A flaw in the law of conservation of angular momentum.

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Abstract

A reductio ad absurdum catastrophe.

Introduction

I am not an academic.

I am an inventor and a successful businessman.

My interest in science lies in applying it toward the creation of original products.

Experimental prototypes for 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.

Proof

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

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!**

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

Discussion

20. $$r_2 < r_1$$

If we conserve rotational kinetic energy,

21. $$v_2 = v_1$$

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

23. $$\omega = v/r$$

24. $$\omega_2 > \omega_1.$$

If we conserve angular momentum,

25. $$L_2 = L_1$$

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

27. $$\theta = \llcorner$$

28. $$p = mv$$ [6]

29. $$m = 1$$

30. $$L = rv$$

31. $$r_2 v_2 = r_1 v_1$$

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

33. $$v_2 > v_1$$

34. $$\omega_2 \gg \omega_1$$

An increase in angular velocity is generally pedagogically proposed and perceived to indicate conservation of angular momentum but it may actually be indicating that it is rotational kinetic energy that is conserved.

Conclusion

The existing paradigm makes predictions which contradict reality.

Clearly there is a mistake somewhere.

Since reality is the truth which physics is attempting to model, the mistake must lie in the physics.

The physical assumptions made for the ball on a string demonstration are sensible and have been generally agreed upon by scientists for centuries so the problem must reside within the mathematics.

This paper contains no mathematical errors therefore the source of the error must be contained within the referenced equations.

The only mathematical assumption that has been made in formulating these equations is the assumption that angular momentum is conserved.

Because there is no scientifically verified empirical evidence confirming that angular momentum is conserved in a variable radii system, it remains an hypothesis and we can correctly refer to this as assumption.

The assumption must be false.

Since the laws of physics are universal, that which applies to a ball on a string also applies to all other orbits.

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).

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