

Who wants to understand Einstein's Relativity? A cry for help

Introduction and relevance

Since Einstein's death in 1955, it seems that nobody has fully understood Einstein's theories, principles, errors, and changes of mind. In 1915, Karl Schwarzschild fully understood his theory of General Relativity (GR) as it was published in the "Annalen der Physik" up to December 1915. One year later, Einstein made a significant change, after Karl's death, but nobody corrected the two Schwarzschild Solutions. Until today, only Karl Schwarzschild has worked out the full tensor analysis as described in the GR of 1915, apart from Einstein himself.

In 1916 Einstein revised his theory of Special Relativity and he also made an important change to the covariant metric tensor of GR, but nobody seems to have noticed all this. Then, in 1922, came Emmy Noether (supported by Hilbert). She made it very clear to Einstein that his GR cannot guarantee energy conservation, but he ignored her (justified) criticism. If anyone would really understand Einstein's theory, then he or she would have:

1. corrected his original theory of Special Relativity (SR) of 1905,
2. corrected the Schwarzschild Solution for the new rules of 1916,
3. corrected the Schwarzschild Solution for Noether's theorems,
4. corrected the Robertson-Walker Solution for Noether's theorems,
5. corrected Einstein's GR for Noether's theorems

Failing these corrections, different Schwarzschild Solutions live on. As a consequence, paradoxes persist, singularities of mathematics are regarded as physical reality, energy is not conserved, and time travel through wormholes are generally accepted!

Paradoxes were solved by Einstein in 1916

When authors publish books about Einstein's SR, they talk about the SR as published in 1905. That version came with inconsistencies. Lorentz, Ehrenfest, and Mach criticized SR on several issues which led to many well known paradoxes (twin, clock, ladder, and Ehrenfest). That's why Einstein changed his mind in 1916, he replaced the Lorentz transformation by the Minkowski formula and dropped the equality of reference frames, solving all paradoxes. Why did hardly anyone notice?

He described these changes in SR in his official document on GR of 1916, which was not noticed by many people, since the document seems to describe GR only. This was a clever way of hiding his change of mind. It worked, professors from high-schools to universities keep copying the 1905 version of SR. Another sign that nobody understands Einstein's Relativity in full.

Errors made and repeated by ignorance

So, in fact the 1916 version of SR is the foundation of GR. Not understanding the SR of 1916, leads to not understanding GR. Relativity has become a very bad copy/paste story by people not understanding Relativity and just repeating the same mistakes others made. This is most obvious in the copy/paste story of the Schwarzschild Solution, an error made by J. Droste in 1917 is repeated by Eddington and others, again and again, leading to the mistaken Schwarzschild Solution as it is currently described in many books.

Who wants to understand Einstein's Relativity? A cry for help

K. Thorne compounded the errors of the Schwarzschild Solution in his book "Black Holes and Time Warps, Einstein's Outrageous Legacy", making Relativity into science fiction. Let us first look at some unscientific statements of authors about the Schwarzschild solution.

Unjustified statements about the Schwarzschild Solution

The coming statements prove conclusively that even famous authors didn't understand Einstein's GR as published in 1916:

Droste J. in 1917: "...we are at liberty to choose instead of r a new variable which will be such a variable of r , that in ds^2 the coefficient of the square of its differential becomes unity"¹.

Eddington A. in 1922: "There is no reason to regard r in (38.12) as more immediate the counterpart of r in (38.11) than $r'l$ is... We shall here choose and accordingly drop the suffix..."².

Misner, Thorne, en Wheeler in 1970: "...With this choice of the radial coordinate and with the primes dropped, equation (23.3) reduces to..."³.

Oas G. in 2005: "In fact, we can limit this to $W = X = 1$ without loss of generality"⁴.

These authors have used semantics to unify two variables that were based on a specific demand in 1915 ($g = -1$), even though Einstein had abandoned this as a requirement the next year in 1916! Did they not read Einstein's footnote in paragraph 19? Did they work towards the presumed correct outcome? Did they just copy an earlier version? We don't know. In fact, none of these authors has actually worked out the exact solution to either a mass-point (Karl's first solution) or to a sphere of incompressible liquid (Karl's second solution) as Karl Schwarzschild did! These authors struggled unsuccessfully with Einstein's GR.

