scilogs, XVI

florentin smarandache

nidus idearum

weaving the neutrosophic web

NSIA Publishing House

Florentin Smarandache

Nidus idearum.
Scilogs, XVI:
weaving the neutrosophic web

Gallup – Guayaquil
(United States of America – Ecuador)
2025

Exchanging ideas with Dan Florin Lazăr, Yaser Ahmad Alhasan, William H. Woodall, M. Karimi, M. R. Hooshmandasl, A. Shakiba, N. Zamani, Said Broumi, Saeid Jafari, Ronald Pinho, Robert Neil Boyd, Victor Christianto, Le Hoang Son, Luu Quoc Dat, Mumtaz Ali, Rafif Alhabib, Kalyan Mondal, Surapati Pramanik, Zhang Wenpeng, Ludi Jancy Jenifer, Peide Liu, Ganeshsree Selvachandran, Terman Frometa-Castillo, Mohammad Khoshnevisan, Maikel Leyva Vazquez, Akira Kanda, Andrușa Vătuiu, Octavian Blaga, Mustapha Kachchouh, Kawther Fawzi, Hamidreza Seiti, Ștefan Vlăduțescu (in the order they appear in the book).

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Invitation

Welcome to the sixteenth volume of *Scilogs*, a continuation of my open laboratory of ideas, where scientific inquiry meets spontaneous reflection!

This series, rooted in the fusion of rigorous analysis and informal discourse, serves as a platform for exploring theoretical advancements, interdisciplinary connections, and personal meditations on scientific and philosophical matters.

In this volume, I delve into a diverse array of topics, spanning mathematics, physics, philosophy, artificial intelligence, and even touching upon social dynamics, literature, arts, criminal justice, and history. A significant portion of the book is dedicated to the ongoing development and exploration of neutrosophy and its related concepts. Together with peer mates, we examine neutrosophic improper integrals, n-ary neutrosophic triplets, refined neutrosophic S-approximation spaces, and the application of neutrosophic statistics and probability. The links between neutrosophy and other fields, such as Grey System Theory, is also investigated.

This volume further explores the breadth of neutrosophic applications, from its use in defining new mathematical structures like neutrosophic triplet hypertopology and exploring neutro-algebraic and anti-algebraic structures, to its application in areas like medical diagnosis with complex neutrosophic similarity measures. We also delve into more theoretical aspects, such as completeness and incompleteness in neutrosophy, the division of quadruple neutrosophic numbers, and the refinement of neutrosophy in relation to lattices, pair structures, and YinYang bipolar fuzzy sets.

Beyond the core of neutrosophic theory, I reflect on a range of philosophical and societal questions. This includes discussions on dialectics, the concept of indeterminacy, the degree of democracy, the blending of capitalism and communism, and the principle of internal fragility in dynamic systems. We also explore the fascinating potential of the aging brain and the principle of interconvertibility of matter, energy, and information, touching upon consciousness and personality.

The *Scilogs* are not meant to provide definitive answers but rather to serve as a repository of ideas, questions, and intellectual provocations.

Let the exploration continue!

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The Expanding Universe of Neutrosophics

Positive-Neutral-Negative Uncertain Structures

Dan Florin Lazăr

Here is a new question for documenting the book[1] I write about your prolific scientific activity: could you provide an example of application of the OffSet?

Florentin Smarandache

Let's ask a specific question to develop such an application: *How can a behavioral evaluation system, designed to operate within a specific range, be adapted to accommodate extreme positive and negative behaviors that fall outside of that predefined range?*

In a penitentiary with the worst inmates, the guards evaluate their behaviors.

- For positive attitudes (obeying the rules of the penitentiary, subordinating to the guards, enrolling to complete their studies, doing some jobs, helping others, etc.) the inmates receive positive qualifications between (0, 1].

[1] Lazăr, Dan Florin (2024). *A Tapestry of Thought. Smarandache's Contributions to Knowledge and Artistic Expression. An Exploration of Smarandache's World, Where Science Meets Creativity. In honorem Florentini Smarandache, ad completam aetatem septuagenariam.* Grandview Heights, OH, United States of America: Biblio Publishing, 2024, 134 p.; ISBN: 9781599738055

- However, for negative actions (insults, attacks, beatings, injuring others, insubordinations to the prison staff, thefts, murders) they receive negative grades, between [-1, 0), where -1 is the worst offense, i.e. for murder).
- The qualificative degree = 0 is for neutral behavior (neither positive nor negative).

Meanwhile Richard has helped Fernando do his assigned job, help that was evaluated as +0.4.

Alex neither helped nor harmed anyone, so he was rated as neutral (0).

Ariel got into a fight with Carlos, and both were slightly injured, so they were both rated by the guards with -0.2.

The evaluations were made between [-1, 1].

Let's assume that the inmate John has killed another inmate, then John's qualitative is -1.1 (the negative worst possible).

Marcelo saved an inmate from drowning in a lake where they had been assigned to work. Thus, Marcelo was evaluated with the maximum positive qualification, Marcelo (1.1).

Therefore, we deal with the interval [-1.1, 1.1], which are outside of the interval [-1, 1].

Neutrosophic Improper Integrals based on AH-Isometry

Florentin Smarandache
to Yaser Ahmad Alhasan

I checked the neutrosophic improper integrals based on AH-Isometry, for the first time introduced by you *et al.*; my great thanks and congratulations for enhancing the neutrosophic field!

Yes, it is correct to consider: $\infty + (a + bI)$,

and respectively $\infty - (a + bI)$ as indeterminate infinity, where *a, b* are real numbers and I is indeterminacy, denoted as ∞_I.

Since you are an avangard researcher in the neutrosophic integrals, try to extend from AH-Isometry:

- to n-Refined AH-Isometry (Smarandache & Abobala, 2024)[2]
- and to m-variables n-refined AH-Isometry (Smarandache, Ghadimi, Rezaei, 2024)[3]

by considering integrals of many variables:

$$d_{x_1} d_{x_2} \dots d_{x_n}$$

and using the extended AH-Isometry types as above.

[2] See: https://fs.unm.edu/NSS/RefinedLiteral21.pdf.
[3] See: https://fs.unm.edu/m-variables-n-refined-AH-Isometry.pdf.

Di-alectic, Tri-alectic, …, n-alectic, for n ≥ 2

Florentin Smarandache and Maikel Vazquez

While the di-alectic is the dynamic of opposites T and F (or Truth and Falsehood), the neutrosophy is a tri-alectic, the dynamic of opposites (T and F) and the neutrality/indeterminacy (I) between them.

In the Andin Dialectic [1, 2], the opposites Yanantin and Pachakuti, are not only contradictory but also complementary, as in our real life.

The woman is the complementary of the man, but sometimes contradictory as well (arguing and fighting).

We may consider, for example, the Quadruple Neutrosophic Logic, where (T, F) is refined into (T, I_1, I_2, F), as follows:

- T = man
- F = woman
- I_1 = a type of indeterminacy, called complementary relationship between man and woman (they help each other);
- I_2 = another type of indeterminacy, called contradictory relationship between man and woman (they are fighting one with the other).

Therefore, herein one has a quadr-alectic, dynamic of four elements.

The most general dynamic is the n-alectic, which is the dynamic of *n* (sub)components of the Refined Neutrosophic Logic [3]:

The Neutrosophic Components (T, I, F) were refined into n Neutrosophic SubComponents:

$$(T_1, T_2, \ldots T_p; I_1, I_2, \ldots, I_r; F_1, F_2, \ldots, F_s),$$

where *p, r, s, n* are positive integers and $p + r + s = n$.

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[1] Alonso Castillo Flores (2021). "Del Yanantin al Pachakuti: La dialectica andina," *Disenso: Critica y Reflexion Latinoamericana*, vol. 4, no. 1.

[2] Aguilar Choque, Franz Emerson (2018). "Lo Ch'ixi: entre lo indigena y lo occidental / La coexistencia de elementos multiples en un mismo sujeto," *Jornadas de Jovenes Investigatores AUGM*, Universidad Nacional de Cuyo, Mendoza, Argentina, 17-19 de octubre de 2018.

[3] F. Smarandache (2013). "n-Valued Refined Neutrosophic Logic and Its Applications to Physics," *Progress in Physics* 4, 143-146, https://arxiv.org/ftp/arxiv/papers/1407/1407.1041.pdf

Corner cases of sets / probabilities / statistics / logics

Florentin Smarandache to Takaaki Fujita

In 2002, I proposed several corner cases in the fields of sets, probabilities, statistics, and logics. One such development was the introduction of a variety of neutrosophic sets, including:

- Neutrosophic intuitionistic set (different from intuitionist fuzzy set), neutrosophic paraconsistent set, neutrosophic faillibilist set, neutrosophic paradoxist set, neutrosophic pseudo-paradoxist set, neutrosophic tautological set, neutrosophic nihilist set, neutrosophic dialetheist set, neutrosophic trivialist set;
- Neutrosophic intuitionistic probability and statistics, neutrosophic paraconsistent probability and statistics, neutrosophic faillibilist probability and statistics, neutrosophic paradoxist probability and statistics, neutrosophic pseudo-paradoxist probability and statistics, neutrosophic tautological probability and statistics, neutrosophic nihilist probability and statistics, neutrosophic dialetheist probability and statistics, neutrosophic trivialist probability and statistics;
- Neutrosophic paradoxist logic (or paradoxism), neutrosophic pseudo-paradoxist logic (or neutrosophic pseudo-paradoxism), neutrosophic tautological logic (or neutrosophic tautologism).

Reference

[1] Florentin Smarandache (2002). "Definitions Derived from Neutrosophics," *Multiple-Valued Logic / An International Journal*, Vol. 8, No. 5-6, 591-604, https://arxiv.org/ftp/math/papers/0301/0301340.pdf https://fs.unm.edu/DefinitionsDerivedFromNeutrosophics.pdf

Neutrosophic Statistics and Neutrosophic Probability

Questions and Answers

William H. Woodall

Smarandache (2014) calculated the average of two neutrosophic numbers, say $a + bI$ and $c + dI$, as $(a + c)/2 + [(b + d)/2]I$. Woodall et al. (2022) pointed out that if we consider the two neutrosophic numbers [4, 6] and [2, 4] represented as $4+2I$ and $4-2I$, respectively, then using the approach of Smarandache (2014), the average of these two neutrosophic numbers would be $4 + 0I$, or simply the precise value 4. This result is not reasonable. In contrast the possible values of the average using interval arithmetic would be (3, 5).

In this paper [1], Smarandache wrote that: "In neutrosophic statistics, from the fact that the single true/correct value v is into the indeterminate set I, it does not result that v is in the neutrosophic number N = $a + bI$ as well, but it means that: $a + bv \in a + bI = N$."

Florentin Smarandache

Let's denote A = $4 + 2I$ and B = $4 - 2I$.

Therefore, if the true value $v \in I$, it does not mean that $v \in A$, but it means that $4 + 2v \in A$.

And similarly if the true/exact value $v \in I$, it does not mean that $v \in B$, but $4 - 2v \in B$.

If we average them, then:

$$\frac{[(4 + 2v) + (4 - 2v)]}{2} \in \frac{(A + B)}{2}$$

or $4 \in \frac{(A + B)}{2}$,

which is correct, yet it is useless since the true value v, which belongs to the indeterminate set I, has been cancelled out, but we do need to contain the value of v.

William H. Woodall

> Reducing indeterminacy in data values by simply using interval arithmetic is not reasonable. The underlying issue is that the neutrosophic numbers $A = a + bI$ and $B = (a+b) - bI$ are not equivalent representations of the interval $(a, a+b)$ since, for example, $A + B = 2a + b$ is not equal to $A + A = 2a + 2bI$.

Florentin Smarandache

The same confusion, see Smarandache [1]. Let the correct/true value be $v \in I$, then: $a + bv \in a + bI = A$, and similarly, from $v \in I$, one gets that: $(a + b) - bv \in (a + b) - bI = B$, whence: $[\ a + bv\ ] + [\ (a + b) - bv\ ] \in A + B$, or $2a + b \in A + B$.

In the same way: if $v \in I$, then $2a+2bv \in 2a+2bI = A + A$.

We are not interested in having $A + B = A + A$, we are interested in finding the true value v that is in I.

William H. Woodall

> "Neutrosophic Probability Distributions are standard probability distributions with the modification that parameters are represented by intervals rather than by constants as in frequentist probability theory.
> The interpretation appears to be that the true value of the parameter must fall within the corresponding interval and that all values in the interval are possible values of the parameter.

Woodall et al. (2022) pointed out that the method for generating random data from neutrosophic distributions has not been carefully explained. No probability distribution is given for the unknown parameter value within the neutrosophic interval…"

Florentin Smarandache

The neutrosophic probability distribution [2] is actually formed by three curves:

- the chance that the event x occur, denoted by t(x),
- the indeterminate-chance that the event x occur or not, denoted by i(x),
- and the chance that the event x does not occur, denoted by f(x).

Therefore one deals with a triple-probability distribution for a better representation of the reality.

Let U be the probability space. The three functions may be represented by curves: t, i, f: U → [0, 1], or by surfaces, t, i, f: U → P([0, 1]), where P([0, 1]) is the powerset of the set [0, 1].

References

[1] Florentin Smarandache (2023). "Foundation of Appurtenance and Inclusion Equations for Constructing the Operations of Neutrosophic Numbers Needed in Neutrosophic Statistics (revised)," *Prospects for Applied Mathematics and data Analysis* 3(1), 29-48, https://fs.unm.edu/NS/AppurtenanceInclusionEquations-revised.pdf

[2] F. Smarandache (2013). *Introduction to Neutrosophic Measure, Neutrosophic Integral, and Neutrosophic Probability*, Sitech, Craiova, https://fs.unm.edu/NeutrosophicMeasureIntegralProbability.pdf

Refined Neutrosophic S-approximation Spaces & S-approximation Space for the Dezert-Smarandache Theory

Florentin Smarandache
to M. Karimi, M. R. Hooshmandasl,
A. Shakiba, N. Zamani

The paper "Single-valued Neutrosophic S-Approximation Spaces", by M. Karimi, M. R. Hooshmandasl, A. Shakiba, and N. Zamani is very strong technically and well organized, while upon the best of my knowledge, it is among the few papers boarding the subject of S-approximation space into the field of neutrosophics.

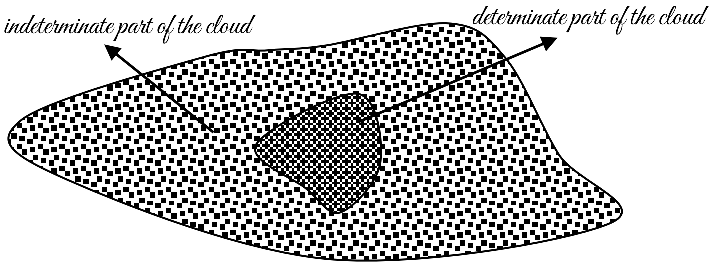
Since the S-approximation spaces were introduced as a generalization of Dempster-Shafer theory of evidence, I suggest the authors also introduce an S-approximation space for the Dezert-Smarandache Theory (DSmT) used in information fusion.[4]

And as future research of their paper would be to extend it to the single-valued Refined Neutrosophic S-approximation spaces.[5]

[4] See: https://fs.unm.edu/IntroductionToDSmT.pdf and https://fs.unm.edu/DSmT.htm.
[5] See: https://fs.unm.edu/RefinedNeutrosophicSet.pdf.

Determinate and Indeterminate Parts of a Sky Cloud

A cloud on the sky is formed by a determinate part and an indeterminate part:



It is like the neutrosophic number $N = a + bI$, where "a" is the determinate part of the number N, while "bI" is the indeterminate part of N.

We transform a real number "r" into a neutrosophic number $N = a + bI$, where a, b are real numbers and I = indeterminacy, "I" is a subset, whence N becomes a subset itself that captures "r" inside.

A simple example:

Real number r = 5, that we are not very sure about, may be a neutrosophic number of the form N_1=4.8 + 2I, with I=[0.05, 0.15], whence N_1=[4.9, 5.1] that captures/includes 5.

There are many ways to capture a real number, let's say: N_2=5.2 + 3I, where I=[-0.2, 0.2], whence N_2=[4.6, 5.8].

Or: N_3=5.2+3I, where I={-0.1, -0.2/3, 0, 1/3}, whence N_3 = {4.9, 5.0, 5.2, 6.2}.

The corresponding neutrosophic numbers depend on the applications and experts.

In a general Refined Neutrosophic Set / Logic / Probability, T can be split into subcomponents:

- $T_1, T_2, \ldots, T_p$,
- and I into $I_1, I_2, \ldots, I_r$,
- and F into $F_1, F_2, \ldots, F_s$,

where $p+r+s = n \geq 1$.

Even more: T, I, and/or F (or any of their subcomponents T_j, I_k, and/or F_l) can be countable or uncountable infinite sets.[6]

Broadest Possible Sense of Indeterminacy

Said Broumi

Lexically, what difference do you see between indeterminacy and uncertainty?

Florentin Smarandache

Obviously, they are *almost* synonymous.

But, in the neutrosophic environment, we interpret Indeterminacy in the broadest possible sense, i.e. everything which is in between the opposites T (Truth) and F (Falsehood) {denoted by 'I' in Neutrosophic Logic,

[6] See: http://fs.unm.edu/n-ValuedNeutrosophicLogic-PiP.pdf.

