Qeios

Peer Review

Review of: "Why Is Gravitational Mass Equal to Inertial Mass?"

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This is my second review of this article.

I take into account the author's two comments on my first review, and I take into account the lack of corrections to the article and the lack of precise responses to my allegations.

The author wrote in the comment:

„*You are probably unfamiliar with or ignorant of the philosophical or epistemological examination of Newtonian laws and other scientific findings*."

The accusation of ignorance does not constitute any substantive defense against the specific allegations made against the article. The author had the entire month of April to provide a substantive response, and all he does is accuse ignorance.

The author further wrote:

„*Therefore, you could not understand my argument that force and mass are jointly defined in Newton's second law, which is not my finding/conclusion. I recounted it as a piece of common knowledge".*

It was not the reviewer but the author who did not understand the accusation. Defining force by F=ma and mass by m=F/a is only a general idea that is sometimes included in a certain canon of knowledge. Unfortunately, in developing a complete metrological procedure for measuring a specific type of mass, this is not enough. The reviewer suggested such measurement procedures to the author, but the author ignored them, accusing the reviewer of ignorance.

Next:

„*YOUR ELECTRONIC SCALE WITH CALIBRATION MEASURE GRAVITATIONAL MASS, simply because it measures relative weights (gravitational force) in terms of the calibrating standard weights/masses on the Earth's surface, and we have defined the mass and weight on the Earth.*"

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SO THE AUTHOR ADMITS THAT MEASURING GRAVITATIONAL MASS IS POSSIBLE. So why does the author claim in the article that there is no procedure for measuring pure gravitational mass? Furthermore, why would the measurement of gravitational mass discussed here not be pure, but use inertial mass?

Next:

„*It would be useless to measure gravitational masses on other planets. I hope you can understand this argument.*"

The author is completely wrong. The procedure for measuring gravitational mass using an electronic scale with calibration will work correctly, for example, on the Moon or Mars. All that is needed is to provide the operating conditions for this device.

Next:

„*How we can measure mass with weights in everyday life is a different issue from whether we can uniquely determine gravitational mass without referring to inertial mass.*"

It may not be a different matter at all if the author cannot prove his claim and indicate where the procedures in question use inertial mass. In particular, where the procedure for measuring gravitational mass with an electronic scale with calibration uses the definition of inertial mass.

Not only is the author unable to prove his thesis, but his thesis is simply wrong. The author does not even attempt to deal with well-known arguments - such as the Eötvös experiment.

Next:

„*People have used scales to measure the weights of masses since ancient times.*"

That's right, they specifically measured gravitational mass using a balance scale. Unfortunately, the author forgot about that.

Finally:

„*This does not prove that gravitational masses can be uniquely determined by F=GMm/r^2.*"

Measuring passive gravitational mass is not an identity using the formula F=GMm/r^2. The author takes a shallow approach to the mathematics of physical relations. The gravitational field could be constant, or the formula for the gravitational force could be slightly different (e.g., MOND or General Relativity).

In summary:

The author made a false claim and, of course, did not prove it. The author ignored balance scales, spring scales, electronic scales with calibration, and mass standards. The author ignored that metrology in physics is based on something more than just two formulas, F=ma and F=GMm/r^2.

Declarations

Potential competing interests: No potential competing interests to declare.