Mr. Fabri's mistakes

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Abstract

A couple of mistakes made by Mr. Elio Fabri in the Italian Google group "Scienza Fisica" are corrected. The first concerns the calculation of an integral which, according to Mr. Fabri, had to be null, showing that, instead, it was anything but null. The second concerns an error repeated several times by Mr. Fabri according to which the Riemann tensor calculated in the Langevin spacetime would still be null. Unfortunately, a sad truth emerges: what is really zero is Mr. Fabri's understanding of what he is saying.

1 The null integral which was not null

In a discussion in the Italian Google group "Scienza Fisica" [2], Mr. Fabri claims that, setting $V(r) = -\frac{k}{r}$, it should be null for every value of k the value of Eq. (9) in [2], that is

$$\triangle\Theta_p = \frac{p^2}{\alpha e}\int_0^{2\pi}\frac{\cos\varphi}{(1+e\cos\varphi)\,2}\frac{dV(r)}{dr}d\varphi, \tag{1}$$

where [2]

$$\begin{aligned} \tfrac{\alpha}{L\dot{\varphi}} &= \tfrac{r^2}{P}, \\ \tfrac{p}{r} &= 1 + e\cos\varphi. \end{aligned} \tag{2}$$

By inserting the second of Eq. (2) in Eq. (1) one apparently gets

$$\triangle\Theta_p = \frac{k}{\alpha e}\int_0^{2\pi}\cos\varphi d\varphi = 0. \tag{3}$$

Thus, it seems that Mr. Fabri is correct in his claim that Eq. (1) is null for every value of k. Mr. Fabri was indeed so sure of the correctness of his computation that claims in very arrogant way that, verbatim, [2] "The decisive formula is (9) (Eq. (2) in the current paper), but I would recommend reconstructing the steps that lead there and seem simple to me. I applied it with $V(r) = -k/r$ and the result is zero, for any k. There are no quibbles that can disprove that result, which however, I repeat, it is not mine. I just limited myself to understanding it." Differently from Mr. Fabri, I understood that, actually, Eq. (2) is NOT null if one sets $V(r) = -\frac{k}{r}$ for every value of k. In fact, Mr. Fabri did not realize a very subtle point. The vector $\frac{dV(r)}{dr}\hat{u}_r$, where $\hat{u}_r$ is the unit vector in the radial direction, has the same direction of $\hat{u}_r$. But the direction of $\hat{u}_r$ for $-\frac{\pi}{2} \leq \varphi < \frac{\pi}{2}$ is opposite with respect to the direction of $\hat{u}_r$ for $\frac{\pi}{2} \leq \varphi < \frac{3\pi}{2}$. This means that if one assumes to be positive the sign of $\frac{dV(r)}{dr}$ for $-\frac{\pi}{2} \leq \varphi < \frac{\pi}{2}$, then one must assume as being negative the sign of $\frac{dV(r)}{dr}$ for $\frac{\pi}{2} \leq \varphi < \frac{3\pi}{2}$. Thus, the correct way to compute Eq. (1) setting $V(r) = -\frac{k}{r}$ is

$$\triangle\Theta_p = \frac{k}{\alpha e}\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos\varphi d\varphi - \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \cos\varphi d\varphi = \frac{4k}{\alpha e}. \tag{4}$$

I have to also recall that Mr. Fabri insulted me in this conversation by writing that, verbatim, [2] "I decided to do an exercise of great patience (and it weighs me down, because patience is not the foremost among my virtues). I'll pretend I read a post whose author is a student of the second year of physics, and not even that smart (remember the famous Berlusconi's joke about Italian voters?)". Now, what Berlusconi said about Italian voters was that they are not so moron as to go against their interest. Thus, Mr. Fabri implicitly said that I am a moron. Instead, there are two very evident facts which emerge from the above analysis. i) What was null was not the quoted integral, but Mr. Fabri's understanding of how it was to be calculated. ii) To recognize a moron you need an even bigger moron.

2 The null Riemann tensor which was not null

Mr. Fabri claims [3] to have shown in [4] that the Riemann tensor for the Langevin metric, which is [5]

$$ds^2 = \left(1 - \frac{r^2\omega^2}{c^2}\right) c^2dt^2 - 2\omega r^2 d\phi dt - dr^2 - r^2d\phi^2 - dz^2, \tag{5}$$

is null. I don't have the time or the inclination to go and look for Mr. Fabri's mistakes in [4] because I have decidedly more interesting things to deal with. However, proving that the Riemann tensor in the Langevin metric (5) is not null is quite simple. Let us assume a weak field approximation, which is $\omega r \ll c$. Then, the relation between g_{00} and the Newtonian potential U is [5]

$$g_{00} = 1 + \frac{2U}{c^2}, \tag{6}$$

which gives

$$U = -\frac{1}{2} r^2 \omega^2, \tag{7}$$

for the Langevin metric (5). In the weak field approximation one also recall that it is [6]

$$R^i_{0j0} = -\frac{\partial^2 U}{\partial x^i \partial x^j}. \tag{8}$$

Thus, setting for example $i = j = r$, one gets immediately

$$R^r_{0r0} = \omega^2,$$

which dismisses Mr. Fabri's claims in a definitive way.

Conclusion remarks

A couple of mistakes made by Mr. Fabri in [1, 3, 4] have been corrected. The first concerns the calculation of an integral which, according to Mr. Fabri, had to be null, showing that, instead, it was anything but null. The second concerns an error repeated several times by Mr. Fabri according to which the Riemann tensor calculated in the Langevin spacetime would still be null. Hence, a sad truth emerged: what is really null is Mr. Fabri's understanding of what he is saying.

References

[1] ttps://groups.google.com/g/it.scienza.fisica/c/nGkfOLOFDfI/m/CbG_pPgQBgAJ

[2] O. I. Chashchina, Z. K. Silagadze, Phys. Rev. D 77, 107502 (2008).

[3] https://groups.google.com/g/it.scienza.fisica/c/mpY4lYa7asg/m/Fg7RQqspBAAJ

[4] E. Fabri, http://www.sagredo.eu/temp/Riemann.pdf

[5] L. D. Landau and E. M. Lifshitz, *The Classical Theory of Fields.* 2nd edition, Pergamon Press, (1962).

[6] C. W. Misner , K. S. Thorne, J. A. Wheeler, *"Gravitation"*, Feeman and Company (1973).