Neutrosophic Set, Neutrosophic Probability} ; or respectively everything which is in between the opposites <A> and <antiA> {denoted by <neutA> in Neutrosophy}, where <A> is an item, idea, concept etc. such that the neutrosophic triplet : (<A>, <neutA>, <antiA>) makes sense.

Even more, Indeterminacy ("I" or <neutA>) can be split/refined (within the Refined Neutrosophic environment) into: Uncertainty (T\/F, or respectively <A>\/<antiA>), Contradiction (T/\F, or respectively <A>/\<antiA>), Unknown, Incompleteness, etc.

Neutrosophic Satisfiability & Neutrosophic Randomness

Florentin Smarandache to Said Broumi

1. A *Boolean Formula* (or *Expression*) F_B is constructed from Boolean variables $(x_1, x_2, \ldots, x_n)$, with $n \geq 1$, parentheses, and Boolean operators {*AND* (conjunction) ∧ , *OR* (disjunction) ∨, *NOT* (negation) ¬}. The Boolean formula is well-defined, i.e. it makes sense in the Boolean algebra. We denote it by $F_B(x_1, x_2, \ldots, x_n)$.

Each variable may take the Boolean values: *0* (*False*), or *1* (*True*).

The *Boolean Formula* F_B is said to be *satisfiable*, if $F_B(x_1, x_2, \ldots, x_n) = 1$ for some values *0* or *1* assigned to each of its n variables.

Otherwise it is called *unsatisfiable*, i.e. when $F_B(x_1, x_2, ..., x_n) = 0$ for all 2^n possible assignments of values *0* or *1* to its variables.

The Boolean satisfiability problem (SAT) is used in artificial intelligence.

2. The *Degree of Boolean Randomness*, considered as the degree/measure of uncertainty in a random process (where the order of events is unpredictable), is:

$$\frac{2^n - m}{2^n}$$

where 2^n represents all possible values of the *n*-tuple $(x_1, x_2, ..., x_n)$, when each variable x_j may take the value *0* or *1*, and *m* is the number of solutions (of *n*-tuples) of the equation $F_B(x_1, x_2, ..., x_n) = 1$.

3. A *Single-Valued Neutrosophic Formula* (or *Expression*) F_N is constructed from Neutrosophic Variables $(x_1(t_1, i_1, f_1), x_2(t_2, i_2, f_2), ..., x_n(t_n, i_n, f_n))$, with $n \geq 1$, parentheses, and Neutrosophic Operators {AND_N (neutrosophic conjunction) $\wedge_N$, OR_N (neutrosophic disjunction) $\vee_N$, NOT_N (neutrosophic negation) $\neg_N$}.

The neutrosophic formula is considered well-defined, i.e. it makes sense in the neutrosophic environment.

We denote it by $F_N(x_1(t_1, i_1, f_1), x_2(t_2, i_2, f_2), ..., x_n(t_n, i_n, f_n))$.

Each variable x_k, $1 \leq k \leq n$, may take the neutrosophic values: $t_k, i_k, f_k \in [0, 1]$.

Let's consider a *neutrosophic tautological threshold* $\tau(t_\tau, i_\tau, f_\tau)$; then each neutrosophic proposition P whose neutrosophic truth value is equal to or above/greater than the neutrosophic truth value of this neutrosophic tautological threshold should be considered a **neutrosophic tautology**; while if it is below it should be a *neutrosophic non-tautology*; in addition there are neutrosophic propositions whose neutrosophic truth value is neither above nor below the neutrosophic tautological threshold; they are called *neutrosophically undecided propositions* [1].

How to establish such threshold? Of course, this should be handled by experts upon the application or problem they need to solve.

The neutrosophic inequality $\leq_N$ is defined as:

$$(t_1, i_1, f_1) \leq_N (t_2, i_2, f_2) \text{ iff } t_1 \leq t_2, i_1 \geq i_2, f_1 \geq f_2,$$

where $t_1, i_1, f_1, t_2, i_2, f_2 \in [0, 1]$, and $>, \geq, <, \leq$ are classical inequalities.

Then, a *Neutrosophic Formula* F_N is said to be *satisfiable,* if $F_B(x_1, x_2, \ldots, x_n) \geq_N \tau(t_\tau, i_\tau, f_\tau)$, for some values between $[0, 1]$ assigned to all t_k, i_k, f_k neutrosophic components of its n variables.

It is called *unsatisfiable*, i.e. when $F_B(x_1, x_2, \ldots, x_n) \leq_N \tau(t_\tau, i_\tau, f_\tau)$, for all possible assignments of values between $[0, 1]$ to its variables' neutrosophic components.

Or it is called *undecidable* [neither satisfiable nor unsatisfiable], if $F_B(x_1, x_2, \ldots, x_n)$ is neither $\leq_N \tau(t_\tau, i_\tau, f_\tau)$ nor $>_N \tau(t_\tau, i_\tau, f_\tau)$.

Open Question.

- How the calculate the *Degree of Neutrosophic Randomness*, considered as the neutrosophic degree/measure of uncertainty in a neutrosophic random process (where the order of events is unpredictable)?
- A neutrosophic random process is based on the process of many neutrosophic random variables, which are variables whose outputs contain indeterminacy.

Reference

[1] F. Smarandache (2017). *Neutrosophic Perspectives: Triplets, Duplets, Multisets, Hybrid Operators, Modal Logic, Hedge Algebras. And Applications*. Pons Editions, Bruxelles, 176-179; http://fs.unm.edu/NeutrosophicPerspectives-ed2.pdf

Neutrosophic Triplet HyperTopology

Florentin Smarandache to Saeid Jafari

A new evolution, from Neutrosophic Triplet Structures to Neutrosophic Triplet HyperStructures [1]. Therefore, a Neutrosophic Triplet Hypertopology may be defined.

Reference

[1] Xiaohong Zhang, Florentin Smarandache, and Yingcang Ma, "Symmetry in Hyperstructure: Neutrosophic Extended Triplet Semihypergroups and Regular Hypergroups," *Symmetry* 2019, 11, 1217; doi:10.3390/sym11101217

n-ary Neutrosophic Triplet of Weaker Type

Florentin Smarandache

An n-ary Neutrosophic Triplet of Weaker Type on M is defined in the following way.

Let an element x ∈ M. If there exist some element e ∈ M such that

$$\circ_n(x, \underbrace{e, \ldots, e}_{n-1}) = \circ_n(\underbrace{e, \ldots, e}_{n-1}, x) = x$$

then it is considered the neutral element of x and it is denoted as $e \equiv neut_n(x)$.

$$\circ_n(x, \underbrace{x^{-1}, \ldots, x^{-1}}_{n-1}) = \circ_n(\underbrace{x^{-1}, \ldots, x^{-1}}_{n-1}, x) = e$$

Further, if there exist some element x^{-1} ∈ M, such that Then it is considered the inverse element of x and it is denoted as $x^{-1} \equiv anti_n(x)$.

Therefore, $(x, neut_n(x), anti_n(x))$ is called an n-ary neutrosophic triplet.

Remark

For an element x, there may exist more n-ary neutrals $neut_n(x)$'s and more n-ary inverses $anti_n(x)$.

Definition of n-ary (strong) Neutrosophic Triplet Set

An *n-ary (strong) Neutrosophic Triplet Set*, is a set M such that for any x ∈ M there exist at least one $neut_n(x)$ ∈ M and one $anti_n(x)$ ∈ M.

Definition of n-ary (weak) Neutrosophic Triplet Set

An *n-ary (weak) Neutrosophic Triplet Set*, is a set M such that for any x ∈ M there exist at least one n-ary neutrosophic triplet (y, $neut_n(y)$, $anti_n(y)$) in M, such that x = y, or x = $neut_n(y)$, or x = $anti_n(y)$.

Definition of n-ary (strong) Neutrosophic Triplet Group

An *n-ary (strong) Neutrosophic Triplet Group* is an n-ary (strong) Neutrosophic Triplet Set whose n-ary law $\circ_n$ is associative.

Definition of n-ary (weak) Neutrosophic Triplet Group

An *n-ary (weak) Neutrosophic Triplet Group* is an n-ary (weak) Neutrosophic Triplet Set whose n-ary law $\circ_n$ is associative.

Concepto <A> con muchos opositos y muchos neutralidades

Florentin Smarandache a Ronald Pinho

Por un concepto <A>, con respeto a un atributo α_1 que lo caracteriza, hay un oposito <antiA$_1$>, y la neutralidad <neutA$_1$> entre los opositos.

Pero, por <A>, con respeto a un otro atributo α_2 que lo caracteriza, hay un otro oposito <antiA$_2$>, y una otra neutralidad <neutA$_2$> entre los opositos.

Etcétera.

En conclusion, por un concepto <A>, hay muchos opositos { <antiA$_1$>, <antiA$_2$>, ... } y muchas neutralidades { <neutA$_1$>, <neutA$_2$>, ... }.

Esta es la realidad.

Expert Systems vs. Neutrosophic Implications

Florentin Smarandache to Robert Neil Boyd

> “Expert Systems (ES) are not necessarily based on exact rules but are often based on non-evaluated assumptions, and hence answers are produced as statistically fuzzy conclusions.”
>
> [from ResearchGate.net]

Expert Systems are similar to fuzzy / intuitionistic fuzzy / and neutrosophic If-THEN rules, i.e.: "If A then B" or "A → B", where A and B are fuzzy / intuitionistic fuzzy / neutrosophic propositions, but using the fuzzy / intuitionistic fuzzy / or neutrosophic implications.

These rules/implications are approximations, of course, since their premises are approximations too (i.e. not 100% true as in classical logic).

I extended Luckasiewicz’ four-valued logic named VL4 to n-valued refined neutrosophic logic, symbolically and numerically.[7]

Grey System Theory as a Neutrosophication

Florentin Smarandache

A Grey System is referring to a *grey area* (as <neutA> in neutrosophy), between extremes (as <A> and <antiA> in neutrosophy). According to the Grey System Theory,

[7] See this article: http://fs.unm.edu/n-ValuedNeutrosophicLogic-PiP.pdf.

a system with perfect information (<A>) may have a unique solution, while a system with no information (<antiA>) has no solution. In the middle (<neutA>), or grey area, of these opposite systems, there may be many available solutions (with partial information known and partial information unknown) from which an approximate solution can be extracted.

Reference

J. L. Deng (1989). "Introduction to Grey System Theory," *The Journal of Grey System*, 1(1): 1-2.

Neutrosophic Physics Laws

Florentin Smarandache to Victor Christianto

Now you see the real applications of neutrosophic statistics, probability, logic in classical physics!

Not only Hubble's Law is not linear, but many classical Physics Laws may be represented by Neutrosophic Physics Laws, i.e. their equations have neutrosophic constants, neutrosophic coefficients, neutrosophic derivatives...

Instead of crisp number we have neutrosophic numbers, and instead of simple curves we have thick curves...

Check that in the future! Interpret many classical physical laws and equations from a neutrosophic point of view, i.e. including indeterminacy and approximations into the variables and coefficients involved into classical physical laws and equations, since our world is imperfect, not idealistic as modelled by the classical physics.

And tell me how you do about "Neutrosophic Graph Processor"!

Decision Making on Complex Neutrosophic Set

A dialogue between Le Hoang Son, Florentin Smarandache, Luu Quoc Dat, Mumtaz Ali

(e-mails exchanges reimagined as a scene in a virtual room)

Le Hoang Son

As you know, Mumtaz and I have been discussing our joint paper, "Decision Making on Complex Neutrosophic Set," and its potential application to green supplier selection.

Mumtaz Ali

Yes, Son and I have outlined a structure we believe is comprehensive, covering complex neutrosophic logic, systems, aggregation operations, relations, and a decision-making model, culminating in an experiment on green supplier selection.

Florentin Smarandache

Excellent! Thank you, Dr. Son and Mumtaz. I agree that the structure looks promising.

I have one key suggestion regarding the definition of the complex neutrosophic set. I propose we extend it to its most general form, similar to what I did with the neutrosophic set years ago.

Luu Quoc Dat

Could you elaborate on that, Professor Smarandache?

Florentin Smarandache

Certainly. Instead of limiting the real and imaginary parts of T, I, and F to crisp numbers or interval values, let's consider them as standard or non-standard subsets of the unitary non-standard interval]-0, 1+[.

This encompasses the previous definitions as special cases: Crisp Complex Neutrosophic Sets, Interval Complex Neutrosophic Sets, and now we add Subset Complex Neutrosophic Sets.

This provides a more robust and flexible framework.

Le Hoang Son

I understand. This broader definition allows for greater expressiveness and can be specialized for practical applications where we might use standard subsets of [0, 1].

Mumtaz Ali

That makes sense. It provides a nice hierarchy of complex neutrosophic sets.

Florentin Smarandache

Precisely. Now, concerning the Complex Neutrosophic Logic, I suggest we explore existing work on Complex Fuzzy Logic, if any, for inspiration and analogies. If anyone has relevant articles, please share them.

Luu Quoc Dat

I can look into that, Professor. I might have some resources on complex fuzzy logic.

Florentin Smarandache

Excellent, Dr. Dat. Now, on a separate note, Dr. Quoc and Dr. Son, Mumtaz and I would like to invite both of you to join the editorial board of our *Neutrosophic Sets and Systems* journal. Your expertise would be invaluable.

Luu Quoc Dat

That's a great honor, Professor. Thank you for the invitation. I'd be delighted to join.

Le Hoang Son

I'm also very grateful for the offer. I would be honored to serve on the editorial board.

Florentin Smarandache

Wonderful! Please let me know the correct affiliations to list for you. Also, for the *Encyclopedia of Neutrosophic Researchers*, I'll need your CVs, photos, and a list of your neutrosophic publications.

Le Hoang Son

We'll send those to you as soon as possible.

Mumtaz Ali

Regarding the paper itself, I can begin working on Sections 1 and 2, the introduction and the complex neutrosophic logic and systems.

Le Hoang Son

Professor Smarandache and I can collaborate on Section 3, the aggregation operators and neutrosophic relations.

Luu Quoc Dat

I'll focus on Sections 4 and 5, the decision-making model and the green supplier experiment.

Le Hoang Son

And I'll wrap things up with the conclusion in Section 6. Does this division of labor and the overall structure sound agreeable to everyone?

Florentin Smarandache

Excellent! This is a promising collaboration. I look forward to seeing the final paper. Let's aim to have a draft by June.

Mumtaz Ali

We'll keep you updated on our progress. Thank you all for a productive meeting.

Neutrosophic Quaternions

Florentin Smarandache

I have extended the Classical Quaternions to Neutrosophic Quaternions, that have the form:

$$(a_1+a_2I) + (b_1 + b_2I)i + (c_1 + c_2I)j + (d_1 + d_2I)k,$$

with a_1, a_2, b_1, b_2, c_1, c_2, d_1, d_2 real numbers, and I = indeterminacy (which can be any real subset), where i, j, k have the same properties as in classical quaternions.

But $A = a_1 + a_2I$ is a neutrosophic number, where a_1 is the determinate part of A, while a_2I is the indeterminate part of A.

For example: A = 3 + 2I, where I = [0.1, 0.2], so we get [3.2, 3.4].

Similarly for:

- $B = b_1 + b_2I$,
- $C = c_1 + c_2I$,
- and $D = d_1 + d_2I$.

$i^2 = j^2 = k^2 = ijk = -1$

$ij = -ji$

$ij = k$

And I want to see how to use them in physical law and equations. Instead of extending to quaternions, let's extend to neutrosophic quaternion some physical laws and equations.

Quaternion multiplication				
×	**1**	***i***	***j***	***k***
1	1	i	j	k
i	i	−1	k	$-j$
j	j	$-k$	−1	i
k	k	j	$-i$	−1

Many physical constants and even physical laws are not accurate, but varying/approximations, so we can called the neutrosophic physical constants and respectively neutrosophic physical laws.

I think we can develop algebraic structures on them as well.

Neutrosophic Random Variable

Florentin Smarandache to Rafif Alhabib

In general, a neutrosophic random variable is a random variable that incorporates *indeterminacy*, which can be present either in its argument, its values, or both. Unlike classical random variables that operate under strict probabilistic laws, neutrosophic random variables extend probability theory by allowing *degrees of uncertainty, vagueness, and incompleteness*. For a deeper exploration of neutrosophic probability, measure, and statistics, refer to the books I cite.[8, 9]

[8] See: http://fs.unm.edu/NeutrosophicMeasureIntegralProbability.pdf.

[9] See: http://fs.unm.edu/NeutrosophicStatistics.pdf.

Key Features of Neutrosophic Random Variables

Indeterminacy in Outcomes

The value of the random variable may not be entirely known or may exist within a range of possibilities rather than a single definite state.

Indeterminate Probability Distributions

Instead of crisp probability values, probabilities may be expressed as intervals, fuzzy numbers, or a neutrosophic triplet (T, I, F) where:

- T (Truth component): Represents the degree of certainty or likelihood of an event.
- I (Indeterminacy component): Accounts for the uncertainty, vagueness, or incomplete knowledge about the event.
- F (Falsehood component): Captures the degree to which the event is unlikely to occur.

Applicable in Uncertain and Complex Systems

Neutrosophic random variables are useful in real-world scenarios where data may be incomplete, conflicting, or imprecise—such as in artificial intelligence, decision-making, quantum mechanics, and risk analysis.

