

We Tell Students To Distrust Common Sense,
Then We Criticize Them For Their Inability To Use Common Sense:
a Comment on Arxiv:1003.4288

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Abstract

The authors of Arxiv:1003.4288 study a student named “Jim”. “Jim” displays a propensity for believing his mathematical solutions rather than what his common sense tells him. He is a student taking an introductory physics class. The authors wonder why mathematical solutions take precedence over common sense. In this brief note we cite as the root cause of the problem the fact that we tell our students to distrust their common sense. When we arrive at relativity theory, for example, we inform our students that common sense is useless in relativity theory. We tell them that common sense is useless in quantum mechanics. Is it any wonder our students believe whatever the math tells them?

“Jim” does not think about whether or not his mathematical solutions to physics problems make sense. He produces solutions and is quite content with them. This is cause for grave concern, not for “Jim”, but for physics education. Physics has taught “Jim” that his common sense is no longer reliable when thinking about nature. What is he to do? Whose fault is it that “Jim” cannot reason? We tell “Jim” that there is a long second,

$$t = \frac{t_0}{\sqrt{1 - v^2/c^2}} \quad (1.)$$

and there is a short second

$$t = t_0 \sqrt{1 - v^2/c^2} \quad (2.)$$

Then we tell him that the mere act of moving a particle causes its mass to increase,

$$m = \frac{m_0}{\sqrt{1 - v^2/c^2}} \quad (3)$$

and a rod shortens as it translates along an axis according to

$$l = l_0 \sqrt{1 - v^2/c^2} \quad (4)$$

when no experiment has ever proved any of these things. “Jim” came to us as a young high-school student, and we ruined him. The damage done to “Jim” was done long before he arrived at university. We dare criticize him when in fact it is we who are the culprits. He accepts his math solutions without question because we taught him to stop looking at nature, stop trusting what he sees, what he smells, what he touches. We have isolated him from nature. We have created a robot who simply does what we tell him. He has trusted us, and we have failed him. I would like to hear what “Jim” has to say, and I trust the authors of Arxiv:1003.4288 will give him the opportunity to respond.. I and several others are interested in what “Jim” has to say.

Bibliography

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