Full Derivation of the Schwarzschild Solution is missing

When Oas, professor at Harvard, publishes a document "Full Derivation of the Schwarzschild Solution", you would expect the solution to be based on the tensor analysis of the published GR of 1916. It is not. You would expect the field equations to be checked, like you check the outcome of four equations with four unknowns. Such a check is missing in this document. Instead, he copied the Eddington/Droste version of 1922, leaving him no choice but also use semantics to get rid of two variables: "without loss of generality".

Thorne ends his document with the "Eddington-Finkelstein inward and outward coordinates", which are the essence of his "falling through the event horizon" and "time warps"⁵. Anyone that has read and understood Einstein's GR, would immediately understand the double error in these coordinates. Firstly, there is "no event horizon" of a black hole if you work out the solution to a sphere of incompressible liquid correctly, the *second* Schwarzschild Solution. To regard a sphere as a mass-point as Eddington did, is allowed at a large distance only, as Eddington rightly argued. So, to use the mass-point solution of Eddington close to a sphere is Thorne's second error.

¹ Droste J. KNAW proceedings 1911, 1917 page 199.

² Eddington A. "The Mathematical Theory of Relativity", 1922 after formula (38.13).

³ Misner, Thorne, and Wheeler, "Gravitation", 1970 between formula (23.6) and formula (23.7).

⁴ Oas G. "Full derivation of the Schwarzschild Solution" Harvard Summer School (Pdf), 2005.

⁵ Thorne, K (1994), "Black Holes and Time Warps, Einstein's Outrageous Legacy"

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Eddington-Finkelstein coordinates are good for Hollywood, not for science. It is 'outrageous', to use *his own words*, that Einstein's name is used to promote books which are in conflict with Einstein's legacy.

Noether's theorems help out

Noether's theorems of energy and momentum conservation are a major contributor to physics. Hilbert and Noether stated in "Invariant variation problems"⁶ on the last page: "Hilbert enunciates his assertion to the effect that the failure of the proper laws of conservation of energy is a characteristic feature of the general theory of relativity".

This is a very diplomatic way of saying that *Einstein's General Relativity does not guarantee energy conservation*. Einstein's *variable speed of light* in GR outside of the origin of a reference frame is the problem. To ensure energy and momentum conservation within a reference frame, the laws of nature and its constants, like the speed of light, must be invariant to location, direction, and time.

Everyone that can understand Relativity, can work out the speed of light (for example) in the Schwarzschild Solution. The exercise is relatively (!) simple, the line element "*ds*" is zero for light, thus for light in the radial direction "*dr*" its speed is dr/dt . Note that both the outcome in the Schwarzschild Solution and in the Robertson-Walker solution is unequal to "*c*". Noether and Hilbert were right to state that GR does not guarantee energy conservation. The solutions to GR and the GR itself need repair for Noether's theorem.

A cry for help

We as authors have repaired the SR, the Schwarzschild Solution, and the Robertson-Walker Solution for Noether's theorem. However, repairing GR itself for Noether's theorem is a major challenge. We hope to complete "Relativity 2.0" or "Noether Relativity" in the coming years, but we need help. It is fun to explore the trail of Albert Einstein and making discoveries nobody before you did. Teamwork and perseverance in mathematics and physics!

We have found a solution *within* a sphere of incompressible liquid by using Einstein's Laplace operator formula, but we need to broaden this outcome to see if all other solutions can be found *without the use of tensor analyses*. Please get in contact with us when you want to help us, we need help from academics with solid mathematical capabilities (variation analysis) and know-how of the basics of physics, observations, and experiments.

Our books

In our books we resolve the problems of Special Relativity and of General Relativity Solutions; no more paradoxes or singularities. Energy is conserved according to Noether's theorem. There is no need for the introduction of "singularities" in black holes or "dark energy" in the universal model. You may freely download the first three chapters of our books and articles on several issues at www.loop-doctor.nl; We hope that you get as many "aha" experiences as we did.

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⁶ Noether E. "Invariant variation problems" translated by Tavel M. TTSP 1971