Examples of Neutrosophic Random Variables

Medical Diagnosis & AI

Suppose an AI-based medical system predicts whether a patient has a disease based on symptoms. A classical probability model may assign P(Disease) = 0.7.

However, due to incomplete medical records or uncertain test results, a neutrosophic random variable would provide:

- T = 0.7 (probability of having the disease)
- I = 0.2 (uncertainty due to missing information)
- F = 0.1 (probability of not having the disease)

This better reflects real-world uncertainty than a classical probability model.

Stock Market Predictions

In financial markets, investors often deal with uncertain or fluctuating data. A classical model may predict a stock's price increase with P(up) = 0.6.

However, news events, economic uncertainty, and insider trading introduce indeterminacy. A neutrosophic model may express this as:

- T = 0.6 (expected increase in price)
- I = 0.3 (uncertainty due to unpredictable factors like global events)
- F = 0.1 (probability of price decrease despite expectations)

Quantum Mechanics & Particle Behavior

Quantum mechanics inherently involves uncertainty and superposition. A quantum particle may have a position x that is not fully deterministic.

Instead of using a single probability function, a neutrosophic quantum model might describe its location as:

- T = 0.5 (particle is in expected position x)

- I = 0.4 (uncertainty due to quantum superposition effects)
- F = 0.1 (particle is elsewhere due to external disturbances).

Applications of Neutrosophic Random Variables

- *Artificial Intelligence & Machine Learning*: Improving AI models by incorporating uncertainty and incomplete knowledge.
- *Decision-Making Under Uncertainty*: Used in politics, economics, and risk management where data is often contradictory or incomplete.
- *Cybersecurity & Fraud Detection*: Helps detect anomalies by analyzing uncertain patterns in online activity.
- *Medical Research & Epidemiology*: Predicting disease outbreaks, drug efficiency, and pandemic trends in the presence of incomplete data.
- *Space Exploration & Astrophysics*: Modeling uncertainty in planetary motion, asteroid paths, and cosmic phenomena.

Complex Neutrosophic Similarity Measures in Medical Diagnosis

A dialogue between Kalyan Mondal, Mumtaz Ali, Surapati Pramanik, Florentin Smarandache,

(e-mails exchanges reimagined as a scene in a virtual room)

Kalyan Mondal

I'm glad we're all here to discuss our paper on complex neutrosophic similarity measures for medical diagnosis.

Mumtaz Ali

Yes, Kalyan. I think we've developed a foundation for handling uncertainty and periodicity in medical data. The complex neutrosophic set seems particularly well-suited for this.

Surapati Pramanik

Absolutely, Mumtaz. The inclusion of phase terms, representing the periodic aspect, alongside the amplitude terms, which capture the degree of membership, indeterminacy, and falsity, is crucial for capturing the nuances in medical data.

Florentin Smarandache

Indeed. The complex neutrosophic set's ability to handle both uncertainty and periodicity simultaneously is its strength. It's a natural extension of the neutrosophic set.

Kalyan Mondal

We've taken the next step by defining complex cosine, Dice, and Jaccard similarity measures for these sets. These measures provide a way to quantify the resemblance between different complex neutrosophic sets, which is essential for diagnosis.

Mumtaz Ali

The example we used, though simplified, demonstrates the potential of this approach. Imagine being able to compare a patient's complex neutrosophic representation of their symptoms with known disease profiles.

Surapati Pramanik

The cosine similarity measure, with its focus on the angle between vectors, seems particularly apt for capturing the overall similarity in the complex plane. While the Dice and Jaccard measures, focusing on set overlap, offer complementary perspectives.

Florentin Smarandache

It's important to remember the historical progression here. From fuzzy sets to intuitionistic fuzzy sets, then incorporating complex numbers to handle periodicity, and finally integrating neutrosophy to address indeterminacy.

Kalyan Mondal

Precisely, Professor. As we mentioned in the introduction, the limitations of fuzzy sets in handling situations where the sum of membership and non-membership wasn't one led to the development of intuitionistic fuzzy sets.

Mumtaz Ali

And then the concept of indeterminacy, introduced by you, Professor Smarandache, filled a critical gap, leading to the neutrosophic set.

Surapati Pramanik

Ramot et al.'s work on complex fuzzy sets paved the way for incorporating the phase component, which Alkouri and Salleh extended to complex intuitionistic fuzzy sets. Our work builds upon all of these advancements.

Florentin Smarandache

It's a testament to the power of collaborative research. Each of us has brought our expertise to the table, and together, we've developed something that has the potential to make a difference in medical diagnosis.

Kalyan Mondal

I'm excited to see how these similarity measures are applied in future research, perhaps with larger datasets and more complex medical scenarios.

Mumtaz Ali

Perhaps we can also explore other types of complex neutrosophic similarity measures and compare their performance?

Surapati Pramanik

We should definitely investigate how to efficiently compute these measures for large datasets.

Florentin Smarandache

These are all excellent points. This paper is just the beginning. Thank you all for your contributions.

Neutrosophic Quantum Computer

Dan Florin Lazăr

> I read your paper[10] that proposes a theoretical framework for a future "Neutrosophic Quantum Computer," extending the concept of classical quantum computers by incorporating indeterminacy. You argue there that while classical quantum computers use coherent superpositions of two states (0 and 1), a neutrosophic quantum computer would utilize superpositions of three states: 0, 1, and I (indeterminacy).

Florentin Smarandache

The paper also explores several related concepts. "Neutrosophic polarization" describes the orientation of a photon's oscillation, which can be 0, 1, or I. This can be refined further, such as distinguishing between different types of indeterminacy (I_1, I_2, etc.) or different speeds of oscillation (0_1, 0_2, etc.). A "neutrosophic particle" is one with indeterminacy in at least one attribute. "Entangled neutrosophic particles" share the same indeterminacy. "Neutrosophic data" is data containing indeterminacy.

The core idea is "neutrosophic superposition," which includes not only superpositions of 0 and 1 (as in qubits) but also superpositions involving I, leading to the

[10] Florentin Smarandache (2016). "Neutrosophic Quantum Computer," *Intern. J. Fuzzy Mathematical Archive*, Vol. 10, No. 2, 2320 –2350.

concept of a "neutrobit." A neutrobit can exist simultaneously as 0 and I, 1 and I, or 0, 1, and I, with associated neutrosophic probabilities (t, i, f). This leads to the idea of a "refined neutrosophic quantum computer," an "n-neutrobit quantum computer," and "neutrosophic quantum gates."

The paper discusses the challenges of reversibility in a neutrosophic quantum computer due to the presence of indeterminacy. It suggests that classical dynamical systems are inherently neutrosophic due to their interaction with the environment.

I also introduced a "Neutrosophic Turing Machine" and a "Neutrosophic Church-Turing Principle." The human brain is presented as an example of a neutrosophic quantum computer due to its handling of incomplete and conflicting information.

Finally, the paper explores a "neutrosophic quantum dot" where a laser pulse of imprecise duration can place an electron in an indeterminate state (I), leading to refined indeterminacy values within the open interval (0, 1). Neutrosophic logic functions (NOT, AND, OR, IF-THEN) are defined, and the concept of "neutrosophic quantum liquids" is introduced, drawing an analogy to quantum computing liquids but with the added dimension of indeterminacy.

The paper concludes by emphasizing the theoretical nature of the proposed concepts and suggesting future research directions, including the possibility of a "Neutrosophic Quantum Biocomputer".

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F. Smarandache, *n-Valued Refined Neutrosophic Logic and Its Applications in Physics*, Progress in Physics, 4 (2013) 143-146. http://fs.gallup.unm.edu/n-ValuedNeutrosophicLogic-PiP.pdf

F. Smarandache, *Symbolic Neutrosophic Logic*, Europa Nova, Bruxelles, 194 p., 2015; in UNM website: http://fs.gallup.unm.edu/SymbolicNeutrosophicTheory.pdf

Expanding Neutrosophic Theory Beyond the [0,1] Interval

Letter to Researchers - Call for Contributions (July 2016)

Florentin Smarandache

Dear Neutrosophic Researchers,

I'm writing to you today with an exciting opportunity to contribute to a second collective book exploring the frontiers of neutrosophic overset, underset, and offset theory, along with their related logics, probabilities, and statistics. These concepts challenge the long-held assumption that membership degrees must always fall within the [0, 1] interval.

For some time, I've been developing these ideas, presenting them at numerous international conferences and seminars (listed at the end of the attached book). The positive reception I've received has encouraged me to share these concepts with the broader neutrosophic community. While I've briefly discussed these with a few colleagues, I now want to open the discussion to all 550 researchers in my database.

The core concept is this: traditional set theory, as well as fuzzy and intuitionistic fuzzy sets, confine membership degrees to the [0, 1] range. However, real-world examples suggest this is a limitation. Consider the case of employee productivity. If full-time work earns a membership of 1, an employee working overtime deserves a value *greater* than 1, reflecting their increased contribution.

Conversely, an employee causing damage to the company warrants a membership *less* than 0, indicating a negative contribution. These "oversets" (membership > 1) and "undersets" (membership < 0), and their combination as "offsets," are not merely theoretical constructs.

They represent real-world scenarios in various organizations. Similar logic applies to other areas like intelligence gathering, where a double agent actively harming their own side would have a negative "membership" within their agency.

I've attached two papers and a small book that delve into these concepts. If you're pressed for time, the papers offer a concise overview.

These resources explain how neutrosophic sets, logic, measure, probability, and statistics can be extended to accommodate over, under, and offset values. While I've adapted some basic operators (like min/max), there's ample room for exploring new operators and developing further applications.

This is a relatively new area of research, and your contributions – particularly new examples and practical applications – would be invaluable. We plan to compile these into a collective book and publish selected works in *Neutrosophic Sets and Systems*.

These concepts, initially introduced in 2007, expand neutrosophic theory to encompass situations where some neutrosophic components exceed 1 (overset), fall below 0 (underset), or both (offset).

This extension applies not only to sets but also to logic, measure, probability, and statistics.

I look forward to hearing your thoughts and potentially collaborating on this project.

Links to the relevant resources are provided in a note.[11]

Completeness or Incompleteness in Neutrosophy

Florentin Smarandache to Said Broumi

I have defined from the beginning that $t + i + f = 3$ if the information is complete, but $t + i + f < 3$ if the information is incomplete.

In general I wrote $t + i + f \leq 3$ (depending on the completeness or incompleteness of the information provided by sources)

Dependence and Independence of Sources providing Information

Florentin Smarandache to Said Broumi

See this paper on dependence and independence of neutrosophic components.[12]

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[11] http://fs.gallup.unm.edu/SVNeutrosophicOverset-JMI.pdf
http://fs.gallup.unm.edu/IV-Neutrosophic-Overset-Underset-Offset.pdf
http://fs.gallup.unm.edu/NeutrosophicOversetUndersetOffset.pdf

[12] See the article *Degree of Dependence and Independence of the (Sub)Components of Fuzzy Set and Neutrosophic Set*, by F. Smarandache, Neutrosophic Sets and Systems, Vol. 11, 95-97, 2016; http://fs.unm.edu/NSS/DegreeOfDependenceAndIndependence.pdf

1) We have independence when we judge a Proposition/Event with respect to a parameter, then we respect to another parameter completely independent of the previous parameter.

For example: let's say there will be a soccer game between India and China.

First parameter P_1: History of India-China games. Suppose according to the statistics of the games between India and China, India won most of the time. Therefore, we may approximate/guess that T = 07 (70% that India win).

Second parameter P_2: Playing home or not. The game will be plaid in China, where China has a bigger chance to win. Hence, we may say F = 0.6 (60% that China win).

2) We may have independence when there are multiple independent sources (that do not communicate with each other), that may be subjective and give information on T, I, F neutrosophic components separately.

The same game: India - China.

Somebody, Raj from India, being patriot, will say that China will win. Someone from China, Young, being patriot for his country, may say that China will win. A third neutral person may say that it is a big chance that the game will be tied.

Division of Quadruple Neutrosophic Numbers

Florentin Smarandache to Zhang Wenpeng

We can define the division of Quadruple Neutrosophic Numbers, but it does not work all the time. I though that we might extend to quadruple neutrosophic field:

$$(a_1+b_1T+c_1I+d_1F)/(a_2+b_2T+c_2I+d_2F) = x+yT+zI+wF,$$

whence:

$$a_1+b_1T+c_1I+d_1F = \text{(identical with)}$$

$$(a_2+b_2T+c_2I+d_2F)(\ x+yT+zI+wF\ )$$

We normally multiply, and then we solve for x, y, z, w and we get an algebraic nonlinear of four equations with four unknowns x, y, x, w. There are some exceptions when the division does not work, i.e. $a_2 = 0$, etc.

Example of Bipolar Neutrosophic Set

Florentin Smarandache to Ludi Jancy Jenifer

See an example for single-valued Bipolar Neutrosophic Set, whose neutrosophic components have the form $(T^+, T^-; I^+, I^-, F^+, F^-)$, which $T^+, I^+, F^+ \in [0, 1]$, and $T^-, I_-, F^- \in [-1, 0]$, where $0 \leq (T^+) + (I^+) + (F^+) \leq 3$, and $-3 \leq (T^-) + (I^-) + (F^-) \leq 0$.

At a company each employee has to work 40 hours a week and produce pieces of good quality.

John works only 35 hours this week (so his positive membership $T^+ = 36/40 = +0.90$), but unfortunately his work is of low quality and below the required standard (so his negative membership T^- is estimated by his supervisor to be $T^- = -0.30$).

John does not work 4 hours this week, therefore his positive nonmembership (what's left from the positive membership) $F^+ = 4/40 = +0.10$; and in addition for not working unfortunately he comes to the company and accidentally destroys some machinery, that his supervisor estimate as negative nonmembership $F^- = -0.20$.

The supervisor is not sure, but he believes that John may have worked 2 hours extra-time in the weekend, therefore John's positive indeterminacy is $I^+ = 2/40 = +0.05$ but again of the same low quality work, that is estimated as negative indeterminacy: $I^- = -0.01$.

Whence, John's single-valued bipolar neutrosophic membership to his company is:

John(+0.90, -0.30; +0.05, -0.01; +0.10, -0.20).

Reference

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Plithogenic Set in Combination with other Set-Types

Florentin Smarandache

Definition of Plithogenic Set

A **plithogenic set** P is a set such that each of its elements is characterized by many attribute-values. Almost all sets in our everyday life are plithogenic sets, because each element into a set is characterized by some attribute-values.

> The (P, a, V, d, c) is called a plithogenic set, where:
> "P" is a non-empty set included into a given universe of discourse U;
> "a" is a (multi-dimensional in general) attribute;
> "V" is the range of the attribute's values;
> "$d(x, v)$", where $x \in U$ and $v \in V$, is the function that represents the degree of appurtenance of the element x, with respect to its attribute-value v, to the set P; and $d(x, v)$ may be of any type (see below);
> "$c(v_k, v_D)$", where v_k is an attribute-value and v_D is the dominant (most important) attribute-value, is the function that represents the degree of contradiction (or dissimilarity) between an attribute-value and the dominant attribute-value.

The functions $(\cdot,\cdot)$ and $c(\cdot,\cdot)$ are defined by experts in accordance with the applications they need to solve. One uses the notation: $(d(x, V))$, where

$$(x, V) = \{d(x, v), \text{ for all } v \in V\}, \forall x \in P\}.$$

The contradiction (dissimilarity) degree was defined in order to obtain a better accuracy for the plithogenic aggregation operators. The plithogenic aggregation operators (intersection, union, complement, inclusion, equality) are based on contradiction degrees between attribute-values; the first two are linear combinations of the fuzzy t-norm and fuzzy t-conorm operators.

The **degree of appurtenance *d(x, v)***, of the element *x*, with respect to its attribute-value *v*, to the plithogenic set *P*, may be of any type: Crisp {*0* or *1*}, Fuzzy, Intuitionistic Fuzzy, Inconsistent Intuitionistic Fuzzy (Picture Fuzzy, Ternary Fuzzy), Pythagorean Fuzzy (Atanassov's Intuitionistic Fuzzy Set of second type), Spherical Fuzzy, n-HyperSpherical Fuzzy, n-HyperSpherical Neutrosophic, q-Rung Orthopair Fuzzy, Neutrosophic, Refined Fuzzy, Refined Intuitionistic Fuzzy Set, Refined Inconsistent Intuitionistic Fuzzy, {Refined Picture Fuzzy), Refined Ternary Fuzzy}, Refined Pythagorean Fuzzy {Refined Atanassov's Intuitionistic Fuzzy of type 2}, Refined Spherical Fuzzy, Refined n-HyperSpherical Fuzzy, Refined q-Rung Orthopair Fuzzy, Refined Neutrosophic, etc.

Similarly, the **degree of contradiction (or dissimilarity)** $c(v_k, v_D)$ between an attribute-value and the dominant attribute-value can be of any type: crisp, fuzzy, etc. as above.

Remark

In my previous publications [1 – 8], I have considered as degree of appurtenance *d(x, y)* and degree of contradiction (dissimilarity) $c(v_k, v_D)$ only the degrees of the types: crisp, fuzzy, intuitionoistic fuzzy, and neutrosophic.
But now, I extend them to more types of degrees of appurtenance and degrees of contradiction (dissimilarity) as above.

