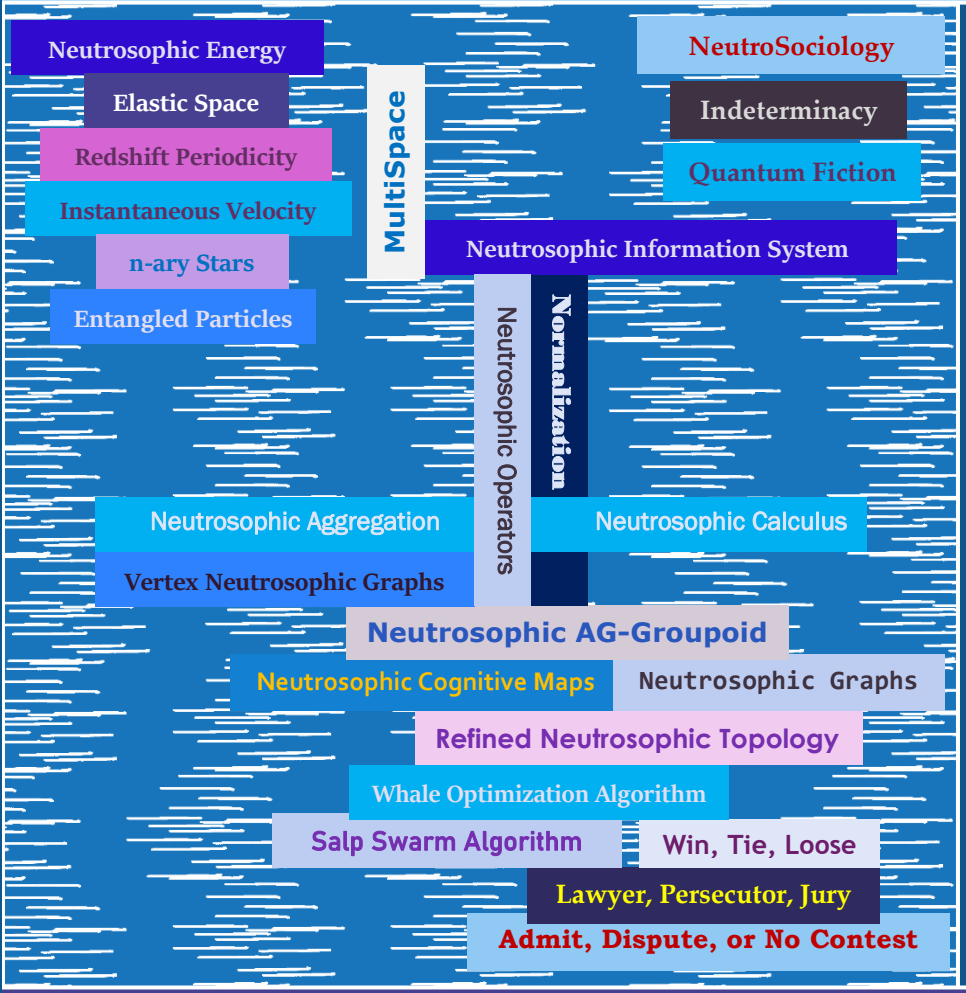
scilogs, X

florentin smarandache

nidus idearum

via neutrosophica



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Florentin Smarandache

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Scilogs, X: via neutrosophica

Grandview Heights, Ohio, USA, 2022

Exchanging ideas with A. Elhassouny, Junhui Kim, Jeong Gon Lee, Kul Hur, Hojjatollah Farahani, W. B. Vasantha Kandasamy, Said Broumi, Mumtaz Ali, Mohamed Abdel-Basset, Ozen Ozer, Madad Khan, Gheorghe Săvoiu, John Mordeson, Adesina Agboola, Waldyr Rodrigues, Ajay Sharma, Stephen Crothers, Vlad, Dmitri Rabounski, Victor Christianto, Trung Duyên, Mirela Teodorescu, Ioan Aurel Pop (in order of reference in the book).

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INVITATION

Welcome into my scientific lab!

My **lab**[oratory] is a virtual facility with non-controlled conditions in which I mostly perform scientific meditation and chats: *a nest of ideas* (**nidus idearum**, in Latin).

I called the jottings herein *scilogs* (truncations of the words *scientific*, and gr. Λόγος (logos) – appealing rather to its original meanings "ground", "opinion", "expectation"), combining the welly of both science and informal (via internet) talks (in English, French, and Romanian).

In this *tenth book of scilogs* – called via neutrosophica (the neutrosophic way) –, one may find new and old questions and solutions, referring mostly to topics on NEUTROSOPHY, but also MULTISPACE, with miscellaneous addition of topics on Physics, Mathematics, or Sociology – email messages to research colleagues, or replies, notes about authors, articles, or books, spontaneous ideas, and so on.

Feel free to budge in or just use the scilogs as open source for your own ideas!

Special thanks to all my peer colleagues for incitant and pertinent instances of discussing.

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NEUTROSOPHICS

Examples of different Neutrosophic Parameters applied in our everyday life

a. In the court of law there are three distinct and opposed parameters:

- *defense lawyer* (that says positive things about inculpate),
- *persecutor* (who say negative things about inculpate),
- and *jury* (who is neutral).

b. Another example of different parameters applied in our everyday life:

Some medications have, besides the *positive effect* against a malady, also a *secondary* (negative) *effect*.

Collecting Neutrosophic Data

to A. Elhassouny

It happens with fuzzy and intuitionistic fuzzy: the patients do not say I am 30% sick, or respectively I am 40% sick and 20% healthy... It is the expert's duty to make a fuzzy/IFS/neutrosophic model. In this case YOU are the expert.

