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Some Explanations on Newton's First Law of Motion, and the Kinetic Energy Action on an Object Movement

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ABSTRACT: *The Newton's First Low stated that: for an object which is under an action of zero force [∑F = zero], has to have some arrangements as: (a) To arrange for the reason of the source, that is making the existing and continuous of the movement of the object. (b) The counting of the time duration of the movement of the object. For the kinetic energy action, the movement application of an object under the effect of the kinetic energy, it shows that, there are: a different physical phenomena are to be acted, and then, the different effect of movement on the same object. As well as, the, kinetic energy formulae are giving different results when applied on the moving of the same body in the same time. Also, the kinetic energy formula is lacking to show the length of the time duration of the object movement.*

KEY: duration of time, formulae, Kinetic energy, Newton's first law,

INTRODUCTION

The Newton's First Law of the movement of an object is stated that: Every object continues in its state of rest, or of uniform motion, [at a constant speed] in a straight line, unless it is compelled to change that state by forces impressed upon it, [1].

Which confirms that, when the resultant forces on an object is zero, [∑ F = 0], then the body is either at rest state, or its movement is by a constant velocity, in a. straight line.

The [Newton's First Law] of motion was stated by Isaac Newton in his *Mathematical Principles of Natural Philosophy, [2]*, originally published in 1687, [3]

Newton used this First Law, [and other two Laws of movement], to investigate and explain the motion of many physical objects and systems. Which laid the foundation for classical mechanics.

The Kinetic Energy action

The kinetic energy: is a form of energy that an object or a particle it posses by reason of its motion, [4]. Where, this is defined as the work, by accelerate an object of mass m, by the acting of force, F, from the rest movement to its steady velocity, then the object gain a kinetic energy.

Then the kinetic energy is a property of a moving object and depends on its motion, [velocity, v] and on its mass, [m]. Where, then, the mechanical energy, E, is proportional to the mass of the object and to its velocity, which is: $E \propto mv^2$
The principle in classical mechanics is that, the kinetic energy is a term in a movement system which determines a mathematical derivative with related to the time, [5, 6].
It is usually, that, the kinetic energy, Ek, of an object of mass m, and velocity of v, is given by the formula:
$EK = {}^{1}/_{2}\, m.\, v^2$,
where, this is a good approximation, when v is small comparing to the speed of light.

[Note: for the square of the velocity item, v^2, this has a mathematical meaning, while it has not a clear of a physical meaning].

Also, the kinetic energy of a moving object is equal to work required to bring the object from the rest state, to its later speed, where, the Ek = net force x displacement,[it is :Ek = F . s].
Then by using Newton's second Law of the force acting, F = m. a, as **a** is the acceleration.
then, the displacement, **s,** of travelling the object in time t, is equal to: $s = at^2 / 2$,
also, it can be find that: v = at, then:
kinetic energy, $Ek = m.\, a\, .at^2 /2 = mv^2 /2$, or = ½ mv^2

For this mathematical formula, it can be shown that, by dropping weights of objects, from different heights into a block of a clay, it determined and penetration depth was proportional to the square of their impact speed, and then to recognise the implication and published an explanation, [7], for the square of the velocity in the formula.

To derive the equation for kinetic energy: $Ek = ½\, m\, v^2$
Starting with the work done on an object: which is by acting a force, F, for displacing the object by a distance L, and it is:
The work done = F. L, which is the kinetic energy, Ek.
then: Ek = F. L , and by the calculus, it can do this job:
the acceleration, **a**, can be derive and written, as:

$a = dv/dt = dv/dx\, .\, [dx/dt] = v\, dv/dx$, where, $dx/dt = v_x$
then: $a = v\, dv/dx$,

Now, by definition, the total work done, the mathematical integration method, is going to be as: $Ek = \int_{x1}^{x2} F(x)\, dx$
this means that, the kinetic energy on an object is acting from distances: x_1 to x_2. then:
$E.k. = \int_{x1}^{x2} m.a\, dx$, , [as the force F = m. a], therefore, the E.k. is:

$Ek = \int_{x1}^{x2} m.\, (v.\, [dv/dx]).\, dx$, , so, this is the kinetic energy, of the mathematical relation, [which is not of a complete physical explanation].

