

## Primary Law Theory (PLT) to theory of Relativity

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### Extract

In article titled: "Relativity by rectifying anomalies of Newton's theory", dated 30 September 2022 and placed on website: <https://newtonslaw.uk>, the author proposed and described Primary law Theory (PLT), that the real velocity ( $v$ ) is different from Newtonian velocity ( $u$ ) and that PLT is alternative to Einstein's theory of Relativity. PLT is founded upon the fact that there is anomaly in Newton's law that momentum is derived directly but Kinetic Energy is derived indirectly. In this updated article, the author explains PLT in simple way.

### Recap

The contents of the article titled: "Relativity by rectifying anomalies of Newton's theory", dated 30 September 2022 and placed on website: <https://newtonslaw.uk>, can be summarized as below. Primary law Theory (PLT) says that PLT velocity ( $v$ ) is the real velocity and it is different from Newtonian velocity ( $u$ ) and that PLT is simple alternative to Einstein's theory of Relativity (velocity is relative to one observer and theory should apply to all observers).

- Newtonian velocity ( $u$ ) =  $(F * t) \div m$ . Newtonian momentum ( $P_N$ ) =  $m * u$ .
- PLT velocity ( $v$ ) =  $c * (1 - e^{-u/c})$  where "c" is nature's speed limit, an electromagnetic constant.
- PLT momentum ( $P_P$ ) =  $m * v$ .
- Converting from index to logarithmic form,  $u = -c * \log_e (1 - v/c)$ .
- $KE = mc^2 * (u/c - v/c)$

### General meaning of theory of Relativity

In mechanics, there is a set of rules called "Galilean Transformations", about how to add two or more multidirectional velocities. It involves use of trigonometry, but at basic level, it reduces to addition of two unidirectional relative velocities; "unidirectional" reduces trigonometry to Arithmetic. For example, if an object is moving at 1 m/s (meter per second) relative to an observer B, and observer B is moving at 2 m/s relative to observer A in the same direction, then, relative to observer A, the object is moving at 3 m/s.

After James Clerk Maxwell discovered that speed of light "c" is absolute, it was surmised that "c" must be nature's speed limit. This, in turn, meant that our understanding of motion was flawed because, in the example shown above, addition can be carried on by adding another observer, and another, ad infinitum, which could add up to relative speed in excess of "c".

### Einstein's theory of Relativity

Einstein's theory is about how to add relative velocities (hence the name), so that, (a) light does not violate laws of Physics and (b) speed of light is "c" for all observers i.e., it is absolute and not relative.

Albert Einstein tackled the issue at root level; his idea was that time must run slow as velocity increases. Thus, Einstein discarded Isaac Newton's axiom recorded in *Principia* by Newton as

*“absolute, true and mathematical time, of itself, and from its own nature, flows equably without regard to anything external and by another name is called duration”.*

### Primary Law Theory (PLT)

PLT is founded on the fact that there is anomaly in Newton’s law that momentum is derived directly but Kinetic Energy is derived indirectly. In PLT, both of these quantities are derived directly. PLT theory of Relativity is unintended but welcome spinoff that flows naturally from it.

PLT retains Newton’s axiom re time but amends Newton’s theory at branch level by introducing *negative feedback* that limits velocity to “c”. (c) is a mathematical asymptote, that cannot be reached even by light, but is so close to it that the difference is practically null. The mathematical analysis culminates with the equation:  $(m * u) = (m * v) + (KE \div c)$ . This is the key, revealing equation of PLT. It is a hybrid equation for momentum, which, by multiplying throughout by “c” turns it into equation for energy.

### “Newtonian” and PLT quantities

To explain PLT clearly, it is necessary to introduce two terms, “Newtonian” and “PLT”. A quantity is “Newtonian” when it flows from Newtonian algorithm. When a quantity flows from PLT algorithm, it is “PLT” quantity. To distinguish one from the other, where necessary, subscript (<sub>N</sub>) is added for “Newtonian” quantity and subscript (<sub>P</sub>) is added for “PLT” quantity. Thus, (u) is Newtonian velocity and (v) is PLT velocity. (P<sub>N</sub>) is Newtonian momentum and (P<sub>P</sub>) is PLT momentum.

### Properties of “Newtonian” and PLT quantities

Force \* time = Impulse → Impulse = change in (P<sub>N</sub>) → Newtonian velocity (u) = (P<sub>N</sub>) ÷ m. (m is mass) Therefore, Newtonian momentum (P<sub>N</sub>) and Newtonian velocity (u) are linear functions of Force and time. PLT velocity (v) =  $c * (1 - e^{-u/c})$  is non-linear function of Newtonian velocity (u). Therefore, PLT velocity (v) and PLT momentum (P<sub>P</sub>) are non-linear functions of Force and time.

It is important to be clear that PLT velocity (v) is the real velocity as observed by an observer. Newtonian velocity (u) is PLT velocity (v) + (KE ÷ m\*c) where m is the mass of body observed by an observer.

### Law of conservation of momentum

The law of conservation of momentum applies to Newtonian momentum (P<sub>N</sub>) because it is consequence of Newton’s theory. Therefore, this law *does not* apply to PLT momentum (P<sub>P</sub>).

### PLT theory of Relativity

Galilean Transformations are valid, for adding Newtonian velocities (u)’s, because, (u)’s are linear functions of Force and time, but not valid for adding PLT velocities (v)’s, because, (v)’s are non-linear functions of Force and time. However, (v)’s correlatives (u)’s, by PLT algorithm,  $u = -c * \log_e (1 - v/c)$ , can be added by Galilean Transformations. There is no limit to value of (u). The resultant [u] can be converted to resultant [v] by PLT algorithm  $v/c = (1 - e^{-u/c})$ . Galilean Transformations method is doddle compared with Einstein’s use of Lorentz Transformations.