After using the aggregation operators you get some results in *(T, I, F)* form.

You collect vague data, conflicting data…

For example, instead of a crisp number, let's say 6.5, you get some approximation, for example between 6 and 7, so you use (6,7) interval to approximate a number which is inside of it but you do not know it.

Or, instead of 7.8 you get some hesitant set approximations: {7.0, 7.7, 7.9, 8.3}.

Or, a doctor says: this patient is probability 70% sick, other says 20% sick…

Example where Neutrosophic Logic works, but Fuzzy Logic does not work

Neutrosophic logic is an extension of fuzzy logic. In fuzzy logic a proposition is t % true and f % false, $t+f = 1$.

In neutrosophic logic a proposition is t % true, i % indeterminacy (neutral, i.e. neither true nor false), and f % false.

For example, in games based on 3 possibilities (win, tie, loose) one can use the neutrosophic logic better than the fuzzy logic.

Suppose the proposition P about a future scheduled soccer game between USA and Argentina: "USA will win against Argentina". The experts can predict that P has the following truth-values: (0.5, 0.1, 0.4) meaning that the chance that USA wins is 50%, the chance the USA has tie game with Argentina is 10%, while the chance that USA loses against Argentina is 40%.

We cannot characterize this game better in fuzzy logic, since in fuzzy logic you do not have Indeterminacy (= Neutrality).

The word "neutrosophic" comes from this component Indeterminacy (or Neutrality), meaning neither true/winning nor false/loosing, which is not used in fuzzy logic (not even in intuitionistic fuzzy logic it is defined, it is only what remains...).

Neutrosophication vs. Regret Theory

Regret Theory (2010) is actually a Neutrosophication (1998) model, when the decision making area is split into three parts, the opposite ones (upper approximation area, and lower approximation area) and the neutral one (border area, in between the upper and lower area).

References:

H. Bleichrodt, A. Cillo, E. Diecidue, A quantitative measurement of regret theory, *Manage. Sci.* 56(1) (2010) 161-175.

F.Smarandache, *Neutrosophy. / Neutrosophic Probability, Set, and Logic*, ProQuest Information & Learning, Ann Arbor, Michigan, USA, 105 p., 1998.

Refined Neutrosophic Topology

to Junhui Kim, Jeong Gon Lee, and Kul Hur

The paper on *Single-Valued Neutrosophic Topology* is well-documented. We can extend it to define and study the *Single-Valued Refined Neutrosophic Topology*, where the neutrosophic components *T, I, F* can be split into $T_1, T_2, \ldots$; $I_1, I_2, \ldots$; $F_1, F_2, \ldots$.

See the paper:

http://fs.unm.edu/n-ValuedNeutrosophicLogic-PiP.pdf

I do not remember having seeing the refined Topology studied before.

Algebraic Neutrosophic Set

It always depends on the way we define the algebraic law $*$.

For example, let us consider the algebraic neutrosophic set

$S = \{a+bI$, where a, b are non-null real numbers$\}$.

We define:

$$(a_1 + b_1I)*(a_2 + b_2I) = a_1a_2 + b_1b_2I.$$

$(S, *)$ is a commutative group,

- since $*$ is well-defined, commutative, associative;
- it has a unit element $1+I$ because $(a_1+b_1I)*(1+I) = a_1+b_1I$, and each element a_1+b_1I has a unique inverse of the form $(1/a_1) + (1/b_1)I$;
- a_1, b_1 are non-null, since $(a_1+b_1I)*((1/a_1) + (1/b_1)I) = a_1(1/a_1) + b_1(1/b_1)I = 1 + I$.

Discrete Indeterminte Set 'I'

Let's say that one has:

$$N = 2+3I, \text{ where } I = \{1.2, 1.3, 1.5, 1.8\},$$

then

$$N = \{2+3(1.2), 2+3(1.3), 2+3(1.5), 2+3(1.8)\} =$$
$$= \{5.6, 5.9, 6.5, 7.4\}, \},$$

so one works with finite discrete sets.

Neutrosophic Cognitive Maps

to Hojjatollah Farahani, W. B. Vasantha Kandasamy, Said Broumi, Mumtaz Ali

So far one has used {-1, 0, 1, *I*} in neutrosophic graphs in *Cognitive Neutrosophic M*aps.

Meaning, the relation (or edge) between two vertexes *A* and *B* into a directed graph,

or $A \to B$,

can be: -1 (strongly negative), 0 (no relation), 1 (strongly positive), *I* (indeterminate relation).

But we might also consider that a vertex *A* influences *vertex* B,

or $A \to B$,

in a (T, I, F) percentage.

This means *A* influences *B* in the following way: *T%* positively, *F%* negatively, and *I%* indeterminately (or neutral, i.e. neither positive nor negative) influence.

We can use this in psychology too, defining *(t,i,f)*-neutrosophic graphs.

Therefore, we can define and apply a new type of *Neutrosophic Cognitive Maps*.

Neutrosophic Graphs

A *Neutrosophic Graph* is a (direct or not direct) graph that has some indeterminacy with respect to its edges, or with respect to its vertexes, or with respect to both (edges and vertexes simultaneously).

1) The *(t,i,f)*-Edge Neutrosophic Graph

In such a graph, the connection between two vertexes *A* and *B*, represented by edge *AB*:

A----------*B*

has the neutrosophic value of *(t,i,f)*.