Now, by the mathematical relation: Substituting dv for [(dv/dx) dx], and to let v_1 and v_2 to be the velocities of the object at positions x_1 and x_2:

therefore: $Ek = \int^{v2}_{v_1} mv\, dv$

By evaluating the integral relation, to give the formula for change in the kinetic energy: Then:
.$Ek = 1/2\ m.(v^2_2 - v^2_1)$
Now, when it can be accepted that: to set $v_1 = 0$, [as an initial velocity], and
$v_2 = v$, [as an average velocity], to get:
$Ek = 1/2\ mv^2$

This formula is for the kinetic energy, by the deriving of the mathematical method, and **not** under the physical explanation method.

It is said for the Ek formula, that the half item, [i.e. 1/2], is coming because, the object is starting from zero speed, and moving at different speeds, then, it has not been going that speed for the whole duration of time. Therefore, the average speed is only a half (as it is started at zero speed), which is as:
$(v_1 + v_2) / 2 = (0 + v)/ 2 = v / 2$.
Then, that gives the term, 1/2 of the Ek formula,
Therefore, the other enquiry is that: what is the result if the object is not starting its travel from zero speed...!
Also, it is still that an important enquiry is rising, which is the square of the velocity, as it is not physically quite explained.

THE DISCUSSION

There are some approaches on the Newton's First Law, and Kinetic energy, to be discussed for their function, when they apply in actions on an object in its movement state:

1- The discussion of the Newton's First Law:

The argument on Newton's first Law of movement on an object, is discussed as,
The Newton's First Law is stated that:
Unless acted upon by a force, F, an object remains at rest or in uniform motion in a straight line, [where the condition is: $\sum F$ = zero].

Now: for the movement of an object in a uniform motion, of constant velocity, [or even in a constant average velocity|], in a straight line, when the object is not acted by any force, [$\sum F$ = zero], then, this matter can be discussed as:

It is to show, first, that, when an object is to be in a movement situation, it should be under an acting of a force, [which is then, the object is affected by an action of a kinetic energy]. Where, the movement, of an object, needs to have an acting force, and then the kinetic energy is there:

to perform on the object, as that of acting formula: E.k. = ½ m v^2 , where, m is the mass of the object, and v its constant velocity.
Therefore, it is not possible for an object to perform its kinetic energy, if it is not entirely possessing any force of acting.

Then the discussion is going like that:
First: The duration action of a uniform constant motion, [constant velocity], on a straight line, on an object, [at the condition of ∑F = zero], has to be performed by the expenses of an action of a physical function. Where, this physical action has to be spent to create the movement of the object. Therefore, the enquiry in this matter, is that:
According to what expenses of a source [or a function], that this movement, of the object, is existed and to be in a continuous state of action, where, for the object, it is under the condition of ∑F = zero ?

As the moving object, it has **not** any source, (or reference), of making it to move, [as it has **no** force acting on, and then **no** kinetic energy effect on]. Where, then, the movement of the object in a constant velocity is, should be supplied by an expense of a sort of an action. Where, this action, [as it been said], is like that of the kinetic energy, [which is giving by the formula: 1/2 m v^2], but this energy needs to have a force, to arrange its acting on the object. Otherwise, there will be **no** source of acting on the object for its movement.
Then, it should be realised that, how the object can gain this kinetic energy, while it is under the condition [∑F = zero] ! which means that, there is **no** force acting. Where, this is showing that, it should be **no** energy acting on the object, for making its movement.

Hence, it should be, emphasise that:
What is the reason behind the cause of making this movement of the object, is to be:
First, it is existing, [at the condition of no force acting: ∑F = zero], and, Second, it is to be in continuous state?
Where, the conclusion, is then to show that:
this is to realising that, there is a sort of lacking information, in the Newton's First Law, to be surly to have the entirely fully explanation to what does happen to the movement of the object.
Hence, accordingly, the Newton's First Law, [under the condition of,
∑F = zero], is having a lacking of the important factor of explanation for that:
The reason behind the source (or reference), which, that is of making the existing of the motion itself, of an object, [without any source that of creating this movement]. Also, for this object's movement, to be in continuous state, which is never to be stopped or reduced, at the condition of ∑F = zero .

