A flaw in the law of conservation of angular momentum

Preprint · August 2018

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Abstract

A reductio ad absurdum catastrophe.

Introduction

I am not a scientist.

I am an inventor.

An invention I was working on disagreed with my predictions so I dusted off my thirty year old, first year university, physics text book and re-investigated my formulae.

All of my relatively simple calculations proved valid and correct.

The discrepancy when compared to reality is astounding.

Thought Experiment

I would say that most professors have, when performing the ball on a string demonstration, spun their device at about 2 revolutions per second and then reduced the radius to about ten percent of original. Personally, I have performed it much faster while optimising radius reduction.

1. $$\omega_2 = (\frac{r_1}{r_2})^2 \omega_1$$ [1]

2. $$r_2 = \frac{1}{10} r_1$$

3. $$\frac{r_1}{r_2} = 10$$

4. $$(\frac{r_1}{r_2})^2 = 100$$

5. $$\omega_2 = 100 * \omega_1$$

6. $$\omega_1 = 2 \text{ rps (revolutions per second)}$$

7. $$\omega_2 = 200 \text{ rps}$$

8. $$1 \text{ rps} = 60 \text{ rpm (revolutions per minute)}$$

9. $$\omega_2 = 12000 \text{ rpm}$$

Roughly the engine speed of a formula one racing car on full throttle at 300 km/h.

The ball would have, every time this was attempted, spun up so fast that the string would have exceeded tensile breaking strength and the ball become a missile.

Many students and experimenters would have been hurt. Some would likely be missing eyes.

Imagine the professors burning their fingers from the frictional heat.

This prediction is so vastly different from reality that it can only be described as absurd.

Proof

The current kinetic energy prediction for an orbiting object having it's radius reduced from one meter to one centimeter:

10. $$E_{kinetic} = \frac{1}{2}mv^2$$ [2]

11. $$m = 1$$

12. $$v_1 = \sqrt{2}$$

13. $$E_1 = \frac{1}{2} * 1 * \sqrt{2}^2 = 1$$

14. $$v_2 = v_1(\frac{r_1}{r_2})$$ [3]

15. $$\frac{r_1}{r_2} = \frac{1}{0.01} = 100$$

16. $$v_2 = 100 * \sqrt{2}$$

17. $$v_2{}^2 = 20000$$

18. $$E_2 = \frac{1}{2} * 1 * 20000 = 10000$$

19. $$\frac{E_2}{E_1} = \frac{10000}{1} = 1000000\,\%$$

O**ne million percent!**

Start with a kilojoule and end up with ten megajoules from pulling a meter on a string.

Consider solving the energy crisis by installing a professor with a ball and a string in every village.

Discussion

20. $r_2 < r_1$

If we conserve linear momentum in magnitude,

21. $v = \omega r$[4]

22. $\omega = v/r$

23. $v_2 = v_1$

24. $\omega_2 > \omega_1.$

If we conserve angular momentum,

25. $L = rp \sin \theta$ [5]

26. $\theta = \llcorner$

27. $p = mv$ [6]

28. $m = 1$

29. $L = rv$

30. $L_2 = L_1$

31. $r_2 v_2 = r_1 v_1$

32. $\dfrac{r_2}{r_1} = \dfrac{v_1}{v_2}$

33. $v_2 > v_1$

34. $\omega_2 > \omega_1$

An increase in angular velocity does not indicate that angular momentum is conserved.

Conclusion

The error is without doubt sourced from the referenced equations and the only mathematical assumption that has been made in formulating these equations is the assumption that angular momentum is conserved.

The law of conservation of angular momentum is fallacy.

References

1. D. Halliday & R. Resnick. Fundamentals of Physics, 2nd edition, extended version (John Wiley & Sons, Inc., New York, 1981) (page 195).

2. D. Halliday & R. Resnick. Fundamentals of Physics, 2nd edition, extended version (John Wiley & Sons, Inc., New York, 1981) (page 184).

3. D. Halliday & R. Resnick. Fundamentals of Physics, 2nd edition, extended version (John Wiley & Sons, Inc., New York, 1981) (page 195).

4. D. Halliday & R. Resnick. Fundamentals of Physics, 2nd edition, extended version (John Wiley & Sons, Inc., New York, 1981) (page 174).

5. D. Halliday & R. Resnick. Fundamentals of Physics, 2nd edition, extended version (John Wiley & Sons, Inc., New York, 1981) (page 181).

6. D. Halliday & R. Resnick. Fundamentals of Physics, 2nd edition, extended version (John Wiley & Sons, Inc., New York, 1981) (page 180).