2) *I*-Edge Neutrosophic Graph

In the book (2003) *Fuzzy Cognitive Maps and Neutrosophic Cognitive Maps*, Vasantha Kandasamy and F. Smarandache used a different edge:

A----------*B*

which can be just *I* = literal indeterminacy of the edge, with $I^2 = I$ (as in *I*-Neutrosophic algebraic structures). Therefore, simply we say that the connection between vertex *A* and vertex *B* is indeterminate.

3) *I*-Vertex Neutrosophic Graph

Or a literal indeterminate vertex, meaning we do not know what this vertex represents.

4) *(t,i,f)*-Vertex Neutrosophic Graph

We may also have neutrosophic vertex, for example vertex *A* only partially belongs to the graph *(t),* indeterminate appurtenance to the graph *(i),* partially does not belong to the graph *(f),* we can say *A(t,i,f)*.

And combinations of any two, three, or four of the above four possibilities of neutrosophic graphs.

If *(t,i,f)* or the literal *I* are refined, we get corresponding refined neurosophic graphs.

Optimization Algorithms in Neutrosophics

to Mohamed Abdel-Basset

Optimization algorithms to be connected with the neutrosophics:

- *Salp Swarm Algorithm*
  http://www.alimirjalili.com/SSA.html
- *Whale Optimization Algorithm*
  http://www.alimirjalili.com/WOA.html

Vertex Neutrosophic Graphs

to Said Broumi

You might consider for your thesis the following type of neutrosophic graphs, called "*(t,i,f)*-edge and vertex neutrosophic graphs" since the neutrosophic values are referred to both the edges and the vertexes [they are also generalizations of the intuitionistic fuzzy graphs]:

$$(t_3,i_3,f_3)$$

$$A_1(t_1,i_1,f_1)\text{----------}A_2(t_2,i_2,f_2)$$

where the vertexes A_1 and A_2 have a neutrosophic appurtenance to the graph, and the edge A_1A_2 connects the vertexes in a neutrosophic way too (t_3,i_3,f_3), meaning that t_3% connection, i_3% indeterminate connection, and f_3% non-connection, where all t_j, i_j, f_j are single-valued numbers in [0, 1].

You'll consider these for all graph edges and vertexes.

But you can also include, as a second chapter, the case when all t_j, i_j, f_j are interval-values included into [0, 1].

Neutrosophic Fibonacci Numbers

to Ozen Ozer

- Fibonacci Numbers:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, ...

- For the Neutrosophic Numbers:

$$N = a + bI,$$

where a and b are real or complex numbers and I = literal indeterminacy, with $I^2 = I$, you may replace a and b by some Fibonacci numbers, for example $F_j + F_kI$, where F_j is the j-th Fibonacci number and F_k is the k-th Fibonacci number, and study the properties of the Neutrosophic Fibonacci Numbers $F_j + F_kI$.

Neutrosophic Probability Distribution Function

For neutrosophic data: consider some neutrosophic probability distribution function, but split it into three parts: a function T for the chance of occurrence, another function F for the chance of non-occurrence, and a third chance I for indeterminate-chance. So you graph three classical functions.

Neutrosophic Operators

As in fuzzy logic/set, in the neutrosophic logic/set the *inference operators are approximations*. They work differently for an application than for another application.

Actually, as Angelo de Oliveira said, there are *classes of neutrosophic operators*, not unique operators (as in the classical logic/set).

For the *neutrosophic negation operator*, that we denote by *anti*, there is a class too of such operators. For several of these negation operators, the double negation holds as in classical logic {i.e. $anti(antiA) = A$ }.

But there are others that do not respect this double negation logical law.

For example:

$anti(t, i, f) = (1 - t, 1 - i, f)$,

as used by some authors considering that T and I are more important than F.

{It is possible to give weights to *T, I, F*, depending on the applications.}

Then:

$$anti(anti(t, i, f)) = (t, i, 1 - f),$$

which is different from *(t, i, f)*.

Neutrosophic AG-Groupoid

to Madad Khan

We extend now for the first time the *AG-Groupoid* to the *Neutrosophic AG-Groupoid*.

A neutrosophic AG-groupoid is a neutrosophic algebraic structure that lies between a neutrosophic groupoid and a neutrosophic commutative semigroup.

Let *M* be an AG-groupoid under the law "." One has *(ab)c = (cb)a* for all *a, b, c* in *M*.

Then $M \cup I = \{a+bI$, where a, b are in M, and I = literal indeterminacy such that $I^2 = I\}$ is called a neutrosophic AG-groupoid.

A neutrosophic AG-groupoid in general is not an AG-groupoid.

If on $M \cup I$ one defines the law "$*$" as:

$$(a+bI)*(c+dI) = ac+bdI,$$

then the neutrosophic AG-groupoid $(M \cup I, *)$ is also an AG-groupoid since:

$$[(a_1+b_1I)*(a_2+_{b2}I)]*(a_3+b_3I) = [a_1a_2+b_1b_2I]*(a_3+b_3I) =$$
$$= (a_1a_2)a_3+(b_1b_2)b_3I = (a_3a_2)a_1+(b_3b_2)b_1I$$

and also

$$[(a_3+b_3I)*(a_2+b_2I)]*(a_1+b_1I) = [a_3a_2+b_3b_2I]*(a_1+b_1I) =$$
$$= (a_3a_2)a_1+(b_3b_2)b_1I.$$

Neutrosophics' Basics

lui Gheorghe Săvoiu

Atanassov a introdus în 1986 și *gradul (procentul) de neapartenență a unui element la o mulțime*, și a introdus *mulțimea intuiționistică fuzzy*.

Smarandache a introdus în 1995 și *gradul (procentul de nedeterminare a apartenenței*, adică nu știm nici dacă aparține, nici dacă nu aparține un element la o mulțime), definind *mulțimea neutrosofică*.