### Energy

Let us first consider what (u/c) and (v/c) mean. (u) and (v) are both velocities; when they are divided by c (constant but still velocity), they become fractions i.e., pure numbers. For example, suppose

that an observer measures PLT velocity ( $v$ ) of an object as  $0.1*c$  (one tenth of speed of light), then its ( $v/c$ ) value is (0.1) which is a pure number. When multiplied by  $c$ , it is velocity in meters per second. When it is multiplied by ( $m*c$ ), it is PLT momentum in Ns (Newton seconds).

Thus, all that we need, is a set of numbers (like a ready reckoner) that encapsulates velocity, momentum and also energy, (because  $KE = m*c^2 *(u/c - v/c)$  in PLT), all in one table shown below.

Several values of quantities:  $u/c$ ,  $v/c$  and ( $u/c - v/c$ ) are tabulated in table below to see if there is a pattern. The lead column is input column. ( $u/c$ ) are input values, ascending linearly, in steps of 2.0 except for first one which is a small quantity instead of 0. The values of  $v/c$  in next column are calculated by PLT algorithm  $v/c = (1 - e^{-u/c})$  and third column is simple Arithmetic.

$u/c$	$v/c$	$u/c - v/c$		$u/c$	$v/c$	$u/c - v/c$
0.001	0.0009995	0.0000005		10.0	0.9999546	9.0000454
2.0	0.8646647	1.1353352		12.0	0.9999938	11.0000062
4.0	0.9816844	3.0183156		14.0	0.9999992	13.0000008
6.0	0.9975212	5.0024787		16.0	0.9999999	15.0000001
8.0	0.9996645	7.0003355		18.0	1.0	17.0

Conclusions

Suppose that there are two observers A and B measuring speed of an object; A is moving at speed  $0.001*c$ , relative to B; A measures the speed of the object as  $0.9999938*c$ ; B will observe it as  $0.9999939*c$ . There is a small difference at seventh decimal place. [Math detail: Add  $u/c$  ( $0.001 + 12 = 12.001$ ), convert to  $v/c$  by the algorithm  $v/c = (1 - e^{-12.001}) = 0.9999939$ ].

There would be even less difference (out of range of standard calculator), when the speed of the object is  $0.9999999*c$ . The essential point is that when velocity ( $v$ ), of an object is close to nature’s speed limit “ $c$ ”, as measured by one observer, it appears virtually the same for all other observers.

Substitute “object” with “particle of light”. The conclusion is that light obeys Newton’s law of Physics in common with all objects, but it is the Newtonian laws that it obeys. Its ( $u$ ) value, must be reconstructed from the real (PLT) velocity ( $v$ ). Although the difference in above example is only  $0.0000001*c$ , and so, hardly noticeable, it is still not absolutely zero. Reconstructing the PLT speed ( $v$ ) of the object relative to A, which is  $0.9999938*c$ , its Newtonian velocity ( $u$ ) is  $12*c$ , the velocity that the laws of Physics relate to.

Reconstructing ( $u/c$ ) from ( $v/c$ ) is virtually impossible task but it can be done by looking at its color.

Arbitrarily, when ( $u/c$ ) = 12, ( $v/c$ ) = 1, ( $u/c - v/c$ ) = 11. After that, ( $u/c$ ) increases linearly with time, ( $v/c$ ) remains virtually constant at ( $v/c$ ) = 1 and ( $u/c - v/c$ ) increases in parallel with ( $u/c$ ). This means that KE increases linearly with relative Newtonian velocity ( $u$ ). This is in line with Doppler effect.

Does  $E = (m*c^2)$ ?

The theory so far is about what happens when a force is applied to a body. But what becomes of KE? With our present knowledge of Thermodynamics, in an open system, KE is not lost, but it dissipates as heat energy.

Now, let us see things in reverse, that is, when energy is emitted from a source of light. In an environment of very high temperature, Electrons spin down from a high energy level to rest at a lower level haphazardly (Quantum Physics).

From perspective of thermodynamic engine, high temperature heat energy turns into (a) work energy and (b) lower temperature sink energy. Suppose that the spiral-down energy has  $u/c$  value of 20 (see above table), its  $(v/c)$  value is 1 and KE value is 19. In other words, its Newtonian value is 20, its PLT value is 1 and its KE value is 19. Newtonian values remain linear. PLT value stays just under 1 but increasing towards the asymptote 1 as Newtonian value increases. KE value follows Newtonian value but 1 short of it.

PLT predicts that light of red color has lower velocity than that of blue color.

For particles in general  $E = (v/c) * (mc^2)$ . It means that  $E = mc^2$  is not quite true. It can be regarded that for light particles with  $(u/c)$  values of 6.0 or more it is acceptable as true. However, when the particle is at rest relative to an observer, it has zero value.

#### Wave-Particle duality

Electromagnetic wave energy does not leak away. So, unlike the case when a body is forced mechanically where KE can leak away as heat, the KE that is electromagnetic wave energy only loses its energy upon impact.

The PLT energy is its particle form of energy.

End. I bow to all, who supported me in various homes in my early years and in various centers of learning, one of whom passed away recently. I dedicate this work to my late wife Jyotsna aka Meena who loved, and was loved by, family and friends.