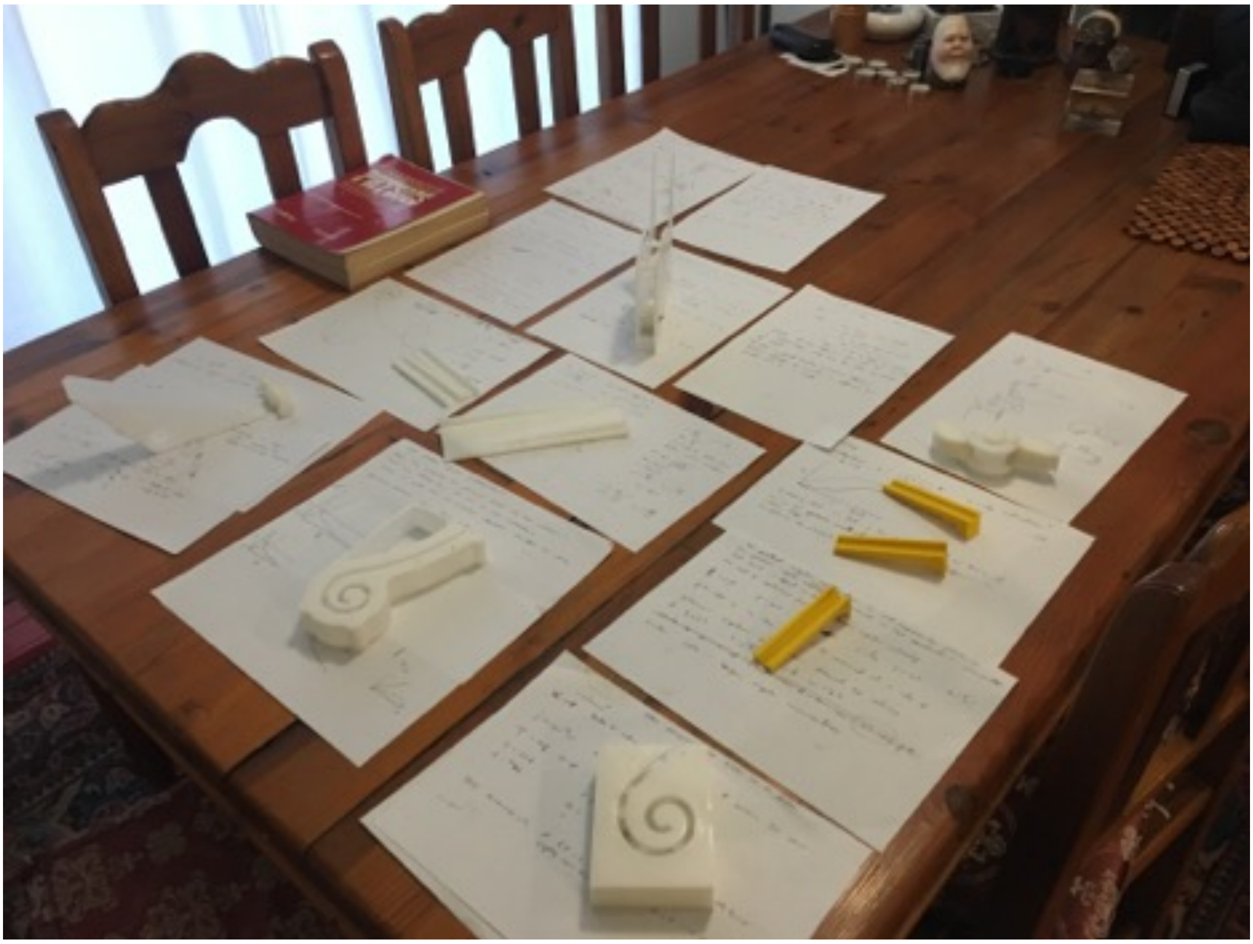
Conservation of angular momentum does not apply to an object orbiting on a tether with a reducing radius.

J.H. Mandlbaur, Baur research cc, 201 Republic rd, Randburg, South Africa

Abstract:

Current education in physics cites the apparent increase in speed of an object rotating on a tether whilst having the length of the tether reduced as evidence of the law of conservation of angular momentum. This theory has clearly not been successfully questioned in centuries and is surely being applied in many fields of study. Most likely it is the cause of some unsolved paradoxes. I myself was fooled for thirty years by my education in physics and recently spent many months designing and producing prototypes for a project and attaining failure after failure, which ultimately caused me to question the law of conservation of angular momentum itself. I used a simple marble drop apparatus which indicated that conservation of angular momentum does not apply. However, the simple analysis that this document provides by applying the current theory produces absurd results, which effectively prove my assertion.



INTRODUCTION

For the past few months I have spent most of my time working on a personal project. I have designed and produced an array of prototypes, all of which were mathematically worked out to produce certain results. All of them failed. I became obsessed in my attempts to understand why and spent ever-increasing quantities of time on this project until such time that I decided to actually test the law of conservation of angular momentum upon which this project relied. I designed a simple marble drop experiment which raced two marbles simultaneously, one which made a constant radius ninety degree turn and one which made a decreasing radius ninety degree turn. The results were clear: angular momentum is not conserved. I have since found an effective way to prove this by proposing and solving a very simple problem.

