

Paper Type: Original Article

The Relation Among (Matter, Un-Matter, Anti-Matter) Positions in the Absolute Neutrosophic Cube

Ahmed K. Essa ^{1,*} , and Huda E. Khalid ¹ 

¹ University of Telafer, Mosul, Iraq;

Emails: ahmed.k.essa@uotelafer.edu.iq; dr.huda-ismael@uotelafer.edu.iq.

Received: 01 Sep 2025

Revised: 12 Oct 2025

Accepted: 23 Dec 2025

Published: 24 Dec 2025

Abstract

In this article, there is an attempt to position the triplet (matter, un-matter, anti-matter) inside the absolute neutrosophic cube, as well as giving some explanations to choose the suitable parts for them. Some new mathematical tools for dealing with the non-standard unit interval $] -0, 1+ [$ are suggested.

Keywords: Absolute Neutrosophic Cube; Technical Neutrosophic Cube; Matter; Anti-matter; Un-matter.

1 | Introduction

The neutrosophic cube $A'B'C'D'E'F'G'H'$ was introduced by introduced by J. Dezert in 2002 [1], as shown in Figure 1:

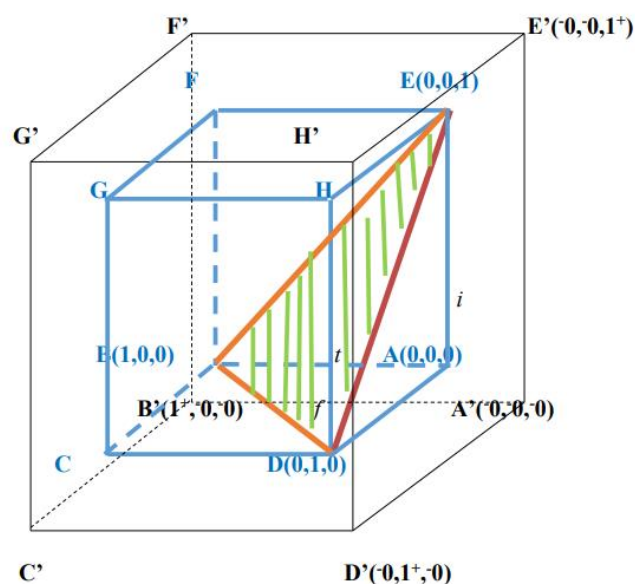


Figure 1. Neutrosophic cube.



Corresponding Author: ahmed.k.essa@uotelafer.edu.iq



<https://doi.org/10.61356/j.nois.2025.8660>



Licensee **Neutrosophic Optimization and Intelligent systems**. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0>).

It is difficult to understand how to use the absolute neutrosophic cube in technical applications, but the next section offers new insight into how to do so.

In addition to the well-known difference between the technical neutrosophic cube $ABCDEFGH$ and the absolute neutrosophic cube $A'B'C'D'E'F'G'H'$, there is an important issue related to the triplet (matter, un-matter, anti-matter) positions inside the absolute neutrosophic cube, which this manuscript will present.

2 | New Diagram for Absolute Neutrosophic Cube

It is obvious that the absolute neutrosophic cube is partitioned into three regions (i.e., it consists of two separate regions representing the truth region corresponding to the falsity region, or we can say they are two opposite regions in addition to the intermediate region representing the indeterminate region (i.e. it is the region between the truth region and the falsity region). The absolute neutrosophic cube is very harmonized with the triplet (matter, un-matter, anti-matter), The following question arises:

2.1 | How can we link the absolute neutrosophic cube with the triplet (matter, un-matter, anti-matter)?

Before answering this important question, the reader must go back to the fundamental definitions as follows:

2.2 | Definition [2]

Matter is a physical substance consisting of elementary particles, which are electrons, protons, and neutrons, that combine to give rise to atoms and larger physical structures. The number of negatively charged electrons is equal to the number of positively charged protons in a neutral atom. The nuclei of most atoms are made up of a combination of protons and neutrons, but the nucleus of the common hydrogen atom is composed of a single proton and nothing else. Thus, the electrical neutrality is due to the equal number of positive charges and negative charges that make up the atom.

