize is not finished, therefore, in the end, the Clay Institute still can give us the Prize. The process is not finished, until the "champaign is opened". The right social behavior is the necessary part of the scientific process.

The best explanation of Grigori'es arXiv paper on finds there to read for free of charge. The well known explanatory book starts with concise description of what the Grigori has done. But it can hardly contain all of the Grigori'es arguments, which one could find in the remaining text. However, I have not the required skills to read it. I can only present my comments to the concise description.

Let us open the John W. Morgan and Gang Tian, "Ricci Flow and the Poincaré Conjecture" arXiv:math/0607607 and read at page 9 the text of overall complexity:

"(ii) If the initial manifold is simpler then all the time-slices are simpler: If (M, G) is a Ricci flow with surgery whose initial manifold is prime, then every time-slice is a disjoint union of connected components, all but at most one being diffeomorphic to a three-sphere and if there is one (my remark (R1)) not diffeomorphic to a three-sphere, then it is diffeomorphic to the initial manifold. (R2) If the initial manifold is a simply connected manifold M_0, then every component (R3) of every time-slice M_t (R4) must be simply connected (R5) and thus *a posteriori* every time-slice is a disjoint union of manifolds diffeomorphic to the three-sphere."

List of Martila's remarks:

(R1) "let us use a symbol for this: the A"

(R2) Let us add in this place: "after the making the surgeries (cut outs) tiny small, because fareign elements (which fill the surgery holes) must not come into the final manifold." And let us call this manifold A as final stage of the "Ricci flow" process: ie, the symbol $M_T = A$ as the John W. Morgan and Gang Tian use.

(R3) "the S_i".

(R4) "Dear John Morgan, please, it is not the M_T, but the M_t!!!"

(R5) "the S_i are made tiny small, so they can be ignored at all. The important is the final M_T. Has it the constant Curvature R or has not?"

I am sorry, but this non-mathematical description of Grigori proof can not possibly demonstrate, what the initial manifold M_0 turns into manifold M_T of constant positive Scalar Curvature R or a collection of manifolds $(\sum S_i)$ with each of them $\{S_0, S_1, S_2, \ldots, S_N\}$ having fixed positive curvatures R_i. We hope to find the strict math of it in the rest of the book.

From this short description the Perelman's method of surgery implants foreign manifolds F_i into original manifold M_0? Yes, it does. Is it threat to homeomorphism? Yes, it is. Shall the combination of cut-outs m_i (which are replaced by the F_i) be carefully re-attached into the final Sphere S to preserve homeomorphism $M_0 \leftrightarrow S$? Yes, it must. Note, Perelman's talk about scalar curvature R is no more general, than the Einstein's use of Riemann's Curvature Tensor: the zero of Scalar Curvature might not be a flat spacetime without singularities.

Chapter 3

On Navier-Stokes problem

Because the NS equation is the Problem in Millennium list, one shall read even the faulty papers to find an inspiration to approach the solution of the problem. My idea: if initial state of the system is smooth in the sense, what all possible derivatives are finite, then the NS equations will be satisfied throughout the evolution of the system. Therefore, the NS equations are not causing the singularities or termination of a solution.©

3.1 Introduction

Isn't it amazing, what such complicated theory as the motion of elastic bodies were published already in first half of the 19-th century? However, one faces difficulties in finding the solutions to the equations.

Very recently the threat of the singularities (the blow ups) was discovered, because some modifications, which are looking almost like the real NS equation, do show it: Ref. [1]. But their lack of ultimate success is what the real NS was not studied. Here, in the present paper I try to do it my own way.

Let us call a function "regular", if the function and all its derivatives are less than infinity in given region of the system.

If initial state is regular (and is expressed through the Taylor series at $t = 0$ with range of convergence $0 < t < T$) and satisfies at initial moment the NS equations, then the equations will be satisfied in all range $0 < t < T$ (see Appendix A). Therefore, there is no source of singularities in the structure of NS equations.

The range of convergence can be made very large, if in the initial state the high order derivatives can be less than $M = fixed$:

$$|\sum f^{(k)} \frac{t^k}{k!}| < \sum |f^{(k)}| \frac{t^k}{k!} < M \sum \frac{t^k}{k!} < \infty$$

with any $0 < t < \infty$.

3.2 Appendix: the form of NS equation

Is well known, what Navier-Stokes equations are derived to have such simple form [2]

$$\rho\left(\frac{\partial\vec{v}}{\partial t}+(\vec{v}\,\nabla)\vec{v}\right)=\rho\vec{F}-\nabla\,p+(\gamma+\mu)\,\nabla\,(\operatorname{div}\vec{v})+\mu\,\triangle\vec{v}\,, \tag{3.1}$$

with equation of state $p = p(\rho, T)$, the dissipative constants γ, μ are assumed to be constant while derivation of latter case of NS equation.

Let's now the γ and μ are functions of space and time. Then the NS equation becomes [3]

$$\rho\left(\frac{\partial\vec{v}}{\partial t}+(\vec{v}\,\nabla)\vec{v}\right)= \tag{3.2}$$

$$=\rho\vec{F}-\nabla\,p+(\gamma+\mu)\,\nabla\,(\operatorname{div}\vec{v})+\mu\,\triangle\vec{v}+$$

$$+A\,\nabla v^i+B^i\operatorname{div}\vec{v}+C_k\,\nabla v^k\,,$$

where $A := \nabla\mu$, $B := \nabla\gamma$, the vector k-th component is $C_k := (\nabla\mu)_k$.