A. A simple classical physics problem

Take a key weighing 20g and travelling at 2m per second attached to the end of a string. The other end of the string is wrapped around a finger which is one metre away from the key. Calculate the centripetal force being generated when the key reaches a distance of 2cm from the finger.

B. The math

mass	m = 0.02 kg
velocity	v = 2 m/s
radius	r = 1 m
angular momentum	L = m x v x r = 0.02 x 2 x 1 = 0.04 kg.m^2/s

Since we are conserving angular momentum, we have the following when we reach 2cm:
L = 0.04 kg.m^2/s
r = 0.02 m

We can calculate the new velocity as v = L / (m x r)

v = 0.04 / (0.02 x 0.02) = 100 m/s

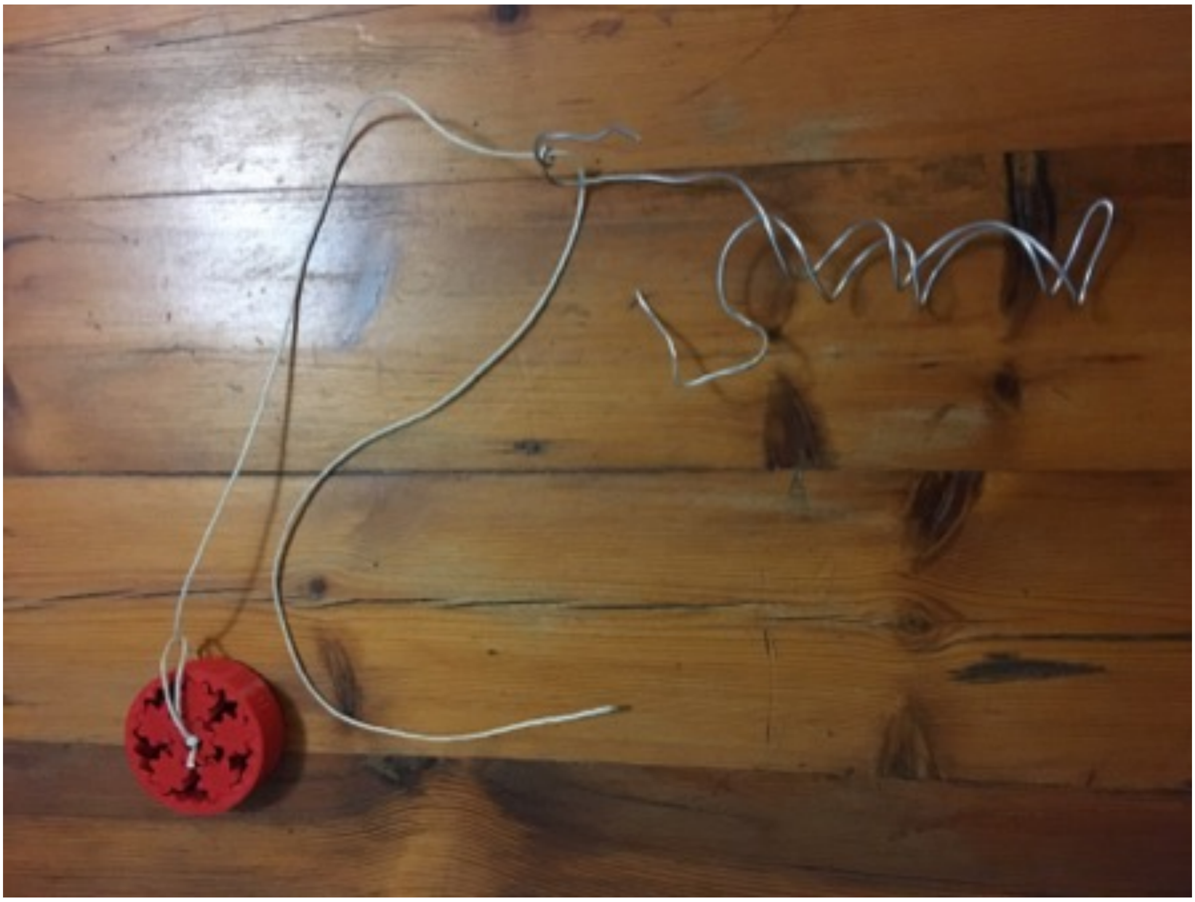
We can then calculate the centripetal force to be:

F = m x v^2 / r = (0.02 x 100 x 100) / 0.02 = 10000 N

Which is slightly more than the force which gravity exerts on a 1000kg mass.

C. An argument rebuttal

An argument I have faced is that since the centre of the radius of rotation is offset by the finger, there is a torque applied to the system and therefore angular momentum is not conserved. This is incorrect: at any given moment, the tension of the string will apply a force on the mass perpendicular to the motion of the mass and directly toward the offset centre of rotation. The radius of the finger is inconsequential. No torque will be applied to the system. I have pulled the tether of a rotating object through a small hole and there is decidedly little difference from the tether wrapping around a finger. The string does not snap as it should from the huge tension that is supposedly generated.



D. Conclusion

Since this is a scenario that everyone can relate to and it is not one in which anyone would agree that anywhere near this amount of force is experienced, the calculations must be severely flawed. Since the maths is extremely simple and there are no errors in the calculation thereof, the flaw must lie in the assumption that angular momentum is conserved. Therefore we can deduce that under these circumstances conservation of angular momentum is a fallacy.

Decades of science education have been wrong and this needs to be rectified.

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