Neutrosofia se bazează pe partea neutră, nici de apartenență, nici de neapartenență. Iar în logică, la fel pe partea neutră: nici adevărat, nici fals, ci între ele.

Așadar, un element $x(t, i, f)$ aparține la o mulțime neutrosofică M în felul următor:

x este t % în M, i % apartenența nedeterminată,

și f % nu aparține

t = truth, i = indeterminacy, f = falsehood.

Alții însă folosesc litere grecești ca dvs. Notația nu contează prea mult aici.

Sau putem privi din punct de vedere probabilistic astfel:

- șansa ca elementul x să aparțină la mulțimea M este t %,
- șansa nedeterminată de apartenență este i %,
- iar șansa de neapartenență este f %.

În cazuri normalizate $t + i + f = 1$ (100%), dar în general, dacă informațiile despre posibilitatea de apartenență a elementului x la mulțimea M provin din surse independente (care nu comunică una cu alta, deci nu se influentează reciproc), atunci se poate ca $0 \leq t + i + f \leq 3$.

În cazuri mai generale și mai aproximative, t, i, f pot fi intervale incluse în [0, 1], sau chiar submulțimi oarecare incluse în [0, 1], adică atunci când lucrăm cu date imprecise rău, contradictorii, vagi...

Înțelegeți logica neutrosofică de la fotbal:

Să presupunem că FC Argeș joacă împotriva lui Dinamo la Pitești. Șansa de a câștiga *(t)* să zicem că este 60%, șansa de meci egal *(i)* de 30%, și șansa de a pierde *(f)* de 10%.

Procente de nedeterminare ale preturilor

Revenind la economie și prețuri, ar mai trebui adăugate și gradele (procentele) de nedeterminare *(i),* și de neapartenență *(f)* ale prețurilor.

Numărul prezentat in articol este număr fuzzy triunghiular, dar putem să-l extindem la număr neutrosofic triunghiular dacă adăugăm același lucru pentru funcția de nedeterminare *(i)* și pentru cea de neapartenență *(f)*.

Fuzzy Tendential Neutrosophic

Cum să interpretăm conceptul "fuzzy tendential neutrosophic"? Cred că prin faptul că avem un grad de apartenență (deci *fuzzy*), dar mai există șansa unui grad de nedeterminare (deci *neutrosofic*) datorită impreciziei și neprevăzutului care apare în fluctuațiile market-ului.

From Fuzzy Notions to Neutrosophic Notions

to Mumtaz Ali and John Mordeson

The adopted fuzzy notions to neutrosophic notions are correct.

I think we can say in a more general way:

Let's use the notations:

$$NS(x) = < T(x), I(x), F(x) >$$

where *NS* means neutrosophic set values,

$$NS(y) = < T(y), I(y), F(y) >,$$

$$NS(xy) = < T(xy), I(xy), F(xy) >.$$

Then one has a *Neutrosophic Fuzzy Subgroupoid A* of a groupoid $(G, .)$

If for all *x, y* in *G* one has:

$$NS(xy) \geq NS(x) /\backslash NS(y)$$

And the definition of the *Neutrosophic Fuzzy Subgroup* can be written as: For *x, y* in *A* one has:

$$NS(xy) \geq NS(x) \wedge NS(y)$$

$$NS(x) \geq NS(x^{-1} >$$

We may have classes of neutrosophic fuzzy subgroupoids, and neutrosophic fuzzy subgroups, since there are classes of neutrosophic conjunctions, i.e.

$$NS(x) /\backslash NS(y) =$$

$$< min\{T(x), T(y)\}, max\{I(x), I(y)\}, max\{F(x), F(y)\} >$$

or

$$NS(x) \wedge NS(y) = <min\{T(x), T(y)\}, min\{I(x), I(y)\}, max\{F(x), F(y)\}>$$

or

$$NS(x) \wedge NS(y) = < T(x)T(y), 1 - I(x)I(y), 1 - F(x)F(y) >$$

or

$$NS(x) \wedge NS(y) = < T(x)T(y), I(x)I(y), 1 - F(x)F(y) >$$

etc.

Classes of Definitions of Neutrosophic Complement

to John Mordeson

Now, if the complement is involutive in fuzzy set and intuitionistic fuzzy set,

i.e. $c(c(a)) = a$ for all a in [0, 1],

the complement in general is not involutive in neutrosophic set.

In neutrosophic set there are several classes of definitions of neutrosophic complement, such as:

- $c(T,I,F) = (F,I,T)$, which is involutive;
- $c(T,I,F) = (1-T,I,1-F)$, which is also involutive;

but

- $c(T,I,F) = (F,(T+I+F)/3,T)$ is not involutive since $c(c(T,I,F))$ is different from (T,I,F) due to the indeterminacy which is not the same [although T and F are complementary];

similarly

- $c(T,I,F) = (1-T,(T+I+F)/3,1-F)$ is not involutive since c(c(T,I,F)) is different from (T,I,F) due again to the indeterminacy which is not the same [although T and F are complementary];

also, the optimistic complement defined as:

- $c(T,I,F) = (1-T,(T+I+F)/3,1-F-I)$ is not involutive, nor T and F are complementary;

similarly the pessimist complement defined as:

- $c(T,I,F) = (1-T-I,(T+I+F)/3,1-F)$ is not involutive, nor T and F are complementary.

T,I,F are more flexible in Neutrosophic Set, that they are in Intuitionistic Fuzzy Set

The case $T + I + F = 1$ does not coincide with the intuitionistic fuzzy set, since when applying the IFS operators these operators are not applied to the indeterminacy *I*, while in NS the neutrosophic operators are also applied to the indeterminacy *I*.