3.3 Appendix A

The NS equation has form $N(t, x, y, z) = 0$ for all t. Therefore, we have following equations at $t = 0$

$$n_k := \left.\frac{\partial^k N}{\partial t^k}\right|_{t=0} = 0\,,$$

for all $k = 1, 2, 3, \ldots$. On the other hand, one inserts the Taylor series

$$f = \sum f^{(k)}\,\frac{t^k}{k!}\,,$$

where f can be density ρ, external field $\vec{F}$, pressure p, velocity $\vec{v}$, viscosity μ etc. One inserts them all into NS equation $N(t, x, y, z) = 0$, and collects the terms with the same power of the t

$$N = N_0 + N_1\,t + N_2\,t^2 + N_3\,t^3 + \ldots\,.$$

It turned out, what the structure of NS equation is so lucky, what all $N_k \sim n_k = 0$, thus all $N_k = 0$.

Chapter 4

The Riemann hypothesis

Derived the Statistics of the un-solved problems (conjectures). The probability, what a conjecture will be solved is 50%. The probability, that a conjecture is true is $p = 37\%$. *The probability, what we get to know the latter is* $\psi = 29\%$. *Within the list of un-solved conjectures in Wikipedia (they are* $w = 140$*) are only* $n = 33$ *right ones, which could be proved positively. But the humankind is able to prove only* $X = 16$. *It is 50% of probability, what given conjecture will not ever be solved (I call a problem "solved", if it is either proved or rejected.) So, the famous David Hilbert's "Wir müssen wissen, wir werden wissen" is not correct. The Rimann conjecture is true with probability 100%. The others un-solved ones are true with probability* $p = 37\%$. ©

4.1 The solution to Riemann Conjecture

If after the $N \gg 1$ tests the theory fails one time, then from definition of probability one says: probability of the failure is $1/N$. It is the start of the statistics, hereby more tests will not follow; moreover, because $N \gg 1$, the collection of more numbers of failures is meaningless, because the "true probability" can change during these successful $N - 1$ tests in between. Therefore, the Scientific probability of failure is $1/N$.

That is fully describing the randomness in the system. So, if there is some collapse of latter, then one writes: $0/N$ and so the theory is true with certainty. About the Riemann Conjecture the Russian Wikipedia says in 2016: "Is known, what if the Conjecture is wrong, then it can be demonstrated." But starting from my formulas there is probability 50%, what the Conjecture will never be solved. Therefore, the Conjecture is True.

4.1.1 Calculation of probabilities

Suppose now, what N first tests were successful. What is the probability, what remaining tests are successful?

$$p := (1 - 1/(N+k))^k = 1/exp(1)\,, \qquad k \to \infty\,.$$

Thus, it is nothing says, what the theory is successful yet. It is still more probable to fail.

If you open the article "List of unsolved problems in mathematics" in Wikipedia-2016, the total number of words "conjecture" is $w = 140$ (the obvious doublets we do not count in) and the total number of solved (I assume, word "solved" is not "debunked") conjectures is $m = 50$.

The total number of conjectures is simply

$$N = \beta_1\,(m+n)/p\,,$$

here and after the $\beta_i = 1 + \epsilon_i \approx 1$. The n is the number of true, but not solved yet conjectures.

The total number of solved conjectures is

$$M = \beta_2\, m/U\,,$$

where U is probability, what the solved conjecture is true. Then, the wrong solved conjectures are $d = M - m$.

From $N = w + m + d$ one finds the n. From $n/(w-m) = p$ one finds the U. Then the probability, what a conjecture is true and what the humankind will get to know this is $H = p\,(m+X)/(n+m)$, where X is the number of conjectures, which humankind will solve to be true. The probability, what conjecture is false, and what the humankind will discover it, is

$$h = (1-p)\,\frac{d+D}{N-(n+m)}\,,$$

where

$$D := \beta_3\, X\,(1/U - 1)$$

is the number of conjectures, which humankind will solve to be false. The $N - (n+m)$ is the total number of false conjectures, which are not solved yet. Then from $1 - H - h = (M + \beta_4\, X/U)/N$ one finds the X. It is 16.

Using the Taylor series for small ϵ_1, ϵ_2, ϵ_3, ϵ_4 one finds in first term the probability, what a problem will be solved: $1 - H - h = 1/2$. It is like the saying: "the probability to meet a dinosaur is 1/2: you meet him or you meet him not." I think, it is subconscious knowledge of the people, about the 1/2, which is derived here. Therefore, it is expected, what 3 of 7 Millennium Problems will not ever be solved. With my help are solved 4 Problems from the Millennium list, therefore there is nothing more, what is left to do with these 7 Problems.

The probability

$$\psi := (m+X)/N = \frac{1}{2\exp(1) - 2} \approx 29\%$$

is the chance, what the Riemann's hypothesis will be solved to be true. Note, what holds $H = \psi$.

Surprisingly, the $\psi < p$. Therefore: The holder of Verity is not the humankind. Note, what the derived probabilities U, p, ψ, h and $1 - H - h$ are expressed through the fundamental constant e only, and are not dependent on the system (the $m-$ and $w-$ independent) and, thus, the system management.

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