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The Newtonian Classical Mechanics is Wrong

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ABSTRACT: Sir Isaac Newton has mathematically stated force to be a multiplication of mass with acceleration. But I disagree with him and in this research paper I prove and propose that force is momentum, and inertia is change in momentum. We need to re-write textbooks of Classical Mechanics and Engineering Mechanics incorporating this change in the definitions of force and inertia.

KEYWORDS: Inertia, Force, Rest, Uniform Motion, Gravity Velocity Rate.

I. INTRODUCTION

The wrong interpretation of inertia in Newton's first law of motion has led to the wrong definition of force in Newton's second law of motion.

According to Newton's first law of motion every body continues in its state of rest or of uniform motion in a straight line unless compelled by some external unbalanced force to act otherwise [1-3].

II. APPLICATION

Let us apply the Newton's first law of motion to two cases: that of rest and that of uniform motion.

IIa. Rest

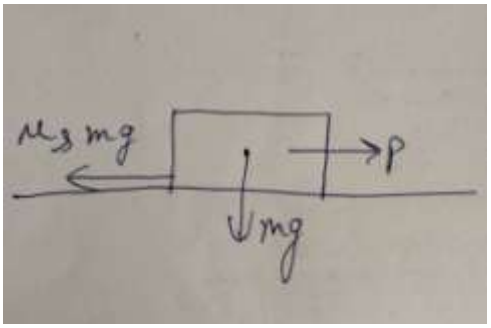

Figure 1: A block of mass m at rest

Let us take the simplest case of the rest of block of mass m, as shown in Figure 1.

μ_s is coefficient of static friction.

P is increased slowly from 0 to μ_s mg and then down to μ_k mg

μ_k is coefficient of kinetic friction.

In between the drop of P from μ_s mg to μ_k mg the block begins to move with uniform velocity, say, v_k.

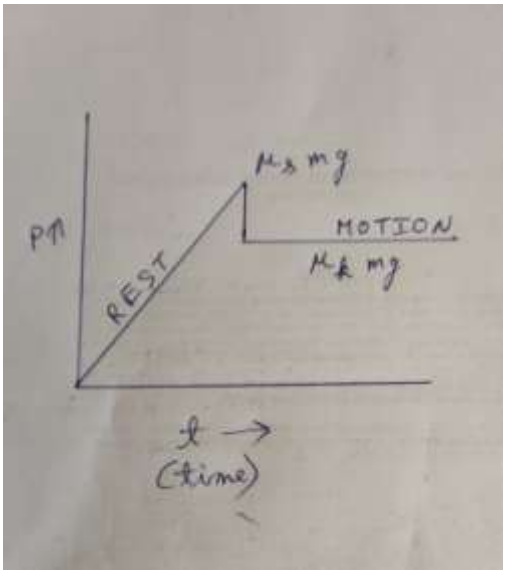

Figure 2: The variation of pulling force on block

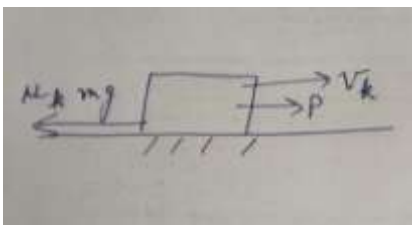

Figure 3: Equilibrium when block is moving

Consider free body diagram of block moving with uniform speed v_k, as shown in Figure

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3. Until and unless a force P of magnitude μ_k mg would not have been acting towards right, the block would not have been moving with velocity v_k towards right. But the block is not accelerating. According to Newton's second law of motion, Force is not acting on block, which is not true. Therefore, force is not mass multiplied by acceleration. Actually, externally, the momentum of magnitude m v_k is being transferred to the block by some external suitable body/mechanism. Until and unless this momentum is transferred, this motion of block is not possible. Without the transfer of momentum between two bodies there is no force acting on the body concerned. Hence momentum is force. The body making the block move has its momentum increased from zero. Hence inertia is change in momentum.

$F = m\,v$ (1)

$P = \mu_k\, mg$ (2)

From (1)

$P = m\, v_k$ (3)

From equations (2) and (3)

$v_k = \mu_k\, g$ (4)

In all experiments with friction equation (4) has been found to be valid, but researchers till now did not have explanation for this.

Comparing units on both sides of equation (4), we get the unit of 'g' to be m./sec., which makes sense. This 'g' with new unit implies that when any body of any mass falls for 1 second, the increase in its velocity is 9.81 m./sec..

$$\frac{dv}{dt} = g_{vr}$$

or $\frac{v-u}{t} = g_{vr}$

Taking v=g, u=0, t=1 sec.,

We get g_{vr} = g= 9.81 m /second square.

g_{vr} is not acceleration due to gravity, but gravity velocity rate.

IIb. Uniform Motion

Consider that you are driving a car at 40 km/hr. After sometime you feel the need to travel at 80 km/hr and you press the accelerator pedal slowly up-to that position when you get car speed as 80 km/hr. Are you really using the mechanism of acceleration to enhance the speed of car? No. What is accelerator pedal doing? It is increasing (in this case) the intake of fuel, more fuel means more milli-explosions, more milli-explosions mean more number of gas jets impinging upon the piston head with particular velocities. So actually what is getting transferred? Momentum is getting transferred in more and more amounts so that the speed of car is enhanced. Hence Force is momentum.

III. CONCLUSION

We need to re-construct the entire subject of classical mechanics and write new text-books of engineering mechanics because it has been proven in this research paper that actually Force is momentum and change in momentum is inertia.

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