For example:

In IFS one has the intersection:

$$(0.1, 0.2, 0.7)\wedge(0.4, 0.5, 0.1) \equiv (0.1,0.7)\wedge(0.4,0.1) =$$
$$(\min\{0.1,0.4\}, \max\{0.7,0.1\})= (0.1,0.7) \equiv (0.1,0.2,0.7)$$

since it is understood that the difference to 1 is indeterminacy.

In NS one has the intersection:

$$(0.1, 0.2, 0.7) \wedge (0.4, 0.5, 0.1) = (\min\{0.1, 0.4\}, \max\{0.2, 0.5\},$$
$$\max\{0.7, 0.1\}) = (0.1,0.5,0.7)$$

whose sum of components is not 1 any longer, so the neutrosophic operators take in general the case $T + I + T = 1$ outside of the intuitionistic fuzzy set, i.e. the result in general is $T + I + F < 1$ or $T + I + F > 1$.

Hence we obtained two different results even in the case $T + I + F = 1$ with respect to IFS and NS.

In fuzzy theory and intuitionistic fuzzy theory, if *T* is big, then *F* has to be small in order to counterbalance the sum of them to be 1. For example, if $T = 0.90$, then $F \leq 0.10$. So, *T* and *F* are complementary in fuzzy theories.

But in neutrosophic theory, if *T* is big, then *F* can be anything (small, medium, or big), because their sum does not have to be 1.

For example, if $T = 0.90$, then F can be even bigger, let's say $F = 0.95$. So, T and F are not complementary in neutrosophic theory.

I recall that $T+I+F \leq 3$.

Now, going to neutrosophic algebraic research started by Mumtaz Ali.

If $T(xy) \geq \min\{T(x), T(y)\}$ it does not mean that

$$F(xy) \leq max\{F(x), F(y)\}.$$

See this counter-example:

Let $A = \{2(0.1, 0.4, 0.3), 3(0.2, 0.5, 0.4), 6(0.3, 0.6, 0.5)\}$.

$$T(2\times3) = T(6) = 0.3 \geq \min\{T(2), T(3)\}=$$
$$= \min\{0.1, 0.2\} = 0.2.$$

But

$$F(2\times3) = F(6) = 0.5 \text{ is not smaller than}$$
$$\max\{F(2), F(3)\} = \max\{0.3, 0.4\} = 0.4.$$

Similarly

$$I(2\times3) = I(6) = 0.6 \text{ is not smaller than}$$
$$\max\{I(2), I(3)\} = \max\{0.4, 0.5\} = 0.5.$$

Justification of $I^2 = I$

In the previous neutrosophic algebraic structures (started by W. B. Vasantha Kandasamy & F. Smarandache in 2003) we have numbers of the form:

$a+bI$, where I = literal indeterminacy, and $I^2 = I$.

In many examples we can consider I = contradiction = $T \wedge F$ (i.e. true∧false).

But $I^2 = (T \wedge F) \wedge (T \wedge F) = T \wedge F = I$,

where we associated to the ∧ in between the parentheses the multiplication [as in fuzzy and neutrosophic logic/set, where $t_1 \wedge t_2 = t_1 t_2$ (multiplication)].

Similarly, in other examples we may consider I = uncertainty = $T \vee F$ (i.e. true∨false).

But $I^2 = (T \vee F) \wedge (T \vee F) = T \vee F = I$,

where we associated in the same way to the ∧ in between the parentheses the multiplication [as in fuzzy and neutrosophic logic/set, where $t_1 \wedge t_2 = t_1 t_2$ (multiplication)].

Of course, there may be cases (applications) where I^2 is not equal to I.

This will be a new class of neutrosophic algebraic structures.

to Adesina Agboola

You might think about such example.

In the case of splitting indeterminacy I to sub-indeterminacies I_1 and I_2,

$$I_1 I_2 = I_2 I_1$$

where I_1 = contradiction, and I_2 = uncertainty (I_1 and I_2 were defined as above),

because $I_1 I_2 = (T \wedge F) \wedge (T \vee F) = T \wedge F = I_1$ and

also $I_2 \wedge I_1 = (T \vee F) \wedge (T \wedge F) = T \wedge F = I_1$.

But it is possible to get another example (to redefine I_1 and I_2 in different ways from above) such that $I_1 I_2$ is different from $I_2 I_1$, if required by the application.

All cases ($I^2 = I$, or I^2 different from I) will be good if we get justifications, examples, or applications.

m-th Refinement of the Neutrosophic Set/Logic/Probability

1. T in the first round of refinement is refined into $T_1, T_2, T_3, \ldots,$
2. Then, in the second round,

   T_1 is refined into $T_{11}, T_{12}, T_{13}, \ldots,$

   T_2 is refined into $T_{21}, T_{22}, T_{23}, \ldots,$

   T_3 is refined into $T_{31}, T_{32}, T_{33}, \ldots,$

   and so on for all T_{ii} from the first round refinement.
3. In the third round of refinement,

   T_{11} is refined into $T_{111}, T_{112}, T_{113}, \ldots$

   T_{12} is refined into $T_{121}, T_{122}, T_{123}, \ldots$

   T_{13} is refined into $T_{131}, T_{132}, T_{133}, \ldots$

   and so on.

   Similarly for all $T_{i_1 i_2}$ from the second round refinement.

   ……

m. In the m^{th} refinement, the last one, all $T_{i_1 i_2 \ldots i_{m-1}}$ subcomponents from the previous m-1^{st} refinement are refined into $T_{i_1 i_2 \ldots i_{m-1}}{}^1$, $T_{i_1 i_2 \ldots i_{m-1}}{}^2$, … .

