Neutrosophic Transdisciplinarity — Multi-Space & Multi-Structure

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§1. Definitions

Neutrosophic Transdisciplinarity means to find common features to uncommon entities, i.e., for vague, imprecise, not-clear-boundary entity <A> one has:

$< A > \bigcap < nonA > \neq \emptyset$, or even more $< A > \bigcap < antiA > \neq \emptyset$. Similarly, $< A > \bigcap < neutA > = \emptyset$ and $< antiA > \bigcap < neutA > = \emptyset$, up to $< A > \bigcap < neutA > \bigcap < antiA > = \emptyset$, where $< nonA >$ means what is not A, and $< antiA >$ means the opposite of $< A >$.

There exists a *principle of attraction* not only between the opposites $< A >$ and $< antiA >$ (as in dialectics), but also between them and their neutralities $< neutA >$ related to them, since $< neutA >$ contributes to the Completeness of knowledge. $< neutA >$ means neither $< A >$ nor $< antiA >$, but in between; $< neutA >$ is included in $< nonA >$.

As part of Neutrosophic Transdisciplinarity we have the following important conceptions.

§2. Multi-Structure and Multi-Space

2.1 Multi-Concentric-Structure

Let S_1 and S_2 be two distinct structures, induced by the ensemble of laws L, which verify the ensembles of axioms A_1 and A_2 respectively, such that A_1 is strictly included in A_2. One says that the set M, endowed with the properties:

a) M has an S_1-structure;

b) there is a proper subset P (different from the empty set $\emptyset$, from the unitary element, from the idempotent element if any with respect to S_2, and from the whole set M) of the initial set M, which has an S_2-structure;

c) M doesn't have an S_2-structure,

is called a 2-concentric-structure. We can generalize it to an n-concentric-structure, for $n \geq 2$ (even infinite-concentric-structure).

(By default, 1-concentric structure on a set M means only one structure on M and on its proper subsets.)

An n-concentric-structure on a set S means a weak structure $\{w(0)\}$ on S such that there exists a chain of proper subsets

$$P(n-1) < P(n-2) < \cdots < P(2) < P(1) < S,$$

where $<$ means *included in*, whose corresponding structures verify the inverse chain

$$\{w(n-1)\} > \{w(n-2)\} > \cdots > \{w(2)\} > \{w(1)\} > \{w(0)\},$$

where $>$ signifies *strictly stronger* (i.e., structure satisfying more axioms).

For example, say a groupoid D, which contains a proper subset S which is a semigroup, which in its turn contains a proper subset M which is a monoid, which contains a proper subset NG which is a non-commutative group, which contains a proper subset CG which is a commutative group, where D includes S, which includes M, which includes NG, which includes CG. In fact, this is a 5-concentric-structure.

2.2 Multi-Space

Let $S_1, S_2, \cdots, S_n$ be n structures on respectively the sets $M_1, M_2, \cdots, M_n$, where $n \geq 2$ (n may even be infinite). The structures $S_i,\ i = 1, 2, \cdots, n$, may not necessarily be distinct two by two; each structure S_i may be or not n_i-concentric, for $n_i \geq 1$. And the sets $M_i,\ i = 1, 2, \cdots, n$, may not necessarily be disjoint, also some sets M_i may be equal to or included in other sets $M_j,\ j = 1, 2, \cdots, n$. We define the *multi-space* M as a union of the previous sets:

$$M = M_1 \bigcup M_2 \bigcup \cdots \bigcup M_n,$$

hence we have n (different or not, overlapping or not) structures on M. A multi-space is a space with many structures that may overlap, or some structures may include others or may be equal, or the structures may interact and influence each other as in our everyday life.

Therefore, a region (in particular a point) which belong to the intersection of $1 \leq k \leq n$ sets M_i may have k different structures in the same time. And here it is the difficulty and beauty of the a multi-space and its overlapping multi-structures.

(We thus may have $< R > \neq < R >$, i.e. a region R different from itself, since R could be endowed with different structures simultaneously.)

For example, we can construct a geometric multi-space formed by the union of three distinct subspaces: an Euclidean subspace, a hyperbolic subspace and an elliptic subspace.

As particular cases when all M_i sets have the same type of structure, we can define the Multi-Group (or n-group; for example; bigroup, tri-group, etc., when all sets M_i are groups), Multi- Ring (or n-ring, for example biring, tri-ring, etc. when all sets M_i are rings), Multi-Field (n-field), Multi-Lattice (n-lattice), Multi-Algebra (n-algebra), Multi-Module (n-module), and so on - which may be generalized to infinite-structure-space (when all sets have the same type of structure), etc.

§3. Conclusion

The multi-space comes from reality, it is not artificial, because our reality is not homogeneous, but has many spaces with different structures. A multi-space means a combination of any spaces (may be all of the same dimensions, or of different dimensions - it doesn' t matter). For example, a Smarandache geometry (SG) is a combination of geometrical (manifold or pseudo-manifold, etc.) spaces, while the multi-space is a combination of any (algebraic, geometric, analytical, physics, chemistry, etc.) space. So, the multi-space can be interdisciplinary, i.e. math and physics spaces, or math and biology and chemistry spaces, etc. Therefore, an SG is a particular case of a multi-space. Similarly, a Smarandache algebraic structure is also a particular case of a multi-space.

This multi-space is a combination of spaces on the horizontal way, but also on the vertical way (if needed for certain applications). On the horizontal way means a simple union of spaces (that may overlap or not, may have the same dimension or not, may have metrics or not, the metrics if any may be the same or different, etc.). On the vertical way means more spaces overlapping in the same time, every one different or not. The multi-space is really very general because it tries to model our reality. The parallel universes are particular cases of the multi-space too. So, they are multi-dimensional (they can have some dimensions on the horizontal way, and other dimensions on the vertical way, etc.).

The multi-space with its multi-structure is a *Theory of Everything*. It can be used, for example, in the *Unified Field Theory* that tries to unite the gravitational, electromagnetic, weak, and strong interactions (in physics).

Reference

[1] F.Smarandache, *Mixed Non-Euclidean geometries*, Arhivele Statului, Filiala Valcea, Rm. Valcea, 1969.