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Neutrosophic Transdisciplinarity and the Philosophy of Multi-space

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Abstract

The pursuit of human knowledge has traditionally been organized into distinct disciplines—such as physics, philosophy, biology, and mathematics. This compartmentalization, while useful in many contexts, fails to capture the complexity and fluidity of reality. Neutrosophic Transdisciplinarity, a framework rooted in the principles of neutrosophy, offers a paradigm shift, enabling us to bridge these gaps. By focusing on the intersections where uncertainty and complexity thrive, neutrosophic transdisciplinarity challenges conventional disciplinary boundaries and facilitates the exploration of knowledge in its interconnected, evolving form.

Keywords: Neutrosophy; Neutrosophic Transdisciplinarity; Multi-Space; Multi-Structure; Multi-Concentric-Structures; Transdisciplinary Knowledge; Philosophical Boundaries; Complex Systems; Relational Knowledge; Interdisciplinary Interactions; Scientific Transdisciplinarity; Cultural Transdisciplinarity; Dynamic Knowledge Systems; Vague Boundaries; Multi-valued Logic; Nested Structures; Evolution of Ideas; Philosophical Synthesis.

1 | Introduction

At the heart of Neutrosophic Transdisciplinarity [6, 7, 8] is the recognition that knowledge is not confined to rigid categories but is instead characterized by uncertainty, vagueness, and the fluid interplay of opposing concepts. In neutrosophic terms [9], this can be understood as the intersection of a concept [A], its anti-concept [antiA], and its neutralities [neutA]—entities that do not exist in isolation but overlap to form a space of possibilities. This interplay can be expressed as:

$$[A] \cap [\text{Neut}A] \cap [\text{Anti}A] = \text{all}.$$

This formulation highlights the dynamic and non-binary nature of knowledge, where concepts interact in ways that transcend dichotomies, and illustrates the neutrosophic idea that a concept is never purely affirmative or purely negative, existing instead in a state of balance. Through this lens, transdisciplinarity [2] does not seek to impose a universal system of thought but instead explores how diverse concepts, ideas, and fields of study can coexist, inform one another, and evolve together. The key insight is that knowledge should not be seen as a collection of isolated domains but as a interconnected landscape where boundaries are porous, and ideas merge and evolve over time.



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2 | Multi-Space and Multi-Structure: Bridging Disciplines

The concept of multi-space [8] provides a conceptual framework wherein multiple structures can coexist and interact within a single overarching space. In neutrosophic terms, a multi-space represents the overlapping realities that make up our understanding of the world. Each “space” within the multi-space—whether it be physical, cultural, emotional, or intellectual—functions as a distinct structure with its own properties, rules, and assumptions. These structures are not independent but interact with one another, influencing each other, coexisting in tension, or even transforming one another (See Figure 1).

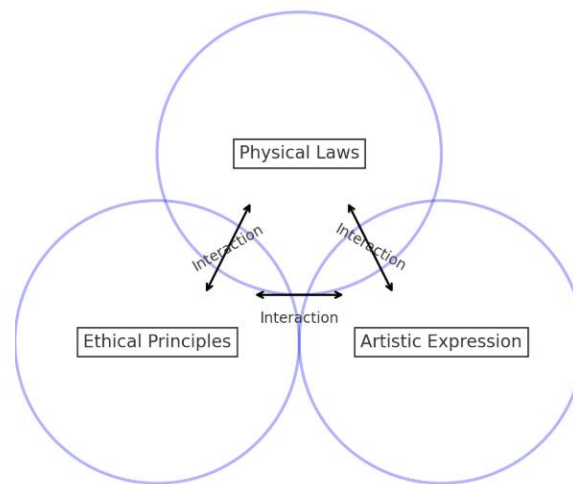


Figure 1. Example of interaction of multi-spaces.

For example, consider a multi-space that includes three distinct domains: one representing the physical laws of the universe (e.g., classical mechanics), another representing ethical principles (e.g., utilitarianism), and a third representing artistic expression (e.g., the composition of a symphony). These domains represent separate structures, but they intersect in the lived experience of a person, whose actions and thoughts cannot be neatly confined to any single discipline. In the neutrosophic view, these overlapping structures are not contradictory; rather, they coexist in a dynamic state of equilibrium.

