



Introduction to Collective Neutrosophy and Collective n-ary Neutrosophy

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Abstract: This paper introduces the novel concepts of Collective Neutrosophy and Collective n-ary Neutrosophy as extensions of Smarandache's foundational theories of Neutrosophy and n-ary Neutrosophy. While classical Neutrosophy generalizes traditional dialectical thinking by incorporating neutralities into the dynamics of opposites, the proposed collective forms address interactions at the group level, where multiple agents and ideas simultaneously engage in opposition, cooperation, or neutrality. Applications in geopolitics, philosophy, corporate ecosystems, and cultural studies are discussed, alongside a theoretical framework for modeling complex relational dynamics. Diagrams illustrating single, collective, and collective n-ary neutrosophic structures are proposed to visualize these concepts.

Keywords: Neutrosophy; n-ary Neutrosophy; Collective Neutrosophy; Dialectics; Neutralities; Opposites; Complex Systems; Conflict Dynamics; Group Theory.

1. Introduction

Smarandache's Neutrosophy, introduced in 1998 [1], and its subsequent extension into n-ary Neutrosophy in 2003 [3], represent significant generalizations of dialectical philosophy. Traditional dialectics, such as Hegelian synthesis and the Yin–Yang model from Chinese philosophy, focus on the tension between two opposites. However, these frameworks largely neglect the role of neutrality or indeterminacy, crucial elements that influence the balance between oppositional forces.

Neutrosophy broadens this view by considering not only the dynamics between opposites but also the influence of neutralities, elements that are neither fully aligned with one side nor the other but that affect the outcome of oppositional interactions. We term this foundational model Single Neutrosophy.

This paper introduces two new theoretical expansions:

• *Collective Neutrosophy*: modeling the dynamics between two opposite groups and their collective neutralities.

• *Collective n-ary Neutrosophy*: further generalizing to interactions among multiple ($n \ge 2$) opposite groups and their respective multiple collective neutralities.

These developments allow for the neutrosophic modeling of highly complex systems characterized by multifaceted relationships between ideas, entities, or actors.

2. Foundations of Single and n-ary Neutrosophy

2.1. Single Neutrosophy

In Single Neutrosophy, the basic unit of analysis is the dynamic between two opposing elements (e.g., two people, two ideas), alongside neutral or indeterminate elements that may sway the dynamic [1-4].

Example: Two individuals are in conflict, while third parties—neutral bystanders—may intervene, supporting one side, mediating, or introducing new dynamics.

2.2. Single n-ary Neutrosophy

n-ary Neutrosophy extends this model to n opposing elements ($n \ge 2$), considering interactions and neutralities between each possible pair.

Example: In a multiparty political system, several parties compete simultaneously, with shifting alliances and neutral stances influencing the overall balance of power.

3. Collective Neutrosophy

Collective Neutrosophy advances the neutrosophic model from individual to group dynamics. It studies the opposition and cooperation between groups of elements, along with the collective neutralities or collective indeterminacies that may emerge between or within these groups.

3.1. Structure

- Groups: Sets of elements (individuals, ideas, organizations) that share a general alignment.
- Intergroup Dynamics: Interactions between entire groups.
- Intragroup Dynamics: Internal oppositions within each group.
- Collective Neutralities: Neutral groups or forces that influence the intergroup dynamics.

3.2. Applications

• *Geopolitical Conflicts*: Conflicts between nation-states, where neutral countries (e.g., Switzerland in WWII) mediate or subtly influence the balance.

• *Philosophical Systems*: Oppositions between schools of thought (e.g., materialism vs. idealism) and the influence of interdisciplinary or neutral intellectual movements.

• *Business Ecosystems*: Rivalry between corporate groups, moderated by regulatory bodies, opensource communities, or independent developers.

4. Collective n-ary Neutrosophy

Collective n-ary Neutrosophy generalizes Collective Neutrosophy to n groups ($n \ge 2$), where complex, multi-faceted interactions are observed.

4.1. Structure

• *n Groups of Opposites*: {G₁, G₂, ..., G_n}

• *Intergroup Dynamics*: Competitive, cooperative, or neutral relationships between any pair of groups.

• *Collective Neutralities*: Entities or groups that interact neutrally or mediate among multiple groups simultaneously.

4.2. Applications

• *International Alliances*: NATO, BRICS, ASEAN, and other coalitions interacting with neutral states or organizations like the UN.

• *Multi-platform Technological Ecosystems*: Interaction between ecosystems like Apple, Google, Microsoft, with neutral cross-platform developers or regulatory influences shaping market dynamics.

• *Cultural Movements*: Interaction among multiple art or literary movements, where certain neutral movements (e.g., postmodernism) mediate between classical conflicts.