Open Research

In the previous plithogenic publications [1-8], only the <u>fuzzy</u> contradiction (dissimilarity) degree function between an attribute-value and its dominant attribute-value has been considered, or 1D (one dimensional) function:

$$c : V \times V \to [0,1],$$

whence the plithogenic operators were linear combinations of fuzzy t-norm and fuzzy t-conorm.

But for other types of contradiction (dissimilarity) degree functions, such as <u>intuitionistic fuzzy, neutrosophic, refined fuzzy and refined neutrosophic types, etc.</u> one has:

$$c_k : V \times V \to [0,1]^k,$$

where k=2 (for intuitionistic fuzzy), 3 (for neutrosophic), and in general $n \geq 2$ (for n-valued refined fuzzy and refined neutrosophic), building the *k-D* (*k*-dimensional) plithogenic operators has not yet been studied and applied. One hint may be to construct *bi-linear, tri-linear, …,* or *n-linear* respectively plithogenic operators.

The readers are welcome to try building such *n-ary* plithogenic operators.

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Plithogenic Set

Florentin Smarandache to Peide Liu

See an extension of neutrosophic set to plithogenic set Plithogenic set is a set P whose elements x are characterized by many attribute values $v_1, v_2, \ldots, v_n$, and the generic element x belongs to the set P with respect to each attribute value with a fuzzy / intuitionistic fuzzy / or neutrosophic degree:

Plithogenic Fuzzy Set

$x(v_1(t_1), v_2(t_2), \ldots, v_n(t_n))$

Plithogenic Intuitionistic Fuzzy Set

$x(v_1(t_1, f_1), v_2(t_2, f_2), \ldots, v_n(t_n, f_n))$, with $0 \leq t_j + f_j \leq 1$, for all $j \in \{1, 2, \ldots, n\}$.

Plithogenic Picture Fuzzy Set

$x(v_1(t_1, e_1, f_1), v_2(t_2, e_2, f_2), \ldots, v_n(t_n, e_n, f_n))$, with $0 \leq t_j + e_j + f_j \leq 1$, for all $j \in \{1, 2, \ldots, n\}$.

Plithogenic Neutrosophic Set

$x(v_1(t_1, i_1, f_1), v_2(t_2, i_2, f_2), \ldots, v_n(t_n, i_n, f_n))$, with $0 \leq t_j + i_j + f_j \leq 3$, for all $j \in \{1, 2, \ldots, n\}$.

where $t_j, i_j, f_j \in [0, 1]$ are degrees of membership, indeterminacy, and nonmembership respectively.

Plithogenic Set is much used in Multi-Criteria Decision Making.

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Plithogenic Graph

Florentin Smarandache to Said Broumi

We can define and study the plithogenic graph, never studied before, as a graph whose vertices are elements of a plithogenic set, while the graph's edges may be: crisp, fuzzy, intuitionistic fuzzy, neutrosophic, or plithogenic relationships between vertices.

For example, a vertex A of the plithogenic graph may be characterized by many attribute values; for example, the attribute "color" and its attribute values: white, blue, violet, green, black; we write:

$A(d(\text{white}), d(\text{blue}), d(\text{violet}), d(\text{green}), d(\text{black}))$,

where $d(\text{white})$ means degree of white, etc.

Download this article:

F. Smarandache (2018). „Plithogenic Set, an Extension of Crisp, Fuzzy, Intuitionistic Fuzzy, and Neutrosophic Sets – Revisited," *Neutrosophic Sets and Systems*, 21, 153-166; http://fs.unm.edu/NSS/PlithogenicSetAnExtensionOfCrisp.pdf

NeutroAlgebra, NeutroOperations and NeutroAxioms

Florentin Smarandache to Said Broumi

The introduction of NeutroAlgebra represents a significant extension of classical algebraic structures, offering a robust framework for handling uncertainty, partiality, and indeterminacy in various applications.

- **Neutrosophic tri-sectioning** allows us to classify functions, operations, axioms, and algebraic structures into **affirmative, opposite, and indeterminate** components.
- **NeutroAlgebra generalizes Partial Algebra**, incorporating both **NeutroOperations** and **NeutroAxioms** to model a wider range of mathematical behaviors.
- Indeterminate functions and operations provide a powerful tool for artificial intelligence, decision-making, quantum mechanics, and fuzzy logic.

Future research will further explore **NeutroAlgebraic applications in logic, topology, and computational sciences**, paving the way for **new mathematical models** capable of addressing real-world uncertainty more effectively than classical approaches.

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Neutrosophic / Plithogenic Entropies

Florentin Smarandache to Ganeshsree Selvachandran

I think in a similar way to Neutrosophic Entropies it is possible to define Plithogenic Entropies, making the distance between a plithogenic set P and its plithogenic complement P^C.

- My question for the many definitions of neutrosophic / plithogenic entropies: which one is the best?
- How to identify the most accurate neutrosophic / plithogenic entropy formula?
- Does it depend on the application, on expert, or on other parameters?

The concept of entropy, a measure of disorder or uncertainty, has been a cornerstone of information theory and statistical mechanics. However, traditional entropy measures often struggle to capture the nuances of real-world systems where information can be vague, indeterminate, or even contradictory. This limitation has led to the development of neutrosophic and plithogenic entropies, which offer more nuanced ways to quantify uncertainty in the presence of indeterminacy and conflicting information.

Neutrosophic entropy, building upon the principles of neutrosophic logic and set theory, extends classical entropy by incorporating the degree of indeterminacy. It recognizes that information isn't always simply true or false; there's often a degree of uncertainty associated with it. Plithogenic entropy takes this concept further, acknowledging that information can be multiple-valued and even contradictory. Plithogenic sets, which can have multiple attributes or values associated with each element, require a more sophisticated entropy measure that can account for this complexity. Just as neutrosophic entropy measures the distance between a neutrosophic set and its complement, plithogenic entropy can be defined by measuring the distance between a plithogenic set and its plithogenic complement. This distance reflects the degree of uncertainty and conflict within the plithogenic set.

The proliferation of neutrosophic and plithogenic entropy formulas raises a crucial question: which one is the "best"? There's no single, universally superior formula. The most accurate or appropriate entropy measure depends heavily on the specific application and the nature of the data being analyzed. For instance, in a medical diagnosis scenario, where information might be incomplete and symptoms can be ambiguous, a neutrosophic entropy measure that emphasizes indeterminacy might be more suitable. In contrast, when dealing with complex social systems or multi-criteria decision-making, where conflicting opinions and multiple perspectives are common, a plithogenic entropy measure that can handle multi-valued and contradictory information might be more appropriate.

Furthermore, the choice of entropy formula can be influenced by expert knowledge and other parameters. Experts in a particular domain might have insights into the types of uncertainty that are most relevant to their field, and this knowledge can inform the selection of an appropriate entropy measure. Computational considerations can also play a role. Some entropy formulas might be computationally more efficient than others, and this can be a significant factor when dealing with large datasets.

Therefore, the identification of the most accurate neutrosophic or plithogenic entropy formula is not a straightforward task. It requires a careful consideration of the specific application, the nature of the data, expert knowledge, and computational constraints. Researchers need to explore and compare different entropy measures, evaluating their performance in the context of specific problems.

Ultimately, the "best" entropy formula is the one that provides the most meaningful and insightful representation of uncertainty for a given situation. Further research is needed to develop methodologies for selecting and validating appropriate entropy measures in different domains, contributing to a more nuanced and accurate understanding of uncertainty in complex systems.

Some Questions on Refined Neutrosophy & Lattices vs. Pair Structures & YinYang Bipolar Fuzzy Set

Regarding Neutrosophic Lattices

- Are existing lattice structures, like those by Klement and Mesiar, truly representative of neutrosophic sets, or do they fall short in some way? If so, how can we construct more appropriate neutrosophic lattices? What would be the key differences?
- What are the different types of neutrosophic lattices we can define? Can we define them in terms of ordered sets and also as algebraic structures?

- What novelties did neutrosophy bring in comparison to classical and multi-valued logics, sets, probability, and statistics? What fundamental limitations do these earlier systems have that neutrosophy overcomes?

Regarding YinYang Bipolar Fuzzy Sets

- How does Zhang-Zhang's YinYang Bipolar Fuzzy Set relate to the Single-Valued Bipolar Neutrosophic Set? Are they equivalent, or is one a subclass of the other? If it's a subclass, what are the implications?
- What are the specific points of difference between YinYang Bipolar Fuzzy Sets and Single-Valued Bipolar Neutrosophic Sets?

Regarding Pair Structures and Refined Neutrosophy

- How does the paired structure of knowledge representation, as proposed by Montero et al., relate to Refined Neutrosophy? Is it a general case or a specific instance?
- Montero et al. claim that Bipolar Fuzzy Sets and Neutrosophic Sets are the same. Is this accurate? What evidence contradicts this assertion?
- How many types of neutralities or sub-indeterminacies are possible within the framework of Refined Neutrosophy? Is it limited to three, as suggested by some, or can it be any finite or even infinite number? What are some examples?
- What are the specific advantages and novel contributions that refined neutrosophy brings to the table? How does it extend or challenge existing philosophical and mathematical frameworks?

What are the most significant innovations of neutrosophic theories?

- What are the practical implications of being able to refine indeterminacy? How does this impact our ability to model and solve real-world problems?
- How does the concept of multiple-included middle principle extend the traditional included middle principle, and what problems does it help to solve?
- What are the key distinctions and relationships between lattices, YinYang Bipolar Fuzzy Sets, pair structures, and refined neutrosophy? How do these concepts build upon or diverge from each other?
- What are the broader implications of these refined neutrosophic concepts for various fields of study?
- What are the potential areas of application where these refined frameworks can offer new insights or solutions?

Geometric Representation of Neutrosophic Cubic Set

Florentin Smarandache to Said Broumi

An Internal Neutrosophic Cubic Set is defined as $\{[a_1, a_2] \times [b_1, b_2] \times [c_1, c_2], (\lambda_1 \times \lambda_2 \times \lambda_3)\}$, where the range $[a_1, a_2] \times [b_1, b_2] \times [c_1, c_2]$ is contained within or equal to $[0, 1]^3$. The values λ_1, λ_2, and λ_3 belong to the intervals $[a_1, a_2]$, $[b_1, b_2]$, and $[c_1, c_2]$, respectively. This set is represented in the Standard Neutrosophic Cube ($[0, 1] \times [0, 1] \times [0, 1]$) by small prisms within the cube.

Each small prism *P* is bounded by [a_1, a_2] on the *x*-axis, [b_1, b_2] on the *y*-axis, and [c_1, c_2] on the *z*-axis, with a point *M* having coordinates (λ_1, λ_2, λ_3) inside the prism.

For a Single-Valued Neutrosophic Set, each element *x* of the neutrosophic components (T_x, I_x, F_x) is represented as a point with coordinates (T_x, I_x, F_x) on the T-axis, I-axis, and F-axis, respectively, within the Neutrosophic Cube. For an Interval-Valued Neutrosophic Set, each element x with coordinates ([T_{x-}, T_{x+}], [I_{x-}, I_{x+}], [F_{x-}, F_{x+}]) is represented by a small prism determined by the intervals [T_{x-}, T_{x+}], [I_{x-}, I_{x+}], and [F_{x-}, F_{x+}] on the respective axes within the Neutrosophic Cube.

An Internal Cubic Neutrosophic Set is represented by a small prism (similar to the Interval-Valued Neutrosophic Set) within the Neutrosophic Cube, with each prism containing a point (as in the Single-Valued Neutrosophic Set).

Neutrosophic Distribution as Triple Probability Distribution

Florentin Smarandache to Terman Frometa-Castillo

Traditional probability focuses solely on the likelihood of an event occurring. Neutrosophic probability, however, offers a more nuanced approach by considering three aspects: the probability of the event occurring (t), the probability of the event *not* occurring (f), and the indeterminate probability of the event occurring or not (i). This third component, 'i,' acknowledges the inherent uncertainties and ambiguities that often arise in real-world scenarios, especially in complex systems like biological processes.

In the context of tumor probability, this trichotomy can be particularly insightful. Instead of just focusing on the chance of a tumor being present, we can also consider the chance of it being absent, as well as the indeterminate chance – perhaps due to limitations in diagnostic tools or the presence of conflicting evidence. By incorporating these additional probabilities, we gain a more comprehensive understanding of the situation. This richer information could lead to more informed medical decisions.

Furthermore, the probability of a tumor can vary depending on different factors. For instance, the probability of a tumor might be higher given certain genetic predispositions, while it might be lower considering a patient's lifestyle. Neutrosophic probability provides a framework for incorporating these multiple, potentially conflicting variables. It allows us to model situations where the probability of an event is not a fixed value but rather a range or distribution of values, depending on the context.

Consider the progression of a tumor. It can advance, regress, or stagnate. A neutrosophic approach allows us to assign probabilities to each of these outcomes. We can envision this as a triple probability distribution: one curve representing the chance of tumor advancement, another for regression, and a third for stagnation. This triple distribution provides a more complete picture of the tumor's dynamics compared to a single probability value. When the probability distributions are not well-defined, or when we have this triple probability distribution, neutrosophic statistics provides the tools to analyze and interpret the data.

Imagine taking a 3D scan of a tumor. Each pixel in this scan can be considered an element of a neutrosophic set. We can then compare this neutrosophic set to a database of neutrosophic sets representing different tumor areas. By calculating similarity measures between the scanned tumor and the database entries, we can identify the closest match, aiding in diagnosis and treatment planning.

This approach, which we've previously applied in neutrosophic image recognition (you can find examples on my UNM websites[13]), offers a powerful way to

[13] See: http://fs.unm.edu/neutrosophy.htm and http://fs.unm.edu/NSS/Articles.

leverage the information contained in medical images. This method allows for a more nuanced comparison than traditional image recognition techniques, as it can account for the inherent vagueness and uncertainty present in medical images.

Enhancing Financial Modeling with Neutrosophics and DSmT

An Exchange of Ideas between Florentin Smarandache and Mohammad Khoshnevisan

(e-mails exchanges reimagined as a scene in a virtual room)

Florentin Smarandache

I've been exploring how neutrosophic probability can offer a more nuanced approach to several problems, particularly in finance and operations research. It seems to me that the traditional probabilistic framework, with its focus solely on the likelihood of an event, often falls short when dealing with the complexities and uncertainties of real-world scenarios.

Mohammad Khoshnevisan

The examples you've shared (option pricing, facility allocation, fraud detection), highlight the limitations of classical probability. The idea of "relative" versus "absolute" sure/impossible/indeterminate events in neutrosophic probability is intriguing. Truth and certainty can indeed be context-dependent.

Florentin Smarandache

Exactly. Take the long-term option pricing example. The market price can deviate from the theoretical price due to an inadequate model, market irrationality, or some combination of both. Classical probability can't easily capture this "indeterminate" aspect. But with neutrosophic probability, we can assign degrees of truth, falsehood, and indeterminacy to these different possibilities.

Mohammad Khoshnevisan

I see what you're saying. The T, I, and F components of neutrosophic probability allow us to represent the chance that the theoretical price is correct, the chance that the market price is correct, and the indeterminate chance that neither is definitively correct. The use of AR1 models and subjective probability assessments to determine these components is a clever approach. And then using the DSmT to fuse conflicting data is very powerful.

Florentin Smarandache

Precisely. And this idea extends beyond finance. Consider the Modified Assignment (MASS) model for facility allocation. The traditional model is deterministic, but in reality, there's always uncertainty and conflicting information. Neutrosophic statistics, combined with the DSmT, can help us optimize facility layout.

Mohammad Khoshnevisan

It's about acknowledging the inherent uncertainty in the problem and using neutrosophic tools to find the best solution despite that uncertainty. The idea of maximizing joint entropy with conflicting information sources is quite clever.

Florentin Smarandache

And then there's the fraud detection example. Using Benford's law is a good starting point, but it doesn't tell us whether a deviation from the expected distribution actually indicates fraud. It just suggests that something might be amiss.

Mohammad Khoshnevisan

Right. Your neutrosophic extension, using the DSmT, adds another layer of analysis. It allows us to consider the conditional probability of *actually* detecting fraud, given that a Type I error (false positive) hasn't occurred. The T, I, and U components here represent the probabilities of the event being true (fraud detected), indeterminate, or untrue, given no Type I error.

Florentin Smarandache

These probabilities can be influenced by various factors, like the organization's history of fraud, employee behavior, and internal controls. The DSmT can then be used to resolve any inconsistencies between these factors.

Mohammad Khoshnevisan

These examples clearly demonstrate the power of neutrosophic probability and statistics. They provide a framework for dealing with uncertainty and conflicting information in a way that classical probability simply can't. It's not about replacing classical probability, but rather extending it to handle more complex and realistic scenarios.

Florentin Smarandache

Precisely. It's about having a more comprehensive set of tools to analyze and understand the world around us.

The Mind of a Neutrosophist

Florentin Smarandache on Research, Inspiration, Universe

Questions by Surapati Pramanik

> Dear professor, your productivity is astounding! It seems your daily life is entirely dedicated to research and writing…

Florentin Smarandache

I'm always thinking about research. My passion. I'm either actively writing or formulating ideas in my mind.

> So, what motivates this incredible work ethic?

Florentin Smarandache

Curiosity, primarily. I research what intrigues me. And I always try to connect my research to real-life experiences. Neutrosophics, for example, stemmed from my childhood love of soccer. The three possible outcomes – win, tie, lose – resonated with the idea of opposites and the neutral middle ground.