3 | Multi-Concentric-Structures: Layers of Reality

Building upon the concept of multi-space, the idea of multi-concentric-structures adds another layer of complexity to the neutrosophic view. A multi-concentric-structure consists of multiple nested structures, where each structure is part of a hierarchical organization. In this system, smaller, more specialized structures are encompassed within broader, more general ones. This creates a multi-layered framework of reality, where each level of structure refines and builds upon the ones beneath it.

For instance, consider a groupoid—a mathematical structure that contains subsets that form progressively specialized structures:

- A semigroup (a set with an associative operation),
- A monoid (a semigroup with an identity element),
- A non-commutative group (a monoid with inverses but without commutative properties),
- A commutative group (a non-commutative group with commutative properties).

(See Figure 2).

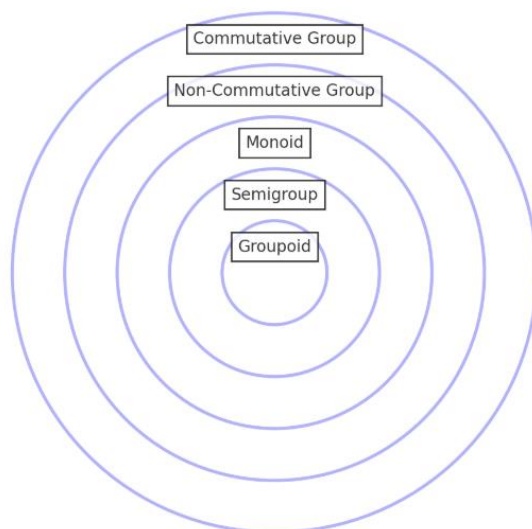


Figure 2. Multiple nested structures.

These structures are not simply discrete or isolated from one another; they form a nested hierarchy, with each level contributing to a deeper understanding of the whole. This concept can be applied beyond mathematics. For example, in cultural systems, specialized cultural practices may be nested within broader societal frameworks, and ethical beliefs may overlap with legal principles, both of which are nested within overarching philosophical systems. The neutrosophic perspective suggests to view these systems as mutually constitutive, and ever-evolving, rather than as distinct and separated entities.

4 | The Neutrosophic Nature of Multi-Structures

In the neutrosophic view, structures are not static; they are in a constant state of flux, shaped by continuous feedback and interaction. Each structure in a multi-space or multi-concentric-system is not isolated but is influenced by the other structures within it. The definition of any given structure is never fixed; instead, it exists in a dynamic process of adaptation, informed by the forces that act upon it.

Neutrosophy extends this approach beyond traditional binary thinking. Rather than categorizing a structure as either true or false, existent or non-existent, neutrosophy recognizes the intermediate spaces where multiple truth values can coexist.

5 | Philosophical Implications of Neutrosophic Transdisciplinarity

Neutrosophic Transdisciplinarity [8] is not merely about blending ideas from different disciplines; it seeks to understand the deeper relational connections between them [4]. In the context of multi-space and multi-concentric-structures, it highlights the relational nature of knowledge, where value arises from the interactions between different domains.

This perspective encourages us to look beyond the boundaries of individual disciplines [1], and let us envisage a few expressions of this transdisciplinarity [5, 6]:

5.1 | Ethical Transdisciplinarity

Ethical dilemmas often require insights from multiple domains—such as science, culture, law, and emotion. Neutrosophic transdisciplinarity helps us navigate these intersections, acknowledging that ethical truths are not absolute but exist in relation to multiple, sometimes contradictory frameworks.

5.2 | Scientific Transdisciplinarity

Fields like bioinformatics, which combine biology and computer science, exemplify scientific transdisciplinarity. From a neutrosophic perspective, this blending of disciplines is a natural extension of scientific inquiry, where different scientific structures interact to generate new knowledge that transcends the limitations of any one discipline.

5.3 | Cultural and Social Transdisciplinarity

In a globalized world, cultural systems often overlap and influence one another [3]. Neutrosophic transdisciplinarity allows us to embrace these intersections, recognizing that cultures are not monolithic but consist of overlapping, even contradictory sometimes, structures that shape our understanding of social dynamics.

6 | Conclusion

The neutrosophic approach to multi-space and multi-concentric-structures offers a shift in how we understand reality and knowledge. By acknowledging the relational, overlapping, and dynamic nature of different structures, neutrosophic transdisciplinarity provides a framework for integrating ideas across disciplines in ways that accept their complexity.

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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.

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