Second, is the time: which is also, there is another factor, concerning the movement of the object, which is: the condition of the duration of the time of the movement of the object, under the condition of, ∑F = zero, which isto be discussed as that:

It is for how long time that the object will be in a continuous movement of action, when the condition of: ∑F = zero, is valid.
This enquire is concerning with the extract of the Newton's First Law of the movement, that, while the condition of ∑F = zero is continuous, then the movement of the object is, also, continuous in all duration of time. Where, the object is **not** going to be stopped, or even, it is not going to be changed of its amount of movement.
Therefore, this means that there is no limit of the duration of time to let the object to be change its feature, whether it will be stopping or changing its movement. Then, this continuously action of the movement means that it is a possibility of an infinity of energy is spending of the object for its movement activity. Where, all of this work is being done, but without any source of having to spend this energy. Hence, this is, physically, impossible to be happened.

While, truly, the duration of time of the object's movement, can be possibly counted in its value, from the exact valid point of that: as the movement of the object is acting by a constant velocity, v, then the amount of the kinetic energy of this movement, of the object, can be calculated, [which is by knowing of the mass, m, of the object and its constant velocity, v]. Therefore, the duration time of the movement of the object, could be explained, and known.

Therefore, the Newton's First Law has to have a sort of mentioning to the limitation of the duration of time of the movement of an object, in the condition of: ∑F = zero.
Hence, it has to show a sensible mentioning for the time duration of the movement of an object, as this is of an important physical factor.

Hence, as the duration of the time is not shown, [in the Newton's First Law of movement], then, this is indicating that, there is a sort of an important lacking in the information of the Law.

2- The discussion of the action of Kinetic Energy and Power Laws, on an object:
Here, it is not applying of any full deriving mathematical formulae.

The discussion here, is for the action of the kinetic energy on the movement of an object. Also, for that of the contradiction in having of different application method of the movements on the same object. Where, this is, as the following:
There are different physical results are shown, by the applying of different formulae of the kinetic energy on the movement of a same object. Also, it is to show a different result, on the method of the motions, which are acting, on the same object, at same circumstances state, and under the same conditions.
The way of discussion is concerning with the state of the movement of an object, which is under the action of the kinetic energy, and by applying the mathematical formulae of the kinetic energy.

A) For the kinetic energy, Ek, which can be given by the formula:

Ek = ½ m v^2 , where, m is the mass of an object, in a movement state, and **v** its average velocity, [where, this velocity is accounted as a constant velocity].
This formula is created by the mathematical derivation action, [and it is not belong to the pure physical explanation]. Then, it should be dealt with, when it is first, inserting the physical explanation.
Also, one of the weak points in this formula, is that of the square of the velocity item, i.e. v^2, which is, this square, has not entirely any physical meaning, but it is concerning with the mathematical explanation.
Therefore, the formula of the kinetic energy, [E = ½ m v^2], is created by the derivation of the mathematical method, where, it is then, accounted as a mathematical equation and application, more than it is a physical formula.

[Note: usually, any item in a formula, which is to the power of greater than one, then, it is not concerning with the physical action, but they are only having a mathematical meaning].
Now, for this formula of the kinetic energy, the constant velocity, **v**, should have the meaning and application, according to the Newton's First Law, which is that, it is for the condition of: ∑F = zero.
In this matter, the expression of the E.k. formula, is going to be performed as that:
The movement of an object, is at a **constant velocity** by the action of the kinetic energy, Ek, and the resulting value, of Ek, is counted by the applying of the physical items of: the mass **m** and the velocity **v**, of the object .
Where, this means that, there is a kinetic energy which is existing and acting on the object, while, [in the fact], that there is **not** any acting of a force on the object, [according to: ∑F = zero, for constant velocity]. Therefore, this result is not physically possible, as the kinetic energy, of the object, should be zero, as that of the resultant of the zero acting of the force!
Then it should be to explain that: how this result of the kinetic energy is performed !