Surapati Pramanik

> Do you have any spiritual experiences or feelings that influence your work?

Florentin Smarandache

Sometimes, I experience inspiration that seems to come from my subconscious, or perhaps the universe. When I read something, I always question it, try to see it from different angles, even the opposite perspective.

Surapati Pramanik

> And what are your thoughts on the universe itself? Is it finite, infinite…?

Florentin Smarandache

Ah, the universe… It's a complex question. It can be both bounded and infinite, depending on your perspective. Like the Earth – if you walk continuously, it seems endless, yet from space, we know it's finite. The universe, for now, remains largely indeterminate for our minds.

Surapati Pramanik

> Indeed. Now, looking back at the evolution of neutrosophics, what do you consider the most important milestones?

Florentin Smarandache

Well, it started in 1998 with the introduction of neutrosophic sets, logic, probability, and statistics. Then came interval neutrosophic sets and logic in 2005. 2013 was a big year, with the development of neutrosophic probability, including the concept of indeterminate chance, and the refinement of neutrosophic components. In 2014, we developed neutrosophic statistics. And in 2015, we introduced neutrosophic precalculus and calculus, along with neutrosophic dynamic systems and symbolic neutrosophic logic. It's been a continuous process of expanding the theory.

Surapati Pramanik

> Impressive progress! I recall your analogy to Cipolla's Laws, comparing them to the neutrosophic concept of the indeterminate middle ground.

Florentin Smarandache

Exactly! There's always a degree of indeterminacy, or "stupidity/incompetence," as you put it, even in intelligent actions. It's about finding that balance between extremes.

Surapati Pramanik

> And e.g. your work on extending Pythagorean Intuitionistic Fuzzy Sets to Spheroid Neutrosophic Sets is remarkable. The visual analogy of the sphere and the circle is very helpful in grasping the concept.

Florentin Smarandache

Thank you. It's about generalizing the idea of restricted sums of squares to accommodate the three components of a neutrosophic set.

Surapati Pramanik

> I also found your idea of extending Zadeh's inequality in fuzzy relations very interesting. The concept of independent neutrosophic values for vertices and edges in a neutrosophic graph opens up new possibilities.

Florentin Smarandache

Yes, it frees us from the constraints of fuzzy relationships where the values are dependent. It allows for a more flexible and realistic representation of complex networks. And we can extend these ideas to Neutrosophic Finite State Machines and Neutrosophic Logic Design.

Surapati Pramanik

> It's clear that neutrosophics offers a powerful framework for dealing with uncertainty, indeterminacy, and even contradictions. Thank you for sharing your insights, Professor!

Florentin Smarandache

The pleasure is all mine. It's through discussions like these that ideas are further refined and developed.

The Breadth and Depth of Neutrosophic Thought

Yoruba Philosophy and Theology

Florentin Smarandache to Maikel Leyva Vazquez

I agree that the Yoruba belief in *Ori* is in between freewill and determinism, actually, a blend of degrees of the soft-determinism and hard-determinism in a dynamic way, varying over the time.

A person in Yoruba thought is made of three elements: body (*ara*), life (*emi*), and spirit (*ori*).

Actually, in the Western view, there are four elements: body, soul, spirit, and mind (*see my article*[14]).

Further comments

The Yoruba belief in *Ori* as a crucial component of an individual's being, situated between free will and determinism, presents a philosophical puzzle. It seems to embody a dynamic blend of soft and hard determinism, shifting over time. This suggests that while an individual's *Ori* may predispose them towards certain paths or characteristics (akin to a degree of *hard determinism*), there's still room for agency and choice within those parameters (akin to *soft determinism*).

[14] Florentin Smarandache (2025). "Neutrosophic Perspectives on the Body-Mind-Soul-Spirit Fluidity," *Neutrosophic Sets and Systems*, Vol. 78, , pp. 97-104, DOI: 10.5281/zenodo.14231175; https://fs.unm.edu/NSS/6NeutrosophicPerspectives.pdf

Perhaps *Ori* can be seen as a potential or a trajectory, rather than a fixed destiny. Individuals, through their actions and choices, can influence the manifestation and unfolding of their *Ori*.

The traditional Yoruba tripartite division of a person into *ara* (body), *emi* (life), and *ori* (spirit) offers a framework for understanding human existence. However, the comparison to the Western concept of a four-part division – *body, soul, spirit,* and *mind* –, adds another layer of complexity.

Questions

How do these two models align, and where do they diverge?

- Does the Yoruba *emi* encompass both the Western concepts of "soul" and "mind," or is there a distinction? If so, how does the Yoruba understanding of *emi* differ from the combined Western notions of soul and mind? Does it lean more towards the vital force, or the cognitive and emotional aspects of being?
- Where does the *Ori* fit within the Western four-part model? Is it primarily associated with the spirit, or does it have connections to the soul and/or mind as well? Could *Ori* be interpreted as a personal "blueprint" that influences all aspects of the individual – body, soul, spirit, and mind?

- Does the *Ori* also exhibit a form of fluidity, changing or developing throughout a person's life? Could this be linked to the idea of destiny being shaped by choices?

Cultural context

Furthermore, exploring the nuances of *Ori* in relation to free will and determinism requires considering the cultural context. Yoruba cosmology often involves interactions with deities and ancestors, which could also influence an individual's path.

How do these external forces interact with the *Ori* and the individual's agency? Are there rituals or practices that can influence or appease *Ori*?

By examining these questions, we can gain a deeper appreciation of the complex and dynamic nature of the *Ori* concept within Yoruba philosophy. Further research into the specific nuances of *emi* and its comparison with the Western soul/mind construct would be highly valuable.

Reference

Yemi D. Prince (Yemi D. Ogunyemi) (2018). *Yoruba Philosophy and the Seeds of Enlightenment Advancing Yoruba Philosophy*. Delaware: Vernon Press (Vernon Series in Philosophy). Excerpts online, https://vernonpress.com/file/4691/d7a1f0929278b40ae540840aa5ee56ae/1506321983.pdf. Accesed on 1 February 2025.

Dialectics is Incomplete

Florentin Smarandache
to Akira Kanda

Hegel's dialectics vs. Yin-Yang

You talk about Hegel's dialectics, but actually it is Chinese Yin-Yang philosophy (dynamic of the opposites), that appeared more than 2,500 years ahead of Hegel and Marx! Therefore, the Western concept of dialectics may have roots in or parallels with earlier Eastern thought, suggesting a more universal understanding of opposing forces. This raises questions about the originality and attribution of philosophical ideas.

Incompleteness of dialectics

And, by the way, dialectics is incomplete, because in our world there is not only the dynamic of opposites, but also the dynamic of opposites *and* the neutrality between them [called *neutrosophy*[15]]. Traditional dialectics focuses on the tension and resolution of opposing forces, but neutrosophy argues that this framework overlooks the crucial role of neutral or indeterminate elements. This inclusion of neutrality

[15] See: http://fs.unm.edu/Neutrosophy-A-New-Branch-of-Philosophy.pdf.

offers a more nuanced and realistic representation of complex systems.

Neutrality in conflict

See, when two countries go to war, other neutral countries help in one side or the other. This demonstrates how neutrality is rarely passive; it often actively influences the dynamics of conflict, shifting the balance of power and potentially mediating the outcome. Neutrality, therefore, is not simply the absence of opposition, but a force in itself.

Neutrality in ideas

In the world of ideas, sometimes contradictory ideas are resolved (reconciled) by the middle (neutral) between them, which may be a mixture of opposites (a degree of an opposite, plus a degree of the other opposite). This suggests that intellectual progress can occur not just through the clash of opposing viewpoints, but also through the exploration and integration of neutral or intermediate positions. This process of synthesis can lead to more comprehensive and nuanced understandings.

Black and white vs. grey

So, world is more complicated than black and white [opposites], but also a grey area [neutrality or mixture of opposites] in between. This "grey area" represents the spectrum of possibilities beyond simple opposition, acknowledging the ambiguity, uncertainty, and complexity inherent in reality. Neutrosophy provides a framework for analyzing and understanding these intermediate states.

Further questions

History of Dialectics

You could ask some other questions to broaden your research:

- What specific evidence supports the claim that Yin-Yang philosophy directly influenced Hegel's dialectics, rather than them arising independently from similar observations of the world? (Simply stating a chronological difference, is it enough to establish influence?)
- How did the concept of Yin and Yang evolve over time in Chinese philosophy, and how does that evolution compare to the development of Western dialectical thought?
- Are there other philosophical traditions besides Chinese and Western that have explored similar concepts of opposing forces and their interaction?

Incompleteness of Dialectics

- How does the concept of "neutrality" in neutrosophy differ from or overlap with existing philosophical concepts like "mediation," "compromise," or "synthesis" within dialectical thought?

- Can you provide more concrete examples of how "neutrality" resolves or influences situations beyond the war analogy?
- Is "neutrality" a static state, or can it also be dynamic and interact with the opposing forces? How does this dynamic neutrality affect the overall system?
- How is "degree of an opposite" measured or determined? Is it a subjective or objective measurement?
- Does the inclusion of neutrality fundamentally change the *process* of dialectical thought, or is it simply an addition to the existing framework?

More on Neutrosophy

- What are the limitations of neutrosophy? Are there situations where not applicable or useful?
- How does neutrosophy address the problem of defining and identifying "neutrality" in different contexts? What criteria are used?
- How does neutrosophy relate to other "triadic" or "ternary" logics or philosophies that have been proposed throughout history?

Degree of Democracy, Degree of Indeterminate-Democracy, and Degree of Antidemocracy

Florentin Smarandache to Victor Christianto

In all countries (61) that I visited I observed good, bad, and neutral/indeterminate things, each of them in some degree different from a country to another.

At least see into the book that I talked about some degree of democracy, another degree of antidemocracy, and a third degree of indeterminate-democracy (contradictory ideas/lays/behaviors etc.) in each society.

Example of Indeterminate-Democracy degree: "abortion"; the religious people say it kills a life (which is true); the women say that they are masters of their bodies (which is true, and they have the right to abortion).

Further questions

- Is abortion a suitable example of indeterminate-democracy, or does it primarily represent a conflict between different values or rights within a democratic framework?
- Are there other, perhaps less contentious, examples of "indeterminate-democracy" that could be used to illustrate the concept more clearly?

- How could you actually measure the democracy?
- How do these degrees relate to traditional measures of democracy, such as electoral processes, freedom of speech, and rule of law?
- Are these degrees intended to be objective measurements, or are they inherently subjective and dependent on the observer's perspective?
- I mean, why today is a better democracy than yesterday (as you said)?
- What criteria are being used to judge that today's democracy is "better" than yesterday's? What specific improvements have been made, and how are they being evaluated?
- Is the concept of "better democracy" universally applicable, or does it depend on specific cultural or historical contexts? (What might be considered "better" in one country might not be in another.)
- How do you account for potential downsides or unintended consequences of changes made in the name of "improving" democracy? (Progress is not always linear.)

- What specific metrics or data points would be used to measure these degrees of democracy? Are there quantitative or qualitative indicators? (Levels of political participation, frequency of protests, access to information, levels of corruption, public opinion surveys on controversial issues, etc.)
- How can these degrees be compared across different countries with vastly different cultures, histories, and political systems? Are there universal standards, or do the measures need to be adapted to specific contexts?
- How would you address the challenge of measuring "indeterminate-democracy," which by its nature involves contradictory elements? How do you quantify or assess the degree of contradiction or ambiguity within a society?
- How do you account for the dynamic nature of these degrees?
- What new democratic elements have been added in the meantime?
- What are the limits of the concept of "progress" in the context of democracy? Is there an ideal state of democracy that societies are striving towards, or is it a continuous process of adaptation?

Capitalism and Communism, blended

Florentin Smarandache to Victor Christianto

I did not say that the communist countries are going back to capitalism, I said that each society has a degree of communism and a degree of capitalism (as in neutrosophy, and as in life in general).

And the degrees fluctuate between extremes in each society, going either closer to capitalism, then moving back towards the communism, and so on.

A capitalist country has a higher degree of capitalism than the communism, and therefore inversely a communist country; while a socialist country is somewhere near the middle in between communism and capitalism.

A Neutrosophic Perspective on Dynamic Systems

Florentin Smarandache and Andrușa Vătuiu

The Law of Internal Fragility
in Neutrosophic Dynamic Systems

We formulated a principle regarding dynamic systems, stating that:[16]

> "It is easier to break from inside than from outside a neutrosophic dynamic system."

[16] See https://fs.unm.edu/EasierMaiUsor.pdf.

> This insight resonates across multiple disciplines, from physics and engineering to sociology and geopolitics. But what does it truly mean, and why is it important?

Understanding Neutrosophic Dynamic Systems

A neutrosophic dynamic system is a system characterized by three fundamental components: determinacy, indeterminacy, and contradiction. Unlike classical dynamic systems, where everything follows precise rules, neutrosophic systems allow for uncertainty, inconsistency, and partial truths. In reality, almost all dynamic systems exhibit some degree of indeterminacy due to the complexity of their interactions and the influence of external and internal factors.

Why Internal Breakdowns Are More Probable

Many systems, whether they be biological, social, or technological, appear robust from an external viewpoint but are vulnerable internally. Several factors contribute to this principle:

Structural Weakness and Complexity

> The more complex a system, the more interdependencies exist. A failure in a small, critical component can cascade throughout the system, leading to a total breakdown.

Insider Knowledge and Manipulation

> Internal agents, such as spies in a nation-state, whistleblowers in corporations, or software bugs in a

program, possess intimate knowledge that allows them to exploit vulnerabilities more effectively than external threats.

Internal Conflicts and Contradictions

Many systems contain conflicting elements that can drive instability. Political entities, for example, often collapse due to internal discord rather than external invasions.

Self-Destructive Feedback Loops

Certain mechanisms within systems, such as feedback loops in economic markets or social movements, may reinforce instability, accelerating an internal collapse.

Real-World Examples of the Principle

Geopolitics and Nations

History is rich with examples of powerful nations that fell not due to external conquest but due to internal strife. The Roman Empire, for instance, succumbed to political corruption, economic instability, and civil wars before external invaders delivered the final blow. More recently, the dissolution of the Soviet Union was precipitated by economic inefficiencies, political struggles, and ideological shifts from within rather than by direct military confrontation.

Organizations and Corporations

Corporate failures often stem from internal mismanagement, fraud, or conflicts rather than external competition. The collapse of Enron was not because of external business pressures but due to financial misconduct by its own executives. Similarly, Facebook (Meta) has faced significant reputational and operational challenges from internal leaks and whistleblowers rather than from rival companies.

Biological Systems

Even in biology, organisms often succumb to internal failures, such as genetic mutations, autoimmune diseases, or metabolic disorders, rather than external threats like predators. Cancer, for example, arises from internal cellular malfunctions rather than external injuries.

Implications and Applications

Understanding this principle has broad implications:

Cybersecurity

Internal threats such as rogue employees or system vulnerabilities are often more dangerous than external hackers.

Political Stability

Governments must address internal dissatisfaction and governance inefficiencies to maintain national integrity.

Engineering and Infrastructure

Designing systems with internal redundancies and self-repair mechanisms can prevent catastrophic failures.

Corporate Governance

Ethical leadership and transparency reduce the risks of internal corruption and collapse.

Conclusion

The law that it is easier to break from inside than from outside a neutrosophic dynamic system provides a valuable framework for analyzing vulnerabilities across multiple domains. Recognizing and addressing internal weaknesses is crucial for sustaining stability in any complex system, whether in nature, technology, or human society.

Neutrosophic Applications in Literature, Arts, Criminal Justice, and History

Dan Florin Lazăr

Here are a few more questions that I would kindly ask you to answer in support of my book:[17]

1. What is the core idea behind neutrosophic logic, and how does it differ from traditional logic?
2. In what fields beyond mathematics and computer science can neutrosophy be applied?
3. How can neutrosophic logic be used to analyze characters in literature?
4. What is the benefit of applying a neutrosophic perspective to the arts?

[17] Lazăr, Dan Florin (2024). *A Tapestry of Thought. Smarandache's Contributions to Knowledge and Artistic Expression. An Exploration of Smarandache's World, Where Science Meets Creativity. In honorem Florentini Smarandache, ad completam aetatem septuagenariam*. Grandview Heights, OH, United States of America: Biblio Publishing, 2024, 134 p.; ISBN: 9781599738055

5. How can neutrosophy be relevant to -say- the field of criminal justice?
6. What is the potential contribution of neutrosophy to the study of history?
7. What is the overall conclusion about the applications of neutrosophic logic in these diverse fields?

Florentin Smarandache

Neutrosophic logic, with its capacity to handle indeterminacy and inconsistency, offers a powerful new lens through which to examine complex and often contradictory aspects of human experience. Beyond its established applications in mathematics and computer science, neutrosophy holds immense potential for enriching our understanding of literature, the arts, criminal justice, and history.

I will explore for you some of these novel applications.

In literature, neutrosophic analysis allows us to delve deeper into the ambiguities and paradoxes that often lie at the heart of great works. Characters rarely embody purely good or evil; they are complex beings driven by conflicting motivations. Neutrosophy provides a framework for acknowledging and analyzing these contradictions, recognizing the "degree of truth," "degree of falsehood," and "degree of indeterminacy" within a character's actions or a narrative's themes. For example, a seemingly villainous character might possess moments of genuine compassion, creating a neutrosophic space where their morality is neither entirely black nor white.

