Universe Framework for Time, Distance, Energy, and Mass

Colin Thomas Lynch
Independent Researcher
colin@colinlynch.world

Abstract

Building upon the concepts in *Time and Distance: A New Approach*[1], proposed here is a framework for how time, distance, energy, and mass relate to each other within a universe. The relevant domains for this work are relativity and cosmology.

Please note that the proposals presented here are speculative and have not been peer-reviewed, tested, or formally examined. They are shared to encourage discussion and exploration. The foundational equations and formulas referenced are the remarkable work of scientists like Einstein, Maxwell, and others, and are fully acknowledged as their contributions. No claim is made regarding the creation or ownership of these established works.

1.   The Universe has a Fixed and Constrained Framework

The interdependence of the parameters that define a universe serves to ensure that a universe is always in balance. I postulate that **the interdependence of time, distance, energy, and mass for any universe are constrained by a single fundamental relationship.**

We will not build this postulate out in this section but will keep it in mind as we move forward.

2.   *Time and Distance: A New Approach*[1] **– Revisited**

We must revisit the postulates and equations from the *Time and Distance: A New Approach*[1] document because they are foundational to the work proposed here.

The first postulate states, "**clocks measure the rate at which time changes**" and correlates to the following equations:

Measured time (T'):

$$T' = \frac{d^n T}{dC^n}$$

Actual time (T):

$$T = \int \frac{d^n T}{dC^n} dt$$

The second postulate states, **"time and distance are equivalent in a manner analogous to matter-energy equivalency in $E = mc^2$"** and correlates to the following equations:

Time and distance equivalency:

$$D = cT$$

Time, distance, energy, and matter unified expression:

$$E = mc^2 = \frac{mD^2}{T^2}$$

Time equation time (T):

$$T = \frac{D\sqrt{m}}{\sqrt{E}}$$

Measured time equation (dT):

$$dT = \frac{\sqrt{m}}{\sqrt{E}}dD + \frac{D}{2\sqrt{m}\sqrt{E}}dm - \frac{D\sqrt{m}}{2E^{\frac{3}{2}}}dE$$

3. Arranging the Parameters in the Time (T) Equation

Time (T), Distance (D), Energy (E), and mass (m) along with a foundational force (F) represent the parameters for any universe to exist. All other aspects within a universe are born from interactions between these foundational parameters. So, we must understand how they relate to each other.

We will use the time equation (T) as a starting point:

With the time (T) equation,

$$T = \frac{D\sqrt{m}}{\sqrt{E}}$$

we arrange all terms to one side,

$$\frac{D\sqrt{m}}{T\sqrt{E}} = 1$$

This new arrangement gives us a reference to wave-particle duality with $\left(\frac{D}{T}\right)$ alongside $\left(\frac{\sqrt{m}}{\sqrt{E}}\right)$. With this new arrangement we are offered all the principles allowed by mathematics relative to proportion and symmetry:

With,

$$\frac{A * B}{C * D} \Rightarrow A * B = C * D$$

we arrive at,

$$D\sqrt{m} = T\sqrt{E}$$

Our wave-particle duality becomes more apparent in this view. This arrangement shows that proportionality is locked in, with no term being able to overstep another term proportionally. This equation represents a proportional balance that is required for a universe to always function.

4. Unpacking the Speed of Light

We desire to see how the four universe parameters (T, D, E, m) contained within the time (T) equation relate to each other in terms of the speed of light (c). To do this, we arrange the parameters on one side of an equation and the speed of light (c) on the other side:

Start with,

$$\frac{D\sqrt{m}}{T\sqrt{E}} = 1$$

multiply both sides of the equation by $\frac{\sqrt{m}}{\sqrt{E}}$,

$$\frac{Dm}{TE} = \frac{\sqrt{m}}{\sqrt{E}}$$

express the right-hand side in terms of speed of light c,

$$\frac{Dm}{TE} = \frac{1}{c}$$

substitute $(\frac{1}{c})$ with the Maxwell relation for the speed of light $(c = \frac{1}{\sqrt{\mu_0 \epsilon_0}}, \frac{1}{c} = \sqrt{\mu_0 \epsilon_0})$,

$$\frac{Dm}{TE} = \sqrt{\mu_0 \epsilon_0}$$

This equation represents why the speed of light remains immutable across all frames of reference within a universe, regardless of variations in measured time for any observer. I postulate that **it is the framework of a universe itself that dictates the immutability of the speed of light within it, not the other way around**. This equation also supports and confirms the single fundamental relationship stated in the postulate at the beginning of this work.

Why are permeability and permittivity chosen as the definitive balancing parameters for the framework of a universe and why aren't we unpacking those parameters within this work?

Permeability and permittivity have been chosen because they possess some of the closest evidence we have as to the existence of the driving force behind a universe. While it is tempting to delve deeper into the roles of permeability and permittivity in the context of this work, such an effort would be futile within the bounds of our current understanding. These quantities, as fundamental as they may seem, are but reflections of deeper principles—symptoms of a far greater force (F) yet to be fully understood, one that governs the very framework of a universe.

For now, we can simply state the framework for any universe as the relationship between time, distance, energy, mass, and an undefined force as follows:

$$\mathbb{U}\left(\frac{Dm}{TE}, F\right)$$

or, within any closed and finite system,

$$\mathbb{S}\left(\frac{Dm}{TE}, F\right)$$

5. In Closing

I humbly present this speculative document with the sincere intention of sparking meaningful conversation. Its contents have not been reviewed by others and represent my personal exploration into the principles by which the universe may govern its resources to maintain harmony.

The time you have spent reading this work is greatly appreciated.

With Gratitude –

Colin Lynch

January 1, 2025

References

1. Colin Lynch, *Time and Distance: A New Approach* (https://doi.org/10.5281/zenodo.14560148)