B) Also, it is to discuss that: what is the action of the kinetic energy, Ek, on an object, by the action of the formula:
EK = F . L
where, **F** is the force acting on the object, and **L** is the displacement of the object, by the action of the force.
Now, when this method of kinetic energy is accounted and applied, to be in the same circumstances of the kinetic energy action of the formula [EK = ½ m v^2], therefore, when F is zero, which is for the constant velocity, v, of the object movement, [as it is, by the action of Newton's First Law of movement], therefore:

Ek = F. L = zero x L= zero, which means that the kinetic energy, in this matter, is zero, as well.
While, this condition means that: for the same state of an object, when the expression of the kinetic energy formula is given by: E = ½ m v^2 , [where, **v** is a constant velocity of a body, for ∑F = zero], then this is shown, (by using this formula), that there is a certain result value, when

the calculating of the amount of this kinetic energy, which means, it is existing and effect on this object.

While, when applying the two formulae of the kinetic energy, a contradiction is being shown, as that, for the applying, [the formulae], on the same object, and under the same conditions and circumstances, it is shown that: once the kinetic energy is existed on the object and having a resultant value, while in another case, the result value is equal to zero...! Where, this shows a contradiction in these result.

Also, in the same manner, for the kinetic energy, which is given by:
$E = ½ m v^2$, is that:
It is **not** showing that, how long is taken the duration of the time, for the action of the kinetic energy, on the movement of the object.
While, as the amount value of the kinetic energy is limited, by knowing:
the value of the constant velocity, v, and the mass m. Then the duration of the time for the object's movement, should be known, and then, this time should be expressed in the formula.
Where, as the duration of the time is not expressed, it is indicated that, there is an important lacking in the information to be included in the formula of the kinetic energy. Then, the kinetic energy, should be arranged scientifically in a way, to be included for the time duration. Then it should be to show that how long time is the object to be spent by its movement.

Again, it should be shown, that, there is a scientific method to arrange these formulae of kinetic energy, to suit the exact physical action.

C) It is, to discuss, also, the **general physical items**, in the action of the kinetic energy, which is showing that:
The kinetic energy, E.k. is given by: the action of a force, **F**, on an object to displace it with a distance, **L**, meter, then, E.K. = F. L
Therefore, for the movement of the object, per unit time, t, then the kinetic energy per unit time, [which is the kinetic power], will be shown as:
$E / t = F . L / t = F. v$
where: **v** is the average velocity, [or the constant velocity], of the movement of the object, under the effect of the kinetic energy.
Hence, the kinetic power, P, will be given as: P = F. v
and this is to be equal to:
P = m .a. v , where, **m** is the mass of the moving object, and **a** its acceleration by the acting of the force, **F**.
Then, for the kinetic power, P, of an object, it can be realised that:
There are two entirely different physical methods of movement, [which are, the velocity **v**, and the acceleration, **a**], where, they are both are acting on the same object, in the same duration of time, and for the same circumstances. Where, then, how the object is going to be directed in its

movement accordingly ! Where this means that: on what physical movement is that the object is going to be applied, is it according to its velocity, v, or to its acceleration, a ! .

This shows that the object, in this relation of the formula, is under the influence of physical of two different and contradicting action of the movements, which physically is not acceptable**.**

Therefore, this result is not physically possible, and then this is not to be acceptable. Where this is appearing to be happened, while the object is to be under these two contradicting physically acting of movements.

Also, this result means that, there should be a sort of a mistake, or deviation from the real physical application, in the method of formulating the kinetic energy matter.

CONCLUSION

For the Newton's First Law:

It should be performed an analysis, to show the exact arrangement and explanation for the matter of that, of the Newton's first Law, which is:
To be fully explanation to the reason behind the causing of the **existing** and **continuation** of the movement, of an object, [at the condition of: $\sum F$ = zero].
Also, to show a sensible mentioning to the duration of a time for the movement of the object, by the acting of the kinetic energy, at the condition of $\sum F$ = zero.

Hence, accordingly, this is to give the Newton's First Law of motion, a completely physically final situation.

For the Kinetic Energy:

According to the lacking of the full information on: the action of the kinetic energy on the movement of an object, and on the contradiction on the physical methods of movement of an object. It has to be arranging the formulae of the kinetic energy to suit the action on the object. Also, to arrange a suitable factor in the formula for the duration of time for the movement of an object under the influence of kinetic energy.

Then, as a whole, it should be performing to explain:
First: where is the mistake in the physical explanation and in the mathematical formulae, for the movement of an object under the action of the kinetic energy. Second: Planning how it is going to be corrected.

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