The arts, too, benefit from a neutrosophic perspective. Artistic expression often thrives on challenging conventional boundaries and juxtaposing seemingly irreconcilable elements. A painting might blend abstract and representational styles, or a musical composition might incorporate both harmonious and dissonant chords. Neutrosophy allows us to appreciate these artistic tensions not as flaws but as integral components of the work's meaning and impact. By acknowledging the "both/and" nature of artistic expression, we can move beyond simplistic interpretations and embrace the richness of ambiguity.

Perhaps even more compelling are the potential applications of neutrosophy in the realm of criminal justice. Legal systems are often riddled with contradictions and inconsistencies. Laws may be vaguely worded, leading to conflicting interpretations, or they may contain exceptions that undermine their general applicability. The example of marijuana laws, where its recreational use is prohibited while its medical use is permitted, perfectly illustrates this.

Neutrosophic logic can be used to analyze these contradictions, identifying areas where laws are unclear, self-contradictory, or create unintended consequences. By explicitly acknowledging these inconsistencies, we can work towards a more just and coherent legal system.

Finally, neutrosophic analysis offers a fresh perspective on history. Historical narratives are often constructed around dominant interpretations, but these interpretations can be challenged by conflicting evidence or alternative viewpoints. Neutrosophy allows us to consider historical events from multiple perspectives simultaneously, acknowledging the "degree of truth" in different accounts, even when they appear contradictory. For example, a historical figure might be simultaneously lauded as a hero and condemned as a tyrant, depending on the perspective of the observer.

These are just a few examples of the potential of neutrosophy, and further research promises to reveal even more profound insights.

Neutrosophy in Arts and Letters

Florentin Smarandache to Maikel Leyva Vazquez

It is possible to use neutrosophy (based on opposites and neutrals, <A>, <antiA>, and <neutA>) in art criticism and literary essays, for example in Comparative Literature or Comparative Art, i.e., making comparisons between the studied work with respect to opposite and neutral works. This approach allows for a more nuanced and comprehensive analysis, moving beyond simple binary comparisons. Instead of just contrasting a work with its direct opposite, we can also consider works that are neutral or indeterminate in relation to it. This "neutral" category might include works that share some similarities but also significant differences, works that explore related themes but with different approaches, or works that simply exist outside the primary opposition being considered.

For instance, when comparing two paintings with contrasting styles (<A> and <antiA>), we could also examine a third painting that blends elements of both or explores a completely different artistic movement (<neutA>).

This neutrosophic lens can reveal hidden connections, shed light on the spectrum of artistic possibilities, and provide a richer understanding of the studied work within its broader artistic context.

Similarly, in literary analysis, a novel exploring themes of love (<A>) could be compared not only with a novel explicitly about hate or rejection (<antiA>), but also with a novel focused on indifference or apathy (<neutA>). This could illuminate the various facets of human relationships and provide a more complete picture of the author's exploration of love.

As we did with neutrosophy used in the study of Martí's poetics, this method offers a powerful tool for exploring the complexities and ambiguities in artistic and literary expression.

Neutrosophic Example in Military

Octavian Blaga

1. What is the challenge in target identification in a military context?
2. How does traditional binary logic fall short in addressing this challenge?
3. How does neutrosophic logic offer a more suitable approach to target identification?
4. What are the different sources of information that can contribute to target identification?
5. How does neutrosophic logic handle potentially conflicting information from different sources?
6. What is the role of the neutrosophic conjunction in target identification?
7. What are the advantages of using a neutrosophic approach to target identification? (
8. What is the overall benefit of applying neutrosophic logic in military decision-making?

Florentin Smarandache

Neutrosophic logic, with its ability to handle indeterminacy, offers a valuable tool for addressing the inherent uncertainties present in military decision-making. A prime example of this can be found in target identification, a critical process in modern warfare.

Consider the scenario of an aircraft detected in airspace. Its status – friendly, neutral, or enemy – is rarely immediately clear. This is where the neutrosophic approach proves particularly useful.

Traditional binary logic forces a definitive classification: the plane is either friendly or it isn't. However, in reality, the available information might be incomplete, ambiguous, or even contradictory. This is where neutrosophic logic, with its three components – truth (t), indeterminacy (i), and falsehood (f) – offers a more nuanced representation. In the context of target identification, 't' represents the degree to which the aircraft is confirmed as, say, friendly; 'i' represents the degree of uncertainty or lack of information about its status; and 'f' represents the degree to which it is believed to be, for example, hostile.

Multiple sources can provide information about the detected aircraft. These sources might include radar data, visual sightings, electronic signals, or intelligence reports.

Each source contributes to the overall assessment of the aircraft's status, but the information may not be consistent or reliable. One source might suggest the plane is friendly based on its transponder signal, while another might indicate hostile intent based on its flight path.

Neutrosophic logic allows us to incorporate and analyze these diverse and potentially conflicting inputs.

The neutrosophic conjunction, a logical operation that combines the truth, indeterminacy, and falsehood values from different sources, plays a crucial role in reaching an optimal estimation of the aircraft's identity. It allows for the aggregation of evidence, even when that evidence is incomplete or contradictory. For instance, if several sources suggest a high degree of truth that the aircraft is friendly, while one source indicates a moderate degree of indeterminacy due to a lack of clear identification, the neutrosophic conjunction will synthesize this information, likely resulting in a high overall truth value for "friendly," a reduced indeterminacy value, and a low falsehood value.

This neutrosophic approach to target identification offers several advantages. It acknowledges the inherent uncertainties in real-world scenarios, allowing for more robust decision-making. By incorporating information from multiple sources and explicitly addressing indeterminacy, it reduces the risk of misidentification.

Furthermore, the neutrosophic approach provides a nuanced picture of the situation, enabling commanders to make informed decisions. In essence, neutrosophic logic empowers military personnel to navigate the fog of war with greater clarity and precision.

Neutrosophic Philosophy

Florentin Smarandache to Mustapha Kachchouh

You had a good idea to consider three categories of people, as in neutrosophy (<A>, <neutA>, <antiA>):

- people who believe in God,
- people who partially believe and partially do not believe,
- and people who do not believe in God.

So, you might write something into neutrosophic philosophy, check the basics in this paper.[18]

Refinement means Detailed Information

Florentin Smarandache to Kawther Fawzi

Refinement is needed when detailed information is needed.

For example in voting process in a given country:

- T = percentage of people voting for the candidate;
- I = percentage of people not voting or casting a black or a white vote;
- F = percentage people voting against the candidate.

[18] See: http://fs.unm.edu/Neutrosophy-A-New-Branch-of-Philosophy.pdf.

But the political analysts want to know in detail what happened in each region of the country in order to take care for future elections. This is refinement.

So:

- T_1 = percentage of people from Region 1 voting for the candidate;
- I_1 = percentage of people from Region 1 not voting or casting a black or a white vote;
- F_1 = percentage of people from Region 1 voting against the candidate.
- T_2 = percentage of people from Region 2 voting for the candidate;
- I_2 = percentage of people from Region 2 not voting or casting a black or a white vote;
- F_2 = percentage of people from Region 2 voting against the candidate.

Etc.

Three-Ways Model

Florentin Smarandache to Said Broumi

The "three-ways model", that means to split the universe of discourse in:

- Acceptance (<A>),
- Rejection (<antiA>),
- and Neither (neutral or indeterminacy) (<neutA>),

is just a process of neutrosophication of the universe of discourse, because -as you know- in neutrosophy we deal with the triplet of the form <A>, <antiA>, <neutA>.

Neutrosophic Risk

Florentin Smarandache to Hamidreza Seiti

I read about optimist risk and pessimist risk. Right!

I noticed that you said that the next study will be using *R*-set for neutrosophic case. Good idea!

I think one can extend it to:

Neutrosophic Risk = [Optimistic Risk, Pessimistic Risk, Neutral (or Indeterminate) Risk].

And I give you an example to prove the existence of neutral risk.

Playing the lottery. Suppose the ticket is $10.00.

- The Optimistic Risk (R_o) is to gain > $10, therefore you gain money.
- The Pessimistic Risk (R_p) is to gain between [0, 10), therefore you lose money.
- The Neutral Risk (R_n) is to gain just $10 (therefore you neither gain, nor loose).

In a neutrosophic set, a generic *element* x has the neutrosophic coordinates (*t, i, f*), whence you endow each of the components with the risk possibilities:

$$[t(R_o, R_n, R_p), i(R_o, R_n, R_p), f(R_o, R_n, R_p)].$$

Something similar may be done for the plithogenic set. In a plithogenic set *A*, a generic element *x* is characterized by many attribute values $v_1, v_2, \ldots, v_n$, $n \geq 1$. The element *x* has, with respect to each attribute value *v*, a degree of appurtenance *t* with respect to the set *A*.

We write:

$$x[v_1(t_1), v_2(t_2), \ldots, v_n(t_n)].$$

We considered the easiest type of degree, the fuzzy degree (*t*), but we can also consider intuitionistic fuzzy degree (*t, f*), neutrosophic degree (*t, i, f*), and so on.

Then, each (fuzzy, intuitionistic fuzzy, neutrosophic, etc.) degree has some degree of risk.

A plithogenic set, with fuzzy attribute value degree, and neutrosophic risk degree:

$$x[v_1(t_1(R_{o_1}, R_{n_1}, R_{p_1})),\ v_2(t_2(R_{o_2}, R_{n_2}, R_{p_2})),\ \ldots,\ v_n(t_n(R_{o_n}, R_{n_n}, R_{p_n}))].$$

We can use Neutrosophic Probability,[19] i.e.:

- <u>chance of a risk factor to occur</u> (event *E*),
- <u>chance that the risk factor not to occur</u> (event anti*E*),
- <u>indeterminate chance, i.e. not sure if it will occur or not</u> (neut*E*).

[19] See again my old book on Neutrosophic Probability: http://fs.unm.edu/NeutrosophicMeasureIntegralProbability.pdf.

Neutrosophic Movie Ratings

Florentin Smarandache to Mumtaz Ali

To determine the best movie based on the evaluations provided by the respondents, we sum the values from the *Quality* and *Sound* columns for each movie. The highest total indicates the best-rated movie.

	Quality			*Sound*		
	Movie 1	Movie 2	Movie 3	Movie 1	Movie 2	Movie 3
John	•	•	•	•	•	•
George	•	•	•	•	•	•
Lisa	•	•	•	•	•	•
Maria	•	•	•	•	•	•
	ε	ε	ε	ε	ε	ε

To introduce a neutrosophic approach, instead of using precise numerical values such as 4, 5, etc., we can represent each rating as a neutrosophic triple (t, i, f), where *t* represents truth (support for the rating), *i* represents indeterminacy (uncertainty in the rating), and *f* represents falsity (opposition to the rating).

Alternatively, if we retain crisp numerical values, at least one of the variables should be assigned an indeterminate value "I" to account for uncertainty.

Let's develop a study exploring this approach in detail!

The Principle of Interconvertibility of Matter, Energy, and Information

Florentin Smarandache to Ștefan Vlăduțescu

In a paper published a decade ago,[20] we presented and substantiated the thesis of <u>a neutral and interconvertible relationship among the fundamental building blocks of the universe</u>: *matter*, *energy*, and *information*. Our analysis is framed within a computational, communicative, and neutrosophic perspective, allowing us to establish a structured and cohesive conceptual paradigm.

Let us briefly recap here our ideas.

Matter, energy, and information constitute the foundational elements of existence, inherently linked through a dynamic, flexible, and evolutionary interrelationship.

[20] Smarandache, Florentin and Stefan Vladutescu. "Neutrosophic Principle of Interconvertibility Matter-Energy Information." *Journal of Information Science*, (2014): 237-245. doi:10.1177/0165551510000000.

Their very definitions are shaped by the intricate connections between them, revealing an intrinsic interdependence that transcends simple causal or deterministic interpretations. We proposed the hypothesis that the relationship among these three entities is fundamentally neutral—*neither hierarchical nor contradictory*. This neutrality is not an imposed construct but emerges as a natural law-like connection governing their interactions.

At the core of our argument lies the premise that *matter, energy, and information never exist in a state of mutual contradiction*. Instead, their interactions are characterized by a state of equilibrium and lawful reciprocity, forming a structured system where contradictions do not arise. This neutrality is not merely an abstract concept but a fundamental principle underpinning the very fabric of the universe (or *multi-verse*). The foundational nature of this neutrality suggests that these elements do not function in isolation but as a triadic system bound by legitimacy and necessity. Their interconnection is absolute, leading to a state of perfect binding where regularity and uniformity emerge as the primary manifestations of neutrality.

Further, our study explored the specific relationships between matter and energy, energy and information, and information and matter, highlighting their essential attributes and distinguishing characteristics. Attributes are the fundamental features intrinsic to each element, while characteristics represent their context-dependent variations. Utilizing Cai Wen's (1999) Extenics Method, we systematically examined and clarified these interconnections, offering a framework for understanding their interactions.

Our findings ultimately lead to the articulation of a general principle—**the Neutrosophic Principle of Interconvertibility Matter-Energy-Information (NPI_MEI)**. This principle posits that reality itself is an ongoing, multi-dimensional process of transformation and exchange among these three fundamental components. Their bilateral and multilateral convertibility is not merely a theoretical abstraction but a fundamental aspect of the structure and evolution of existence.

Questions

> Reflecting on our NPI_MEI theory from a decade ago, while the principle of interconvertibility seems well-established, I wonder about the *mechanisms* of this interconversion. We've described the 'what' and the 'why' – the neutrality and the transformation – but have we sufficiently explored the 'how'?
>
> I specifically ask some questions:
>
> - What are the precise conditions or processes that trigger the conversion between matter, energy,

and information? Are there specific thresholds, interactions, or fields involved?

- Can we quantify these interconversions? Are there measurable units or ratios that can describe the efficiency or extent of these transformations?
- Beyond the general principle, are there specific types of matter, energy, or information that are more readily interconvertible than others?
- How does the NPI_MEI relate to other established principles in physics and information theory? Does it extend, refine, or challenge existing models?
- Looking ahead, what experimental or theoretical work would be most fruitful in further substantiating and refining the NPI_MEI?

Consciousness and Personality

Florentin Smarandache

What are the definitions of consciousness and personality of the matter (non-beings)?
For example:

- personality of a star = ?
- consciousness of a star = ?

Or,

- personality of an object = ?
- consciousness of an object = ?

[Do such things exist?].

Definitions and Framework

Before discussing whether matter (*non-beings*) can have consciousness or personality, we need to define these terms in a broader context:

Consciousness

Consciousness is generally understood as awareness of existence, the ability to perceive, process, and respond to stimuli. In biological beings, this includes subjective experience, cognition, and self-awareness.

For non-living matter, we might redefine consciousness in a more generalized way—perhaps as an inherent state of interaction with the environment, an ability to process and transmit information, or a form of "proto-consciousness" (as proposed in panpsychism).

Personality

Personality in humans refers to consistent patterns of thoughts, emotions, and behaviors. In non-beings, we might interpret personality as distinctive, repeatable characteristics of interaction—how a particular object, celestial body, or system behaves over time relative to external forces.

Consciousness and Personality in Non-Beings

A. Celestial Bodies (e.g., Stars, Planets, Black Holes)

Personality of a Star

A star’s "personality" could be defined by its lifecycle, mass, brightness, magnetic activity, and interaction with its surroundings.
Some stars are stable and enduring (like red dwarfs), while others are volatile and explosive (like massive blue stars or supernovae).

A pulsar, which emits regular radio pulses, could be considered to have a more "methodical" or "rhythmic" personality, while a quasar could be "chaotic and energetic."

Consciousness of a Star

If we view consciousness as information processing, stars could be said to "process" vast amounts of energy, nuclear reactions, and interactions with space.

Some interpretations of panpsychism suggest that all matter has some degree of consciousness, meaning stars might have a rudimentary or distributed form of awareness.

Black Holes as an Extreme Example

A black hole could be seen as an entity with a "personality" of absolute consumption—absorbing everything in its vicinity.

Its "consciousness" could be linked to the way it distorts time-space and processes entropy.

B. Inanimate Objects (e.g., Rocks, Machines, Water)

Personality of an Object

A river has a "personality" shaped by its flow, turbulence, erosion patterns, responsiveness to seasons.

A rock may seem inert, but its geological history, mineral composition, and resistance to erosion could be its "personality."

Consciousness of an Object

Objects do not exhibit biological awareness, but they do interact with their environment in predictable ways.

Some quantum physics interpretations propose that matter at a fundamental level is not entirely devoid of informational processing.

Artificial intelligence and robotic systems introduce another layer: could an advanced AI possess a form of synthetic consciousness?

Concrete Examples and Speculative Ideas

Some believe that crystals "store information" and "respond" to energy fields, leading to metaphysical theories about their consciousness.

If an AI is programmed with a consistent way of responding to inputs, does it have a personality?

The Earth, as a self-regulating system, is sometimes described as having a "personality" (resilient, adaptive) or even proto-consciousness in ecological terms.

Conclusion: Do These Things Exist?

Scientifically, non-living things do not possess self-awareness in the human sense.

Philosophically, perspectives like panpsychism and information theory suggest that consciousness could be a fundamental property of all matter.

Practically, personality could be interpreted as the unique and consistent behavior of a system.