2.3 | Definition [3]

Antimatter is the inverse of matter and contains antiparticles that are counterparts to each known elementary particle. The mass, spin, and lifetime of antiparticles are equal to the mass, spin, and lifetime of their matter partners, but they have opposite electric charge and additive quantum numbers. An antimatter atom consists of a positron (anti-electron), an anti-electron, and an antiproton. When the number of positrons is equal to the number of antiprotons, antimatter atoms are electrically neutral, just like ordinary matter atoms. The existence of antimatter is a consequence of the fundamental laws of relativistic quantum mechanics and particle–antiparticle symmetry.

2.4 | Definition

A physical system that contains both matter and antimatter components in the same bound or interacting system is termed “unmatter”. The particles and antiparticles will not mix with ordinary matter and antimatter, which consist entirely of particles or antiparticles, respectively, but unmatter will be a hybrid between the two, containing both at the same time to a degree that allows them to coexist temporarily or permanently. The standard model of particle physics proposes that particles are made up of elementary particles or “fermions”: six quarks and six leptons, and that particles and antiparticles pair up in the same way. Thus, the subatomic constituents of an unmatter configuration must include at least one elementary particle and at least one corresponding antiparticle capable of forming a bound, composite or interacting system. According to the neutrosophic concept, unmatter is in an ontological space between matter and antimatter. The absolute neutrosophic cube ($A'B'C'D'E'F'G'H'$) can be divided into three mutually disjoint regions: matter, antimatter, and unmatter, which can be analogous to the three mutually disjoint regions of the partitioning of the technical neutrosophic cube ($ABCDEFGH$). These areas are a geometric and conceptual solution for

describing the co-existence, interaction and transition of the three fundamental categories in a unified model of neutrosophic.

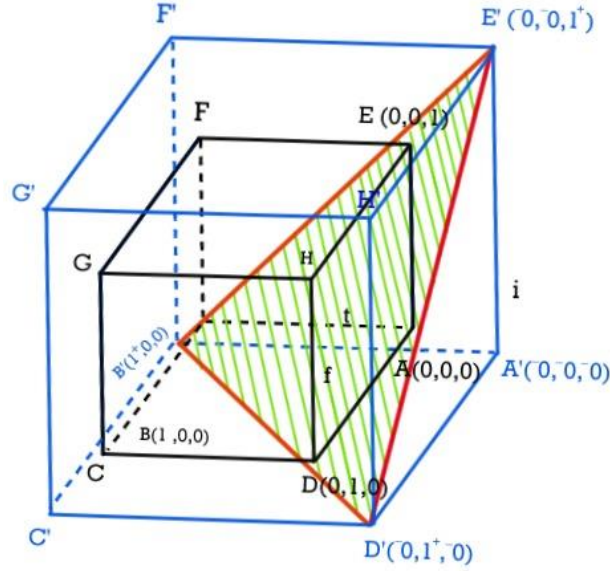


Figure 2. Modify Neutrosophic Cube.

The authors identified the above absolute neutrosophic cube (i.e. Figure 2) to be partitioned into three disjoint regions, each of which represents one component of the triplet (matter, un-matter, anti-matter) as follows:

- At the left of the triangle $\Delta B'D'E'$ there is the solid $E'F'G'C'D'E'B'D'$ (excluding $\Delta B'D'E'$) which is the locus of points whose sum of their coordinates is greater than 1^+ .

Let the point $p_1 \in E'F'G'C'D'E'B'D'$, then

$$T_{p_1} + I_{p_1} + F_{p_1} > 1^+ \quad (1)$$

Since the matter state is the prevailing situation and more stability than the anti-matter or the un-matter, it is harmonized with the region positioned at the left of the triangle $\Delta B'D'E'$ (i.e. inside the solid $E'F'G'C'D'E'B'D'$).

- The pyramid $E'A'B'D'$ situated on the right side of the triangle $\Delta B'D'E'$, including its faces as follows:

$\Delta A'B'D'$ (the base of the pyramid), $\Delta E'B'A'$, and $\Delta E'D'A'$ (lateral faces of the pyramid), but excluding its face $\Delta B'D'E'$ is the locus of the points whose sum of coordinates is less than 1^+ .