Afterwards, the same rounds of refinements in a similar way are applied to the indeterminacy *'I'* and to *F*.

Normalization in Neutrosophic Logic

Another thing that occurs in neutrosophic logic and it is different from other logics is the normalization. This is the fact that in NL one can normalize if needed.

Let's have an example:

$$(0.4, 0.5, 0.3)$$

and use the negation:

$$anti(t, i, f) = (1 - t, i, 1 - f),$$

then

$$anti(0.4, 0.5, 0.3) = (1 - 0.4, 0.5, 1 - 0.3) = (0.6, 0.5, 0.7).$$

Let's normalize and divide each component by their sum $(1.8 = 0.6 + 0.5 + 0.7)$.

We get: $(0.33, 0.28, 0.0.39)$.

Then:

$$anti(0.33, 0.28, 0.39) = (1 - 0.33, 0.28, 1 - 0.39) = (0.67, 0.28, 0.61)$$

which is different from $(0.4, 0.5, 0.3)$.

Soft n-valued Neutrosophic Algebraic Structures

We can generalize the "soft neutrosophic algebraic structures" to "soft *n*-valued neutrosophic algebraic structures".

Let's consider a universe of discourse *U*, and let *P(U)* be the set of all *n*-valued neutrosophic sets included in *U*.

Let *A* be a set of attributes. The collection *(f, A)*, where *f: A →P(U)* is a soft *n*-valued neutrosophic set.

For example, let *U = {x, y, z, w}* a set of houses, and *A = {quality, price}* a set of attributes.

One has:

F (quality)= $<x; (T_1, T_2, T_3; I_1; F_1, F_2)>$,

where T_1 = very high quality, T_2 = high quality, T_3 = medium quality; I_1 = indeterminate quality; and F_1 = low quality, F_2 = very low quality.

With $T_1+T_2+T_3+I_1+F_1+F_2$ in [0, 6], since 3+1+2=6.

Similarly for price:

f (price)= $<x; (T_1, T_2, T_3; I_1; F_1, F_2)>$,

where T_1 = very high price, T_2 = high price, T_3 = medium price; I_1 = indeterminate price; and F_1 = low price, F_2 = very low price.

As numerical example, we may consider:

f (quality) = {<x; (0.4, 0.5, 0.6; 0.1; 0.9, 0.3)>,
<y; (0.0, 0.1, 0.9; 0.5; 0.8, 0.2)>,
<z; (0.6, 0.0, 0.9; 0.7; 0.5, 0.5)>,
<w; (0.1, 0.3, 0.6; 0.8; 0.3, 0.1)>}

and

f (price) = {<x; (0.3, 0.1, 0.5; 0.4; 0.2, 0.5)>,
<y; (0.6, 0.6, 0.1; 0.5; 0.1, 0.9)>,
<z; (0.3, 0.8, 0.2; 0.2; 0.5, 0.4)>,
<w; (0.7, 0.2, 0.1; 0.2; 0.5, 0.9)>}.

m-valued Refined Neutrosophic Triplet

We can go further and extend our neutrosophic triplet (*a, neut(a), anti(a)*) to a *m*-valued refined neutrosophic triplet, in a similar way as it was done for $T_1, T_2, ...; I_1, I_2, ...; F_1, F_2, ...$ (i.e. the refinement of neutrosophic components).

Interval Refined Neutrosophic Set

Instead of single refined neutrosophic set, we can extend it to interval refined neutrosophic set, which means that each $T_1, T_2, ...; I_1, I_2, ...; F_1, F_2, ...$ can be an interval (at least one of them to be an interval of [0, 1]).

It will work in some cases, depending on the composition law $*$. It depends on each $*$ about how many neutrals and anti's there are for each element "a".

We may have an m-tuple $(a; neut_1(a), neut_2(a), ..., neut_p(a); anti_1(a), anti_2(a), ..., anti_p(a))$, where $m = 1+2p$, such that:

- all $neut_1(a), neut_2(a), ..., neut_p(a)$ are different from the unitary element with respect to the composition law $*$;

- also: $a*neut_1(a)=neut_1(a)*a=a$
  $a*neut_2(a)=neut_2(a)*a=a$
  .....
  $a*neut_p(a)=neut_p(a)*a=a$
- and: $a*anti_1(a)=anti_1(a)*a=neut_1(a)$
  $a*anti_2(a)=anti_2(a)*a=neut_2(a)$
  .....
  $a*anti_p(a)=anti_p(a)*a=neut_p(a).$

n-valued Refined Neutrosophic Notions

Extending the neutrosophic notions to *n*-valued refined neutrosophic notions. We can extend all previous neutrosophic notions, such as:

Similarity Measure, Distance between Neutrosophic Sets, Correlation Coefficient of Interval Neutrosophic Set, Neutrosophic Fuzzy Matrice, Rough Neutrosophic Set, Neutrosophic Implication, soft neutrosophic algebraic structures, etc.

to their corresponding n-valued refined neutrosophic notions i.e. :

Similarity Measure between n-valued neutrosophic sets, Distance between n-valued Neutrosophic Sets, Correlation Coefficient of n-valued Interval Neutrosophic Set, n-valued Neutrosophic Fuzzy Matrice, Rough n-valued Neutrosophic Set, n-valued Neutrosophic Implication, n-valued soft neutrosophic algebraic structures, etc.

