Is it so hard to prove the Poincare Conjecture?

Dmitri Martila (eestidima@gmail.com)

Independent Researcher

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Abstract

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. ©

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I. IS IT SO HARD TO PROVE THE POINCARE CONJECTURE?

A. First Proof

The spacetime metric is g_{ij}, $i, j = 1, 2, 3$. The according Ricci tensor is R_{ij}. The according deformation equation

$$R_{ij}(\kappa) = \kappa\, U_{ij} + (1-\kappa)\, R_{ij}(0)\,, \tag{1}$$

has allways a singularity-free solution, which is the metric $g_{ij}(\kappa)$. Because the metric has 6 independent components and there are 6 independent functions $R_{ij}(\kappa)$. The U_{ij} is the Ricci tensor of the Friedman closed Universe:

$$ds^2 = dr^2 + (\epsilon + \sin r)^2\, (d\theta^2 + (\beta + \sin\theta)^2\, d\phi^2)\,, \tag{2}$$

where constants $\epsilon = \beta = 0$.

B. Second Proof

The metric (2) with $\beta = 0$, $\epsilon \neq 0$ can be transformed using the $\theta = \theta(v, w)$, $\phi = \phi(v, w)$ into the metric $\hat{g}_{ij}$, which has $\hat{g}_{v\,w} = 0$, $\det \hat{g} = 1 + \det g$. These are two equations for two transformation functions. So, it has the solution.

Through the coordinate transformation the original metric can allways be transformed to the diagonal form:

$$ds^2 = f_1\, dv^2 + f_2\, dw^2 + f_3\, dq^2\,. \tag{3}$$

The corresponding RicciScalar is non-singular, if the $\det \bar{g} = f_1\, f_2\, f_3 \neq 0$ in all the manifold. Let us make the deformation transformation

$$\bar{g}_{ij}(\kappa) = \kappa\, \hat{g}_{ij} + (1-\kappa)\, \bar{g}_{ij}(0) \tag{4}$$

During all the $0 \leq \kappa \leq 1$ the determinant is non-zero, thus, there is no curvature singularity. The nonzero of ϵ implies to the singularity-free mini-wormhole, which mouths are connecting the south and north poles: $r = 0$ and the $r = \pi$. By turning $\epsilon \to 0$ this wormhole shrinks to zero – vanishes.

C. Third Proof

The deformation (4) with $\hat{g}^{ij}$ in form of the (2) with non-zero ϵ, and the β. After we get from the original manifold the $\hat{g}^{ij}$, we can turn the β to zero, without any singularity of the RicciScalar (please check it), and then to shrink the mini-wormhole to zero by taking the limit $\epsilon \to 0$.

II. THE CONNECTIVITY OF MANIFOLD

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.

III. DISCUSSION ON CONTRIBUTION OF GRISHA PERELMAN

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.