If a point $p_2 \in E'A'B'D'$, then

$$T_{p_2} + I_{p_2} + F_{p_2} < 1^+ \quad (2)$$

Hence, the antimatter will represent this region (i.e. the pyramid $E'A'B'D'$).

- The equilateral triangle $\Delta B'D'E'$, whose sides are equal to $\sqrt{2}^+$ which represents the geometrical locus of the point whose sum of the coordinates is equal exactly to 1^+ .

Let the point p_3 is situated inside of the triangle (as well as on the sides of it), then

$$T_{p_3} + I_{p_3} + F_{p_3} = 1^+ \quad (3)$$

The un-matter (means neither matter nor anti-matter, but a state in between two states, an entity which has common parts from both matter and anti-matter), it will be represented by the triangle $\Delta B'D'E'$.

3 | How to Manipulate $\sqrt{2}^+$

In the absolute neutrosophic cube ($A'B'C'D'E'F'G'H'$) it can be dealt with the number $\sqrt{2}^+$. Hence, there is no more need to the technical neutrosophic cube ($ABCDEFGH$) and we can neglect it. The following suggested way explains how to manipulate the number $\sqrt{2}^+$:

Technical neutrosophic cube (TNC)	Absolut neutrosophic cube (ANC)
$\sqrt{2} = 1.414214 + 0I$ Is a special case of neutrosophic number of the form $a + bI$, where $a, b \in R$, I is the indeterminate component of the neutrosophic number $a + bI$, hence the TNC is a special case of the ANC .	$\begin{aligned}\sqrt{2}^+ &= (\sqrt{2})^+ \\ &= (1.414214)^+ \\ &= 1 + 0.414214I\end{aligned}$

3.1 | Example

Write the following neutrosophic numbers by the form of $a + bI$ where a, b are any real numbers:

1. $\sqrt{5}^+$
2. $\frac{5^+}{1.5}$ or $\frac{5}{1.5^+}$

Solution:

1. $\sqrt{5}^+ = (\sqrt{5})^+ = (2.236)^+ = 2 + 0.236I$
2. $\frac{5^+}{1.5}$ or $\frac{5}{1.5^+} = \left(\frac{5}{1.5}\right)^+ = (3.333333)^+ = 3 + 0.333333I$

So the phrase {because in technical applications only the classical interval $[0, 1]$ is used as range for the neutrosophic parameters t, i, f , we call the cube $ABCDEFGH$ the technical neutrosophic cube and its extension $A'B'C'D'E'F'G'H'$ the neutrosophic cube (or absolute neutrosophic cube), used in the field where we need to differentiate between absolute and relative [4] is meaningless and we can delete the technical neutrosophic cube.

4 | Conclusion

All the synonymous definitions of matter, antimatter and un-matter would not be contrary if they forgather inside the absolute neutrosophic cube. could not use the interval $] -0, 1 + [$ in technical applications be in past. Now we can interpret any nonstandard number like $\sqrt{2}^+$ as $a + bI$ neutrosophic number. not yet this essay any limitation for using absolute neutrosophic cube.

Funding

This research has no funding source.

Data Availability

The datasets generated during and/or analyzed during the current study are not publicly available due to the privacy-preserving nature of the data but are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that there is no conflict of interest in the research.

Ethical Approval

This article does not contain any studies with human participants or animals performed by any of the authors.

References

- [1] Dezert, J. (2002). Open questions in neutrosophic inferences. *Multiple-Valued Logic/An International Journal*, 8(3), 439-472.
- [2] Smarandache, F. (2004). A geometric interpretation of the neutrosophic set-A generalization of the intuitionistic fuzzy set. *arXiv preprint math/0404520*.
- [3] Smarandache, F. (2004). A new form of matter—unmatter, formed by particles and anti-particles. *Bull. of Pure and Appl. Sciences*, 23(2), 173-177.
- [4] Smarandache, F. (2011). Verifying unmatter by experiments, more types of unmatter, and a quantum chromodynamics formula. *Florentin Smarandache*, 63.

Disclaimer/Publisher's Note: The perspectives, opinions, and data shared in all publications are the sole responsibility of the individual authors and contributors, and do not necessarily reflect the views of Sciences Force or the editorial team. Sciences Force and the editorial team disclaim any liability for potential harm to individuals or property resulting from the ideas, methods, instructions, or products referenced in the content.