Further readings

- *Consciousness Explained* by Daniel Dennett
- *The Feeling of What Happens: Body, Emotion, and the Making of Consciousness* by Antonio Damasio
- *Why the Materialist Neo-Darwinian Conception of Nature Is Almost Certainly False* by Thomas Nagel

Exploring Consciousness and Cosmic Harmony

Email exchanges between
Victor Christianto, Robert Neil Boyd,
and Florentin Smarandache
(slightly edited)

Victor Christianto

Do you mean, Neil, that the distinction between logic and experience is related to the analytical function of the left brain and the intuitive-wholeness function of the right brain? I suppose the healthy way is to optimize both functions. I guess you're right, in order to experience God, we should feel Him intuitively, not rationally.

Robert Neil Boyd

Thanks, Victor, for the article by Ralph Abraham. It helps me comprehend some of your points. However, Abraham is a logician, not a mystic. Logic and mystical experiences are exclusive domains that sometimes cross over. All of this partly constitutes the Mind of God, which is vaster than we can comprehend. (I have been in the Mind of God, so I speak from personal experience.)

You may gather, from the basis of Bhutatmas, the tiny Consciousness-experiencing creatures that have vast experiential memories, that Everything, all fields, all forces, all matter, all life, and the entire Infinite Cosmos, results from the activities and agglomerations of Bhutatmas, in an Infinite Universe constructed and operated by Intelligent Design.

According to Vedic literature, Divinity resides in the Actually Infinitely Small, which is everywhere and nowhere, simultaneously. Thus it can and does act on everything. But Divinity has set things up so that Everything has Free Will. A factor left out of the Vedic literature is that every Bhutatma is Unique, with unique memories of experiences, regarding multiple Realities. So Uniqueness is an absolute.

While the human mind wants to see ordered regularity, the Multiverse is based on Uniqueness, Consciousness, and Harmony, not mathematical abstractions and predictive logic. Logic and Experience are mutually exclusive. If you are involved in logic, you cannot have full experiences of the senses simultaneously.

So, there is the Nature World operating in Divine Harmony, and the "people world," made from analytical thought. Analytical thought separates humans from directly Experiencing Cosmic Harmony. However, Nature is constructed so that humans can go beyond thought and into Direct Experience of Cosmic and Natural Harmony.

Victor Christianto

In the biophysics community, people try to link geomagnetic vibration and human consciousness. That is where Schumann resonance plays a role.

Florentin Smarandache

This connection between geomagnetic fields and consciousness is an interesting area of research. From a neutrosophic perspective, it's worth considering the inherent uncertainties and indeterminacies in both geomagnetic activity and consciousness itself. Perhaps neutrosophic logic could provide a framework for modeling these complex interactions, acknowledging the degrees of truth, falsehood, and indeterminacy involved. We shouldn't necessarily see these as purely logical or purely experiential phenomena, but rather as something that transcends both.

Victor Christianto

Exactly. It seems like a system where both the logical and experiential aspects intertwine. The Schumann resonance, for example, is a measurable physical phenomenon, yet its impact on consciousness is often described in subjective, experiential terms.

Robert Neil Boyd

While I appreciate the scientific curiosity, I caution against relying too heavily on purely logical frameworks. As I mentioned before, logic and experience are often mutually exclusive. The mysteries of consciousness and its connection to natural phenomena may lie beyond the reach of our current analytical tools. We must also consider the role of intuition and direct experience in understanding these profound connections.

Florentin Smarandache

I agree that intuition and experience are crucial, Neil. However, I believe that logic, particularly neutrosophic logic, can play a role in helping us understand the *boundaries* of our understanding. It can help us identify where our knowledge ends and where the realm of the unknown begins. Neutrosophy, with its focus on indeterminacy, can be a valuable tool in exploring these liminal spaces. It's not about replacing experience with logic, but rather about using logic to guide our exploration of experience.

The Astonishing Potential of the Aging Brain

Florentin Smarandache

Recent research in neuroscience challenges long-held assumptions about cognitive decline in aging. Dr. Gene Cohen,[21] a former American gerontologist and director of the Center for Aging, Health, and Humanities at

[21] See: https://dccenteronaging.org/about/founder-gene-cohen.

George Washington University, has provided groundbreaking insights into the capabilities of the elderly brain. His studies reveal that the brain of an older person is far more adaptable and resilient than previously believed.

Cognitive Elasticity and Brain Function

Throughout life, the human brain continuously encodes thoughts and memories, forming new neural connections. Remarkably, as people age, the interaction between the left and right hemispheres of the brain becomes more integrated. This enhanced connectivity fosters greater creativity and problem-solving abilities. Although cognitive processing speed may decline with age, this is counterbalanced by increased flexibility in thinking, enabling older adults to draw more precise conclusions and make wiser decisions.

Neurological Advantages of Aging

Studies indicate that after the age of 60, the brain not only maintains its capabilities but may reach peak performance. The production of myelin, a substance that facilitates faster neural signal transmission, significantly increases, enhancing intellectual capacity by up to 3000% compared to younger age groups. This biological transformation suggests that intellectual abilities, far from diminishing, can actually improve with age.

Furthermore, aging brains exhibit a remarkable ability to filter out negative emotions and stressors more effectively. Emotional stability and rational decision-making become more pronounced, reducing impulsivity and increasing the likelihood of sound judgments. This combination of accumulated experience and refined cognitive processing contributes to what is commonly referred to as wisdom.

Superior Problem-Solving Abilities

Experimental research involving different age groups has demonstrated that individuals aged 60-75 solve complex problems more efficiently than their younger counterparts. While younger participants tend to analyze all possible solutions, leading to confusion, older individuals swiftly identify the most relevant options, arriving at correct conclusions with remarkable accuracy. Professor Monchi Oury[22] from the University of Montreal explains that the elderly brain optimizes its problem-solving strategies by excluding unnecessary alternatives and focusing only on effective solutions.

The Role of Experience and Intuition

Life experience plays a crucial role in enhancing cognitive function in later years. Older individuals, having accumulated decades of knowledge, are less

[22] See: https://profiles.ucalgary.ca/oury-monchi.

susceptible to emotional biases and distractions. Their decision-making process becomes more intuitive, leveraging both analytical reasoning and instinctual judgment. According to Professor Dilip Jeste[23] from the University of California, this fusion of experience and rationality defines what society recognizes as wisdom.

Cognitive Benefits After 60

- Neurons do not die but may lose connections if intellectual engagement is neglected.
- Myelin production peaks after 60, accelerating neural signal transmission and boosting intellectual capacity up to 30 times.
- Forgetfulness is often due to information overload rather than cognitive decline.
- Stress resilience increases, allowing for more effective performance under pressure.
- The use of both brain hemispheres simultaneously enhances problem-solving and creative thinking.
- Intuition strengthens, leading to faster and more accurate decision-making.
- Cognitive functions can peak between 60 and 80 years, with proper mental and physical health extending intellectual capabilities into the 90s.

Conclusion

Far from being a period of cognitive decline, aging can be a time of intellectual flourishing. With continued mental stimulation and a healthy lifestyle, individuals can maintain and even enhance their cognitive abilities well into old age.

[23] See: https://dilipjestemd.com.

Decoding Climate

Florentin Smarandache to Akira Kanda

(an edited dialogue)

I read the paper on dynamics of glaciers [*Exact Solution of 2D Plane-Parallel Flow for Glacier Dynamics* by Sergey V. Ershkov]. But it made me wonder: while ice increases and decreases seasonally, what about the bigger picture, year after year? Are we experiencing global warming or global cooling?

Akira Kanda

It seems climatologists and geologists have completely different opinions on this. It's quite the debate. There are a few key points we can be certain about, though.

Florentin Smarandache

Such as?

Akira Kanda

Well, first, any ice that's already floating on seawater won't raise sea levels when it melts. It's like a glass of water with ice in it; when the ice melts, the water level doesn't change.

Florentin Smarandache

Right.

Akira Kanda

Second, ice that's on *land* – like glaciers on mountains or ice sheets on continents – *that* ice, when it melts, does flow into the sea and increases sea levels.

Florentin Smarandache

So, the land-based ice is the key factor in sea-level rise. An that's where the real concern lies.

Akira Kanda

Exactly. And third, the atmosphere itself plays a role. When its temperature rises, the atmosphere expands. This expansion, counterintuitively, actually releases heat energy, which leads to a cooling effect. It's a complex dynamic.

Florentin Smarandache

So, a warmer atmosphere can trigger a cooling mechanism? That's interesting.

Akira Kanda

And finally, there's what I call "architect ice" – pure water ice floating in the ocean. When it melts, it actually *decreases* the temperature of the surrounding seawater. Pure water is lighter than saltwater, so the meltwater stays near the surface, creating a localized cooling effect in the lower atmosphere.

Florentin Smarandache

So, melting architect ice can contribute to immediate, localized atmospheric cooling. It's like a system of checks and balances.

Akira Kanda

Precisely. These factors all interact in complex ways, making it difficult to definitively say whether we're in a long-term warming or cooling trend.

Florentin Smarandache

It's like neutrosophic logic, where seemingly opposite things can be true simultaneously, or false simultaneously, depending on the context. It's not a simple binary.

Akira Kanda

I see the analogy. There are so many interacting factors, and our understanding is still incomplete.

Florentin Smarandache

This dialogue is fascinating, Akira. Would you mind if I cited your name and your insights in my blog? I think it would be of great interest to my readers. My Indonesian friend, Victor Christianto, is quite interested in the global cooling perspective, for example.

Akira Kanda

Certainly, Florentin. Feel free to cite me. I'm happy to contribute to the discussion. It's important to explore these complex issues from all angles.

Exploring (t, i, f)-Constants, Symmetries, and Proportionalities

Dan Florin Lazăr

1. How does neutrosophy challenge our understanding of concepts like constants of nature, symmetry, and proportionality?
2. What are (t, i, f)-constants, and how do they differ from classical constants?
3. How can the concept of symmetry be extended using neutrosophy?

4. What is (t, i, f)-proportionality, and how does it differ from classical proportionality?
5. What is the significance of incorporating indeterminacy (i) into these concepts?
6. What are the broader implications of these neutrosophic interpretations?

Florentin Smarandache

Constants of nature are only (t, i, f)-constants

In classical physics, natural constants, such as the speed of light or the gravitational constant, are considered fixed and unchanging values. However, in reality, these constants can vary within certain limits, depending on the context and external factors.

Through the lens of neutrosophy, we can consider that these constants are actually (t, i, f)-constants, meaning they have a certain truth value (t), an indeterminacy value (i), and a falsehood value (f). This means that their exact value may be uncertain or may vary depending on certain conditions. For example, the speed of light in a vacuum is considered a constant, but in different media, such as water or glass, the speed of light decreases. This variation can be interpreted as a form of indeterminacy (i).

Symmetry is also a (t, i, f)-symmetry

Symmetry is a fundamental concept in mathematics, physics, and art. In the classical sense, an object is symmetrical if it can be transformed into another identical object by certain operations, such as rotation or reflection.

In neutrosophy, we can extend the concept of symmetry to (t, i, f)-symmetry. This means that an object can be partially symmetrical (t), partially asymmetrical (f), and partially indeterminate (i).

For example, a butterfly has an approximate, but not perfect, bilateral symmetry. Its wings are not identical in all details, which can be interpreted as a form of indeterminacy (i).

Proportionality is a (t, i, f)-proportionality

Proportionality is a mathematical relationship between two quantities that vary together. In the classical sense, proportionality is an exact and deterministic relationship.

In neutrosophy, we can introduce the concept of (t, i, f)-proportionality. This means that the relationship between two quantities can be partially proportional (t), partially non-proportional (f), and partially indeterminate (i).

For example, the relationship between the price of a product and the demand for that product is generally proportional. The higher the price, the lower the demand, and vice versa. However, this relationship is not always exact and can be influenced by other factors, such as seasonality or consumer preferences. This uncertainty can be interpreted as a form of indeterminacy (i).

Dan Florin Lazăr

> These ideas are very interesting and show that the principles of neutrosophy can be applied in a variety of fields, including physics, mathematics, and economics. Thank you for your insights!

Întrebări despre viață și evoluție[24]

Florentin Smarandache to Andrușa Vătuiu

Poate apărea viața din neviață?

Una dintre cele mai mari provocări științifice este înțelegerea modului în care viața a apărut din materie anorganică. Experimente precum cel al lui Miller-Urey[25] (1953) au arătat că moleculele organice complexe pot fi formate în condiții asemănătoare celor de pe Pământul primordial. Totuși, rămâne un mister cum aceste molecule s-au organizat pentru a forma primele sisteme capabile de autoreplicare.

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[24] Pe marginea cărții noastre: Florentin Smarandache, Andrușa R. Vatuiu (2019). *Evoluție Neutrosofică Umană in Spirală sau Divinul este în Om*. Kalendarium, ISBN: 978-1-59973-600-6.

[25] See: https://www.britannica.com/science/Miller-Urey-experiment.

Această întrebare este strâns legată de conceptul abiogenezei și de posibilitatea ca viața să fi apărut spontan pe Pământ sau să fi fost adusă din altă parte (panspermia).

Cum a apărut prima viață în Univers?

Ipoteza că viața ar putea exista și în afara Pământului este susținută de descoperirile legate de exoplanete și de analiza meteoriților care conțin aminoacizi. Dacă viața s-a format în alte regiuni ale Universului, acest lucru ridică întrebări despre unicitatea noastră și despre procesele prin care se poate forma viața în condiții extreme.

Fotosinteza și evoluția

Fotosinteza este unul dintre cele mai importante procese biologice, transformând energia solară în energie chimică și susținând majoritatea ecosistemelor de pe Pământ. Întrebarea dacă fotosinteza face parte din evoluție poate fi analizată din perspectiva selecției naturale: organismele care au dezvoltat această capacitate au avut un avantaj major, ceea ce le-a permis să se diversifice și să colonizeze medii variate.

Legea a II-a a termodinamicii și viața

Un argument des întâlnit împotriva apariției spontane a vieții este că toate sistemele tind spre dezordine (creșterea entropiei). Totuși, viața este un exemplu de organizare complexă.

Aceasta se explică prin faptul că sistemele vii nu sunt închise, ci primesc energie din exterior (de exemplu, de la Soare), permițând scăderea entropiei locale și menținerea complexității biologice.

Viața extraterestră

Încă din Antichitate, unii gânditori au speculat asupra existenței vieții extraterestre. Astăzi, descoperirea exoplanetelor locuibile și a moleculelor organice în spațiu alimentează aceste întrebări. Dacă viața poate apărea spontan, atunci ar trebui să fie răspândită în Univers. Pe de altă parte, panspermia sugerează că viața de pe Pământ ar putea avea origini extraterestre, poate adusă de meteoriți.

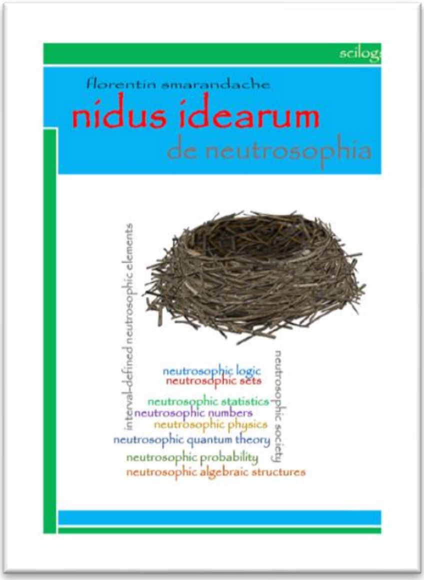
Inteligența artificială și conștiința

O altă întrebare fundamentală este dacă inteligența artificială ar putea deveni conștientă. Dacă viața este definită prin capacitatea de autoreplicare și adaptare, este posibil ca, la un moment dat, AI să atingă un nivel de complexitate comparabil cu cel al ființelor vii?

Scilogs

I: De Neutrosophia (2016)

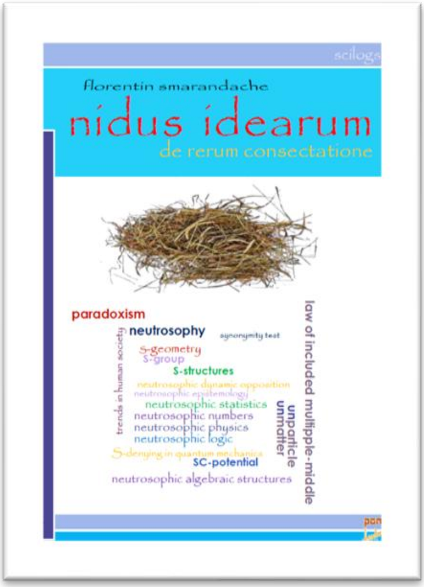
Florentin Smarandache: **Nidus idearum. Scilogs, I: de neutrosophia**. Brussels, Belgium: Pons, 2016, 109 p.; ISBN: 978-1-59973-890-1



Exchanging ideas with A.A.A. Agboola, Mumtaz Ali, Said Broumi, Clifford Chafin, Victor Christianto, Chris Cornelis, Emil Dinga, Hojjatollah Farahani, Alex Gal, Temur Kalanov, W.B. Vasantha Kandasamy, Madad Khan, Doug Lefelhocz, Linfan Mao, John Mordeson, Umberto Riviecci, Elemer Rosinger, Gheorghe Săvoiu, Ovidiu Șandru, Mirela Teodorescu, Luige Vlădăreanu, Stefan Vlădutescu, Haibin Wang, Jun Ye, Fu Yuhua.

