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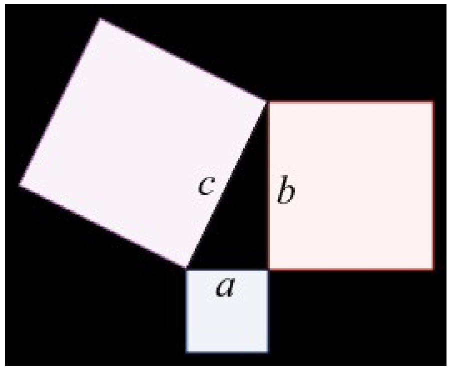
The Failure of the Friedmann Metric



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The Friedmann metric—also called the FL metric, the RW metric, and the FLRW metric—is called an "exact solution" of Einstein's field equations, and it describes the expansion of the universe, among other things. It has been used in many cosmological models—or all of them—including all inflationary models. Although I will analyze and criticize this equation in much more detail in upcoming papers, I wanted to start by showing a 27% hole in the equations, right at the foundations. This should prepare my reader for later shocks and revolutions.

I had recently been sent to the Friedmann metric by physicist Jeremy Dunning-Davies, who was showing me his own problems with the equations, and especially the thermodynamic assumptions of Guth and others. However, as usual I stomped around in the bushes in my own way, finding things that no one had discovered before me—to my knowledge. Again, as usual, I started my bug hunt by scanning the current page at Wikipedia. I quickly found a creepy-crawly in plain site. Wiki was nice enough to write the spatial metric when $k=0$ in Cartesian coordinates, in the simple form

$$\mathbf{d\Sigma^2 = dx^2 + dy^2 + dz^2}$$

This makes it easy to see that motion is defined in these equations as motion along slants or diagonals. That equation is just a fancy 3D Pythagorean theorem, so that the line of motion is assumed to be along the hypotenuse. This has always been the assumption, all the way back to the Greeks, so it is unlikely anyone before me took exception to it. However, I have recently proved that real bodies do not travel hypotenuses, slants, or diagonals. In curves, they travel a limit of the shorter legs of the triangle, not the limit of the longer leg. In other words, they move in a Manhattan metric, not in a so-called Euclidean metric. Since General Relativity is a math of curves, it must conform to the rules of that math. As we see from the little d's in the equation, this math is based on the calculus, and calculus is based on an analysis of the curve. But since I have shown this analysis—whether of Pascal, Leibniz, or Newton—is mistaken, GR must be built on faulty foundations. To say it as bluntly as possible, the arc *doesn't* approach the chord as we go to the limit. It is the arc and the tangent that are connected logically and kinematically, but *neither* is connected to the chord. I have shown that both Pascal and Newton analyzed the wrong angle in the triangle, which led to this momentous mistake. The chord is *always* smaller than the tangent and arc, even at the limit. And this means that real bodies, in traveling an arc, *never* travel upon a chord. The chord is a slant or diagonal, and real bodies never travel on diagonals. They may seem to, on a visual analysis. But *in the math*, they never do.

Since the math is always a 4-vector math, velocities in this math must be in x, y, or z. Velocities along diagonals are logically disallowed, since diagonals are always composed of compound motions, by definition. Velocity is never a compound motion; it is always a simple motion, one that can be decomposed no further. Since in real situations, time is always present, any two velocities will already represent an acceleration. In other words, since both velocities are working *under the same time*, they are already integrated. You can only add velocities that happen at different times. If they happen at the same time, they aren't added, they are integrated, in which case they become an acceleration. This means that any diagonal drawn on any space that includes time is already an acceleration. It is already mathematically a curve. You may draw it straight—because you are not drawing time—but in the math it is a curve.

Some will try to hide behind the tensors here, as usual, telling me that new math—being non-Euclidean—doesn't fall to this analysis. But it does, and you can see that even on this Wikipedia page, where the math can be written in a Euclidean or Cartesian form. Since Einstein's field equations are equations of motion, they must conform to the original definition of velocity. Since all tensors are compounds of vectors, every tensor or field curve must be based at the axiomatic level on the simplest vectors or velocities, which are Euclidean.

In this way, we see that the whole division of Euclidean and non-Euclidean math is garbled and false. All non-Euclidean math is ultimately Euclidean, since it relies on definitions of motion which are Euclidean. A non-Euclidean field is either supported by multiple Euclidean fields, or it is supported by nothing. The curvature is either defined by some integration of straight lines, or it is undefined. There is no such thing—or *should* be no such thing—as background independent non-Euclidean math. But the same can be said in reverse. Every Euclidean field is, in some sense, non-Euclidean, provided time is involved. Given two or more influences, time will automatically make any motion an acceleration, and thereby a curve. This is because each influence will give us a velocity, and two velocities plus time is an acceleration. So *by itself* time immediately turns every Euclidean field into a space of mathematical curves. If every acceleration is a curve, then the only possible field that is strictly Euclidean is a field with one influence.

This nicety may seem esoteric, but it is fundamental. The fact that it has been missed throughout history has caused magnificent and pandemic problems in both math and physics. It completely compromises the calculus, since in the current calculus, motions are always along these hypotenuses. The integral is a sum of slants at the limit, so the integral is false at the foundation. To say it again, the curve *never* approaches those slants at the limit. It doesn't even get close. In the circle, we found a gap of around 27%, so we may assume most curves are off by similar margins.

You will say, "Good lord, are you telling us the Pythagorean theorem is wrong, too?" Well, the Pythagorean theorem is true as far as it goes. In geometry, it is true. But since geometry is static and doesn't include time, this doesn't help us in real life. It isn't that the Pythagorean theorem is false, it is that the Pythagorean theorem *isn't applicable* in physical field equations. In 4-vector math, real objects don't travel along hypotenuses, so the equation $d\Sigma^2 = dx^2 + dy^2 + dz^2$ isn't applicable. Since the Friedmann equations assume that equation is applicable, and reduce to it, the Friedmann equations must also be false.

Of course this doesn't just apply to the Friedmann metric. It applies to *everything*. All the equations of motion have to be redone, all the way back to Newton. This is what I have been doing for the last decade, but there is a lot left to do. All of both quantum mechanics and astrophysics has to be rewritten from the ground up.

For more on the Friedmann metric, you may go to part 2 of this paper. I also recommend my three-part series on the Einstein equations.