5. Diagrams and Visual Representations

Several diagrams can aid in understanding these complex relationships:

5.1. Single Neutrosophy Diagram

Figure 1. Two nodes (A and B) connected by a dynamic arrow, with neutral elements (N) influencing the arrow's balance. A and B are two opposites (e.g., two people, two ideas); neutral(s) can influence either side or mediate.

5.2. Single n-ary Neutrosophy Network

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[ A1 ]<--->[ B1 ]
[ A2 ]<--->[ B2 ]
[ A3 ]<--->[ B3 ]
      etc.
      (n pairs)
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Figure 2.1. Several independent oppositional pairs; multiple nodes $(A_1, A_2, ..., A_n)$ with pairwise connections; neutral nodes positioned between each connected pair.



Figure 2.2. Single n-ary Neutrosophy Network.

5.3. Collective Neutrosophy







Figure 3.2. Collective Neutrosophy.

5.4. Collective n-ary Neutrosophy Network

Group A Group B Group C ... Group N I I I I <---- Collective Interactions -----> ‡ ‡ ‡ ‡ [Multiple Neutral Entities/Groups]

Figure 4.1. Multiple groups with cross-interactions and neutral clusters linking multiple groups.



Figure 4.2. Collective n-ary Neutrosophy Network.

6. A Short Comparative Analysis: EU vs. MERCOSUR through Collective Neutrosophy and Collective n-ary Neutrosophy

6.1. Basic Structure

EU is political and economic union of 27 countries with deep integration (common market, customs union, shared policies, and in some cases, common currency - the Euro).

MERCOSUR is a South American trade bloc (Argentina, Brazil, Paraguay, Uruguay, Venezuela - suspended) aiming primarily at free trade and fluid movement of goods, people, currency.

Each bloc is a collective made of multiple nations (not individuals), thus fitting Collective Neutrosophy.

Internal dynamics among member states = internal single neutrosophic tensions.

Aspect	European Union (EU)	MERCOSUR
Internal Opposites	Differences between northern vs. southern economies; national sovereignties vs. federalism; euro- zone vs. non-eurozone members.	Brazil vs. Argentina economic competition; agricultural vs. industrial interests; political instability vs. democratic consolidation.
Neutralities	Neutral countries (e.g., Austria in military matters); mediators like Germany in conflicts; EU Com- mission trying to balance East-West tensions.	Paraguay and Uruguay often act as balancing powers between Brazil and Argentina; external neutral actors (e.g., Bolivia trying to mediate trade terms).
External Opposites	EU vs. US/China in global trade; EU vs. Russia geopolitically.	MERCOSUR vs. Pacific Alliance (competing South American trade blocs); MERCOSUR vs. external trade blocs (like the EU itself during free- trade talks).

6.2. Dynamics of Opposites and Neutralities

Neutrosophically, each market isn't just a binary tension but has multiple tensions, neutral mediations, and indeterminacies.

6.3. n-ary Collective Neutrosophic Dynamics

In EU:

• Germany–France–Italy–Poland–Spain: major economic players, each having different priorities.

• Each pair (Germany–Italy, France–Poland, etc.) can have tensions, cooperation, and neutrals. In MERCOSUR:

• Brazil-Argentina-Paraguay-Uruguay-Venezuela (suspended).

• Similar: Brazil-Argentina rivalry, Paraguay-Uruguay as mediators, Venezuela's instability adding indeterminacy.

6.4.	Strength	of	Neutrality	Zones

Bloc	Internal Neutral Zones	External Neutral Interactions	
EU	Countries like Austria, Finland; neutral platforms like European	EFTA (European Free Trade Association) as semi-neutral	
	Parliament debates.	economic players.	
	Uruguay and Paraguay trying to	Chile and Bolivia acting as external	
MERCOSUR	mediate disputes.	neutral or semi-associated countries.	

6.5. Remarks

- Collective Neutralities help stabilize each market but the degree of stabilization differs.
- EU shows stronger structured neutrality mechanisms (formal mediation processes).
- MERCOSUR's neutralities are more informal and sometimes fragile.

6.6. Summary Interpretation

Concept	EU	MERCOSUR
Collective Dynamics	Highly institutionalized	More political, informal
Internal	Complex; multilayered (economy,	Primarily economic with some
Neutrosophy	policy, sovereignty)	political overlaps
n-ary Dynamics	>5 strong member interactions	3-5 strong, others weaker
Neutralities	Formal, legally enforced (e.g., treaties)	More ad hoc, based on diplomacy
Indeterminacies	Brexit, Eurozone crises, East-West divergence	Political instability (Venezuela), economic crises

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