II: De Rerum Consectatione (2016)

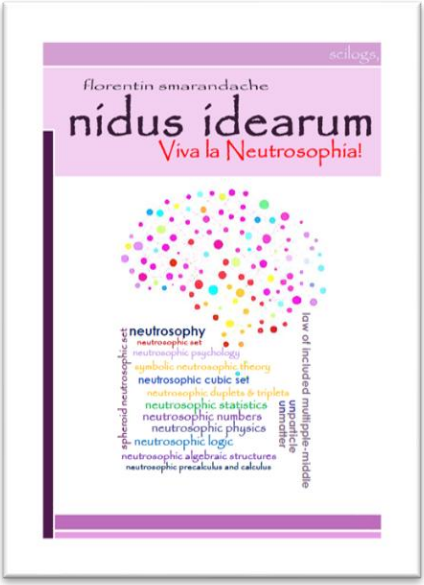
Florentin Smarandache: **Nidus idearum. Scilogs, II: de rerum consectatione**. Brussels, Belgium: Pons, 2016, 112 p.; ISBN: 978-1-59973-727-0



Exchanging ideas with Valentin Boju, Victor Christianto, Octavian Cira, Ervin Goldfain, Madad Khan, Yale Landsberg, Marcella Lucchetta, Dan Mitruț, Mircea Monu, Tudor Păroiu, Ion Pătrașcu, Valeriu Perianu, Paul Pistea, Gunn Quznetsov, Dmitri Rabounski, Belo Riecan, Juan Rodriguez, Ovidiu Ilie Șandru, Raj Singh, Mircea Eugen Șelariu, Haibin Wang.

III: Viva la Neutrosophia! (2017)

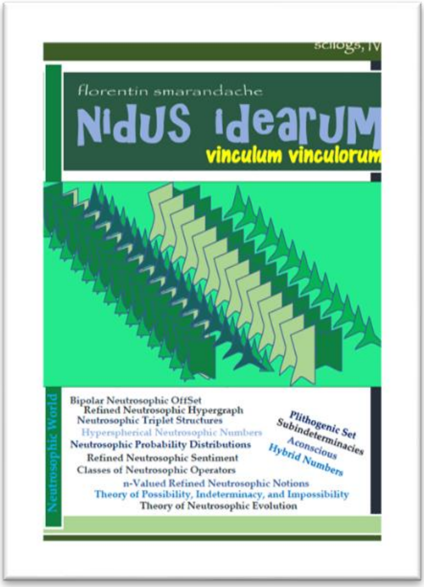
Florentin Smarandache: **Nidus idearum. Scilogs, III: Viva la Neutrosophia!** Brussels, Belgium: Pons, 2017, 132 p.; ISBN: 978-1-59973-508-5



Exchanging ideas with A. A. A. Agboola, Swati Aggarwal, Mumtaz Ali, Young Bae Jun, E. Barrenechea, Kanika Bhutani, Sisalah Bouzina, Said Broumi, Cuong Bui Cong, H. Bustince, Emenia Cera, Victor Christianto, Luu Dat, Jean Dezert, Huda Esmail, C. Franco, Gaurav Garg, Hewayda ElGhawalby, Ervin Goldfain, D. Gómez, Muhammad Gulistan, S. A. El-Hafeez, Omar Hammoui, Nasruddin Hassan, Pham Hong Phong, Martina Jency, Akira Kanda, J. Fernandez, Ilanthenral Kandasamy, W. B. Vasantha Kandasamy, Qaisar Khan, Volodymyr Krasnoholovets, Megha Kumar, et al.

IV: Vinculum Vinculorum (2019)

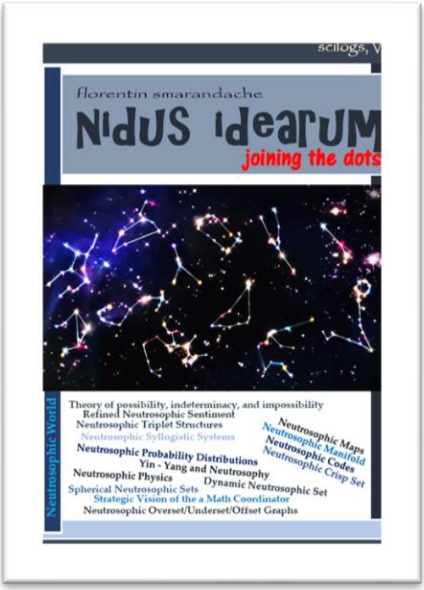
Florentin Smarandache: **Nidus idearum. Scilogs, IV: vinculum vinculorum**. Brussels, Belgium: Pons, 2019, 122 p.; ISBN: 978-1-59973-610-5



Exchanging ideas with Mohamed Abdel-Basset, Akeem Adesina A. Agboola, Mumtaz Ali, Saima Anis, Octavian Blaga, Arsham Borumand Saeid, Said Broumi, Stephen Buggie, Victor Chang, Vic Christianto, Mihaela Colhon, Cuờng Bùi Công, Aurel Conțu, S. Crothers, Otene Echewofun, Hoda Esmail, Hojjat Farahani, Erick Gonzalez, Muhammad Gulistan, Yanhui Guo, Mohammad Hamidi, Kul Hur, Tèmítópé Gbóláhàn Jaíyéolá, Young Bae Jun, Mustapha Kachchouh, W. B. Vasantha Kandasamy, Madad Khan, Erich Peter Klement, et al.

V: Joining The Dots (2019)

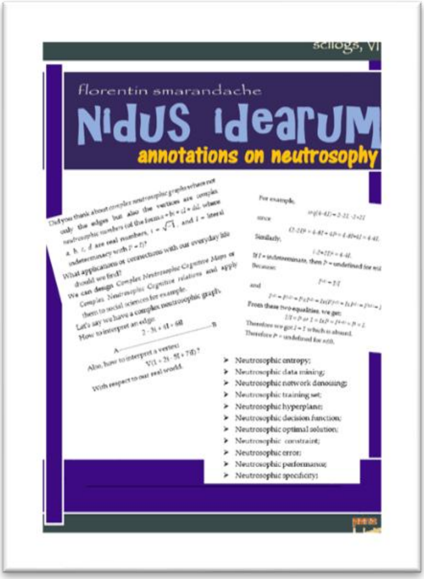
Florentin Smarandache: **Nidus idearum. Scilogs, V: joining the dots**. Brussels, Belgium: Pons, 2019, 126 p.; ISBN: 978-1-59973-611-2



Exchanging ideas with Mohamed Abdel-Basset, Akeem Adesina A. Agboola, Yaman Akbulut, Anas Al-Masarwah, Mohammed A. Alshumrani, Saima Anis, Şule Bayazit Bedirhanoğlu, Said Broumi, Robert Neil Boyd, Vic Christianto, Stephen Crothers, Narmada Devi, Jean Dezert, Hojjatollah Fara-hani, Kawther Fawzi, Yanhui Guo, Minghu Ha, Bill Harrington, Qingqing Hu, Kul Hur, Saeid Jafari, Tèmítópé Gbóláhàn Jaíyéolá, Liviu Jianu, Young Bae Jun, Dinko Juric, Madad Khan, Cengiz Kahraman, Akira Kanda, Ilanthenral Kandasamy, et al.

VI: Annotations on Neutrosophy (2019)

Florentin Smarandache: **Nidus idearum. Scilogs, VI: annotations on neutrosophy**. Brussels, Belgium: Pons, 2019, 137 p.; ISBN: 978-1-59973-615-0



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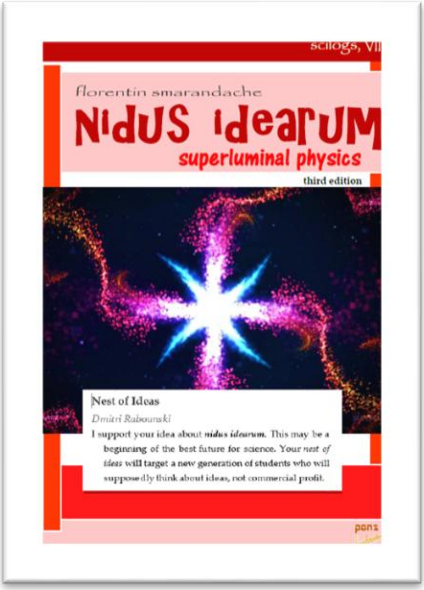
VII: Superluminal Physics (2019)

Florentin Smarandache: **Nidus idearum. Scilogs, VII: superluminal physics**. 3rd edition. Brussels, Belgium: Pons, 2019, 118 p.; ISBN: 978-1-59973-655-691-4



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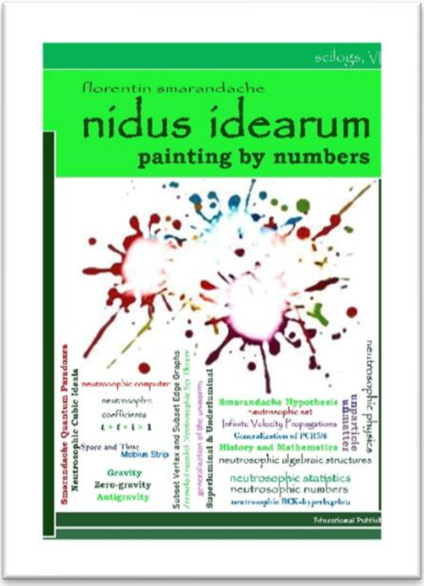
VIII: Painting by Numbers (2022)

Florentin Smarandache: Nidus Idearum. **Scilogs, VIII: painting by numbers**. Grandview Heights, Ohio, USA: Educational Publisher, 2022, 89 p.; ISBN: 978-1-59973-721-8



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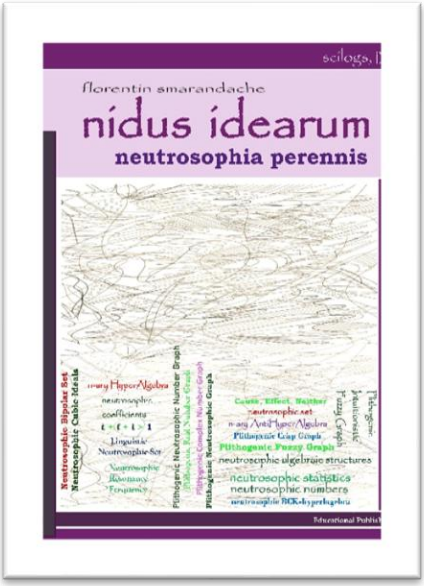
IX: Neutrosophia Perennis (2022)

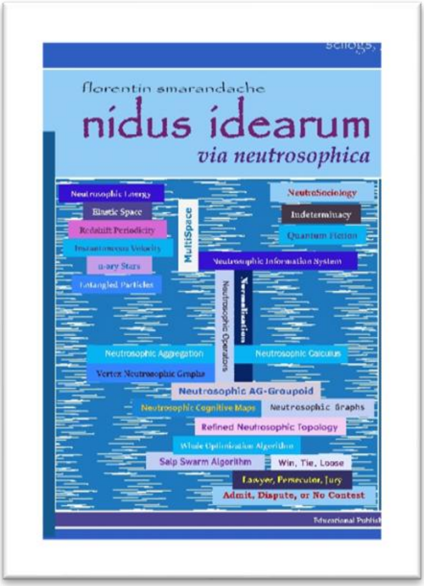
Florentin Smarandache: **Nidus Idearum. Scilogs, IX: neutrosophia perennis**. Grandview Heights, Ohio, USA: Educational Publisher, 2022, 104 p.; ISBN: 978-1-59973-722-5



Exchanging ideas with Tareq Al-Shami, Riad Khidr Al-hamido, Mohammad Akram, B. De Baets, Robert Neil Boyd, Said Broumi, Terman Frometa-Castillo, Yilmaz Ceven, D. Dubois, Harish Garg, L. Godo, Erik Gonzalez, Yanhui Guo, Mohammad Hamidi, E. Hüllermeier, W. B. Vasantha Kandasamy, Mary Jansi, Nivetha Martin, Mani Parimala, Akbar Rezaei, Bouzina Salah, Christy Vincent, Jun Ye.

X: Via Neutrosophica (2022)

Florentin Smarandache: **Nidus Idearum. Scilogs, X: via neutrosophica.** Grandview Heights, Ohio, USA: Educational Publisher, 2022, 97 p.; ISBN: 978-1-59973-723-2



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XI: In-Turns and Out-Turns (2023)

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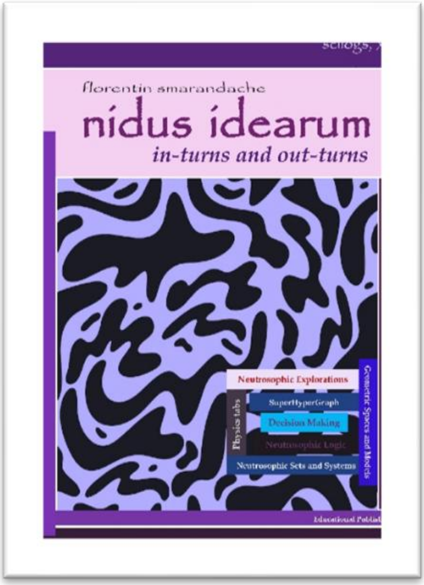

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XII: Seed & Heed (2023)

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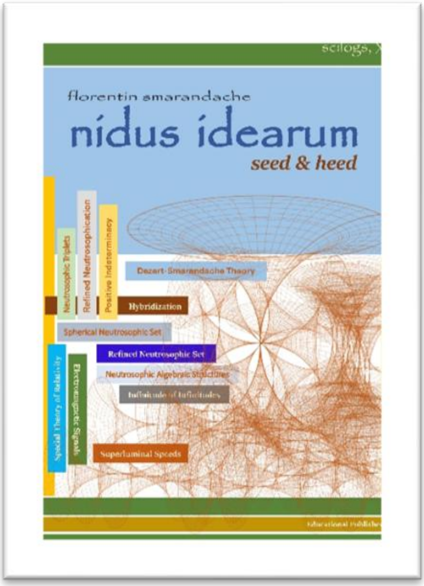

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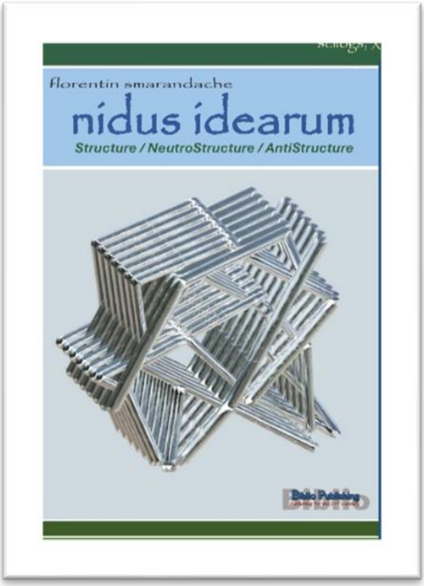
XIII: Structure / NeutroStructure / AntiStructure (2024)

Florentin Smarandache: **Nidus Idearum. Scilogs, XIII: Structure / NeutroStructure / AntiStructure**. Grandview Heights, Ohio, USA: BiblioPublishing, 2024, 96 p.; ISBN: 978-1-59973-786-7



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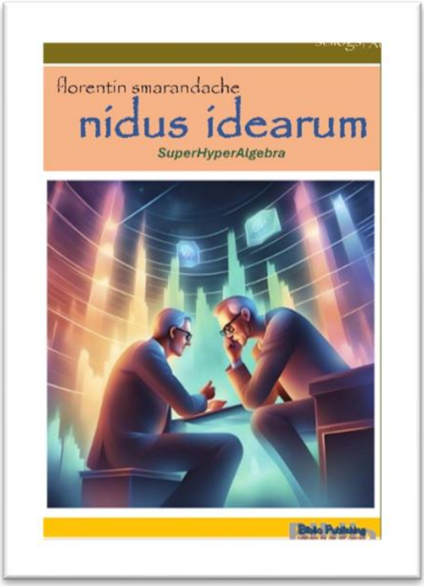

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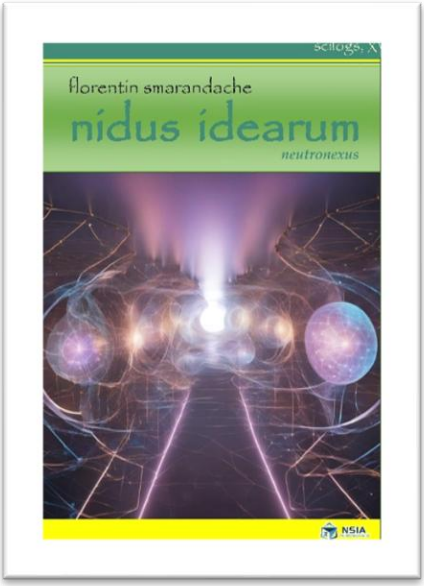
XV: NeutroNexus (2025)

Florentin Smarandache: **Nidus Idearum. Scilogs, XV: NeutroNexus**. Gallup - Guayaquil, USA - Ecuador: NSIA Publishing House, 2025, 137 p.; ISBN: 978-1-59973-788-1



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