When we refine T, I, F to $T_1, T_2, \ldots; I_1, I_2, \ldots; F_1, F_2, \ldots$, all T_j, I_k, and F_l can be subsets of [0, 1] (in a particular case they are just numbers in [0, 1]).

n-valued Refined Neutrosophic Set

I thought that it is possible to extend the score, accuracy, and score-accuracy functions, used by Dr. Jun Ye, from single-value and interval-value neutrosophic set of the form T, I, F to n-valued refined neutrosophic set of the form: $T_1, T_2, \ldots; I_1, I_2, \ldots; F_1, F_2, \ldots$, and then use them into a n-valued neutrosophic decision making.

For example: a 6-valued neutrosophic element $\langle x; (T_1, T_2, T_3; I_1; F_1, F_2)\rangle$ referring to quality, where T_1 = very high quality, T_2 = high quality, T_3 = medium

quality; I_1 = indeterminate quality; and F_1 = low quality, F_2 = very low quality.

With $T_1+T_2+T_3+I_1+F_1+F_2$ in [0, 6], since 3+1+2=6.

In this way we can define neutrosophic elements of any *n*-valued length.

Neutrosophic Information System

A neutrosophic information system is a system with incomplete or unknown information.

Neutrosophic Calculus

An approach to the Neutrosophic Calculus will be to consider functions with neutrosophic coefficients. For example, $f(x) = 2-I + (1+3I)x^2$, where I = literal indeterminacy is considered a constant.

Another approach to Neutrosophic Calculus would be to use indeterminacy related to the values of the function.

We consider that in practice somebody wants to design a function that describes a certain process. But for some values he is not able to determine exactly if, for example, $f(3) = 5$ or 6...

So, we should be able to work with such non-well known functions...

For example,

$f(1) = [0,2]$, $f(2) = 5$ or 6, $f(3) = (4,5)\vee(7,8)$,

i.e. we do not know exactly the value of function *f,* or we do not know exactly the argument, let's say f(7 or 8)=20.

In general, we mean:

$f : A \to P(A)$, where $P(A)$ is the power set of A.

Neutrosophic Graphs&Trees

An edge of a graph, from A to B (i.e. how A influences B), may have a neutrosophic value (t, i, f), where

— t means the positive influence of A on B,

— i means the indeterminate influence of A on B,

— f means the negative influence of A on B.

Then, if we have: $A \to B \to C$,

— such that $A \to B$ has the neutrosophic value (t_1, i_1, f_1)

— $B \to C$ has the neutrosophic value (t_2, i_2, f_2),

— $A \to C$ has the neutrosophic value $(t_1, i_1, f_1) \wedge (t_2, i_2, f_2)$,

where $\wedge$ is the AND neutrosophic operator.

APPLICATIONS OF NEUTROSOPHICS AND MULTISPACE IN SCIENCES

Explanation

The following blogs on applications of neutrosophics and multispace in sciences include meditations / reflections on science, comments, hypotheses, proposals, comparisons of ideas, possible projects, extensions or deviations or alternatives to classical knowledge, etc. selected from e-mails, letters, drafts, conversations, impressions, my diary, etc.

We introduce the *non-standard quaternion space* and *non-standard biquaternion space* [and even an extension of them to a general non-standard vector space of any dimension] as possible working spaces for connecting the micro- and macro-levels in physics. **Neutrosophy is a MetaPhilosophy.**

Also, we consider that our multispace (with its multistructure of course) unifies many science fields. We write about parallel quantum computing and mu-bit, about multi-entangled states of particles and up to multi-entangles objects, about multispace and multivalued logics, about possible connection between unmatter with dark matter (what about investigating a possible existence of dark antimatter and dark unmatter?), about parallel time lines and

multi-curve time, projects about writing Science Fiction stories at the quantum level, about parallel universes as particular case of the multispace, and advance the hypothesis that more models of the atom are correct not only the classical standard model of the atom, etc.

I coined the name *unmatter* as a combination of matter and antimatter – and a possible third form of matter – since 2004, in a paper uploaded in the CERN website, and I published papers about "unmatter" that is now the predecessor of unparticles, which are a type of unmatter (mixtures of particles and antiparticles).

These fragments of ideas and believes have to be further investigated, developed and check experimentally if possible. {**Actually, no knowledge is definitive in no domain!**}

1. Blogs on the Applications of Neutrosophics in Sciences

F. Smarandache, V. Christianto, Neil Boyd

1.1 I supposed that the readers will find it helpful trying to calculate for example Schrödinger's equation from quantum mechanics taking into consideration the indeterminacy.

1.2. As a physics example, in Schrödinger's Cat the neutrosophic logic offer the possibility of considering the cat neither dead nor alive, but undecided (i.e. Indeterminate, as in neutrosophy), while the fuzzy logic does not do that.

We can, let's say, instead of introducing in the problem a pair of twin cats - one cat in the box and another outside, we might also think at introducing a pair of entangled particles *A* (in the box) and *B* (outside the box). Then everything what happens to particle *A* inside will happen the opposite to particle *B* outside, hence measuring *B* will know the state of *A* (since *A* and *B* are complementary).

Readers, what are your opinions?

It would be nice to have entangled macro-objects (for example Entangled... Cats!). Let's name the two cats C_1 *and* C_2, but in such a way that cat C_2 is made from all entangled particles which form cat C_1. Then cat C_2 will be the entangled cat of C_1.

Similarly to the possible teleportation of objects: decompose an object in particle, then teleportate each particle, and then reassemble the teleportated particles - in this way it might be possible to teleportate objects.

Hence, decompose C_1 in particle, get an entangle particle for each particle of C_1, then reassemble the entangled particles and get a cat C_2 that is the entangled of C_1.

Herein the neutrosophic logic, based on three components, truth component, falsehood component, indeterminacy component *(T, I, F),* works very well.

