ON THE AGE OF THE UNIVERSE

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Abstract:

The conventional cosmological models, principally the Lambda-CDM framework, estimate the universe's age to be approximately 13.8 billion years, and recent alternative analyses of the same redshift phenomena propose a significantly different timeline of about 26.7 billion years. Such estimates rely on well established physical laws, cosmological measurements, and assumptions surrounding the Big Bang model. In this paper, we will re examine the notion of the age of the universe from a more foundational, mathematical, and conceptual standpoint. By considering the idea that any finite measure or form is negligible compared to the infinite extent of the cosmos, we explore the limit of a diminishing quantity as it approaches zero. I have used a limit based argument, and also have invoked Gödel's Incompleteness Theorems to highlight the inherent limitations in proving or disproving statements proposing truth within any formal axiomatic system. The result of the proposed equation is that it suggests that the notion of a definitive age for the universe is inherently flawed, as there is no age you could assign to it – the universe was, is, and will always be there – it is eternal.

Introduction:

Most scientific models, including the widely accepted Lambda-Cold Dark Matter (ΛCDM) model, suggest that the Universe is about 13.8 billion years old. Recent studies have even extended this estimate to around 26.7 billion years. These figures are based on observations like the Cosmic Microwave Background (CMB) and the rate at which the universe is expanding. However, the idea that the universe has a specific starting point raises deep questions: What existed before the beginning? What lies beyond the singularity? How can we reconcile the concept of a starting point with the vastness of the cosmos?

In this paper, we delve into these questions by combining mathematical reasoning with philosophical inquiry. We explore how the concept of limits in mathematics and Gödel's incompleteness theorems can provide insights into the nature of the universe. My goal is to present a compelling case for the universe's eternal existence, challenging the conventional view of a finite cosmic age.

Limits:

At the core of my argument lies the concept of limits, which helps us understand how any finite form behave in relation to the infinite formless. Consider any form, however large, when compared to the infinitely vast cosmos, its significance becomes negligible.

Intuitively, it seems closest to zero, but using limits, we can rigorously prove that such forms are not merely close to zero but exactly equal to zero.

When $n \to \infty$, the sequence $a_n = 1/10^n$ becomes arbitrarily small, effectively converging to zero.

$\lim_{n \to \infty} 1/10^n$

To prove: -
$\lim_{n \to \infty} a_n = 0$, where $a_n = 1/10^n$:

Proof:
Let $\varepsilon > 0$ be arbitrary.
Choose $N \in \mathbb{N}$ such that $N > -\log_{10}(\varepsilon)$.
For all $n > N$:
$1/10^n < 1/10^N < \varepsilon$
Therefore, $|a_n - 0| = |1/10^n - 0| = 1/10^n < \varepsilon$ for all $n > N$.
By the definition of limit, $\lim_{n \to \infty} a_n = 0$.

Conceptually, any finite form can also be represented as 000…1 (with infinitely many zeros before the digit 1). Though it may appear exceedingly close to zero, the limiting process confirms it is exactly equal to zero.

This reasoning parallels the behaviour of 0.999…9, which, though intuitively seen as approaching 1, is mathematically proven to be exactly equal to 1. Similarly, while 0.000….1 (even though it is not defined as a real number) might seem to approach zero, the limit shows it is precisely zero.

In essence, as 0.999…9 approaches 1 from the left-hand side; 0.000…1 approaches 0 from the right-hand side I would propose and argue. This analogy reveals an interesting implication: within an infinite framework, the distinction between approaching and equal to dissolves.

Putting this in cosmological context, any Form - Finite (particle), no matter how large, is not merely close to zero but exactly equal to zero when compared to the whole universe which is inherently Formless - Infinite (wave).

Gödel's Incompleteness Theorems:

$0 = \infty$

Gödel's incompleteness theorems states that in any sufficiently complex formal mathematical system, there are true statements that cannot be proven or disproven within that system. When we try to determine the age of the universe using our current mathematical tools, we also encounter these fundamental limits. This doesn't mean these truths are false; rather, it indicates the inherent limitations of our mathematical frameworks.

Since it is not possible to prove the equation through a formal system, we must examine it logically to assess its validity. Logically, if zero resides within infinity, then infinity cannot exist without zero. This raises critical questions: Where is infinity if there is no zero? Since when are we counting? From where do we begin? For there to be an ending point, there must logically be a starting point.

From this reasoning, we understand that there is no starting point and no ending point. *The universe was, is, and will always be there.* The confusion may arise if one interprets that zero and infinity are the same. Whereas, what I am proposing is that they are non-dual - two sides of the same coin.

Furthermore, discrepancies in measurements, such as varying estimates of the Hubble constant, hint at issues with our current understanding. These inconsistencies reflect the limitations of our models rather than actual properties of the universe. The universe being eternal, our attempts to assign a finite age is fundamentally flawed, stemming from our reliance on finite measures to describe an infinite universe.

Conclusion:

These findings align with the law of conservation of energy, which states that energy can neither be created nor destroyed; it can only change from one form to another. In similar lines, the confusion regarding the beginning and end of the universe can be avoided by replacing the terms with *appearing* and *disappearing.* It is much like waves in water. The waves appear and disappear, but the water remains, unaffected and unchanged. The material does not go anywhere. It is consistent.

This understanding removes the need for a definitive starting point as suggested by the Big Bang or the Lambda-CDM Model. *This paper proposes there is No Age of the Universe – it is Eternal*, which challenges the boundaries of current scientific understanding. This equation not only bridges mathematical and philosophical insights together, but also paves the way for new discoveries and deeper understanding of our reality.

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