We agree that MultiValued (or MultiVariate) interpretation offers better explanation, but it seems to me that physicists in particular those who work with

experiments prefer some quantitative effect: what can be measured!

For instance, some people began to test this paradox using Bose condensate... so we should translate this issue in a math language, like Bell inequality, which is testable; see the below references in arXiv.org:

cond-mat/0508659:
Title: Creation, detection and decoherence of Schrödinger cat states in Bose-Einstein condensates
Authors: Y. P. Huang, M. G. Moore

cond-mat/0310573:
Title: Generating Schr\"{o}dinger-cat states in momentum and internal-state space from Bose-Einstein condensates with repulsive interactions
Authors: J. Higbie, D. M. Stamper-Kurn

cond-mat/0006349:
Title: Decoherence and long-lived Schrödinger cats in BEC Authors: Diego A. R. Dalvit, Jacek Dziarmaga, Wojciech H. Zurek

I think that perhaps we should find first Schrödinger's original paper on this issue. This problem has deep linkage with decoherence, in my opinion.

In the meantime, my viewpoint is that Schrodinger wanted to emphasize the inadequacy of statistical interpretation of his wavefunction. Therefore, multivaluedness offer significant advantage... .

I find this *n-valued logic* interpretation of Schrödinger equation goes unnoticed in almost all physics literature... .

The cat can be dead, or can be alive, or it is undecided (i.e. indeterminate, we don't know if she is dead or alive).

Frédéric Dambreville, a French expert in logics [I was amazed by his "referee function" in sensors' fusion, being able to deduce many fusion rules], wrote to me that the notion of "true" is very subtle in the deterministic (non classical) logics.

Certain modal logics can include three states: *certain*, *possible*, and *impossible*. These are not habitual multi-valued logics, but they 'simulate' a kind of three-valued logic.

I replied back that there also are other logics, such as: the dynamic logic, tense logic, dialethism, etc. and also that:

Dans l'intuitionistique logique je suis d'accord qu'il n'est pas toujours vrai que d'une contradiction on peut trouver n'importe quoi [tu m'as ecrit ça dans un e- mail antérieur];

par example: "il pleut" et "il ne pleut pas" n'implique pas que "ma voiture est blanche";

car dans la logique classique tu as:

$A \wedge nonA \rightarrow B$ *est vrai pour n'importe quelles propositions logiques A, B.*

Aussi pour la logique trivalente, introduite par Lukasiewicz, avec les valeures 1, 1/2, 0.

Mais, dans les applications de la logique floue, ça marche mieux que dans la logique modale qui donne l'etat de possibilité (il peut etre 1% possible ou bien 99% possible, mais entre ceux-ci est une grande difference).

Aussi, la logique néutrosophique marche mieux que la logique trivalente, qui dit que 1 = vrai, 0 = faux, et 1/2 = inconnu, car la logique néutrosophique donne des pourcents/gradients (est plus rafinée, plus éxacte).

Splitting indeterminacy may help to a better accuracy, depending on the type of indeterminacy. Normally indeterminacy *(I)* is split into uncertainty *(U)* and paradox / conflicting *(P).*

The sum of the components is *1* in complete information, but we may have less than *1* for incomplete information, and greater than 1 for paraconsistent information.

In the cases when it is not *1*, we normalize the components if needed (dividing each component by the sum of all components) and the sum becomes *1*.

A known approach explaining the *n*-value logic is via hydrodynamics (Fokker) process.

1.3. But it seems to me, that an unexplored part of information theory in physics, is what we know as *the physics of information.* For instance, physicists used to exchange scientific articles and cite each other. Can we consider it as unit of 'information bit'?

I've got a draft article on this issue, albeit not rigorous yet. The idea is quite simple: each time a scientist cites another article by his/her peer, we can count it as 1 quantum bit of information. At the end, citation analysis would end up to become another 'lab' where we could study quantum of decision making... Perhaps we could extend this approach.

Maybe we'd like to write a story/novel where philosophy ideas become the main theme, though in 'playful' tone or perhaps humorous, like Borges or Umberto Eco who blends ancient tales with philosophical maze.

Borges used mysticism somehow, while Eco science and religion. I'd like to write this in popular style: the connection between the universe, cosmology, and number theory. But, of course, it should go beyond simple numerology or gematria, but perhaps a touch on information theory, Shannon entropy, Riemann zeta hypothesis, and perhaps also neutrosophy (and world peace?)...

Or, as alternative, what if a kind of weird *UFO*-like culture want to wreck havoc to this Earth, and there is no way to stop it except we can come into their computer-base, crack their own computer code (which requires some cryptography exposition), and reprogramming all their scenario from the ground?

In information fusion, the neutrosophic bba (basic believe assignment, or mass), denoted herein by nm(·), i.e. neutrosophic mass, is a generalization of the classical bba, because if for example the frame of discernment is $\theta = \{A, B\}$, and $m_1(A)=0.2$, $m_1(B)=0.5$, $m_1(A \cup B)=0.3$, then you can write it as a neutrosophic bba:

$nm_1(A)=(0.2,0,0)$,

$nm_1(B)=(0.5,0,0)$,

$nm_1(A \cup B)=(0.3,0,0)$,

where each triplet for example $nm(A) = (a_1, a_2, a_3)$ means the believe in A is a_1, the disbelieve in A is a_3, and the unknown/indeterminate believe in A is a_2.

Better example is when we have the complement:

$m_2(A)=0.4$,

$m_2(antiA)=0.1$,

$m_2(neutB)=0.3$,

$m_2(A \cup B)=0.2$,

then the neutrosophic bba associated *to* $m_2(.)$ is:

$nm_2(A)=(0.4, 0, 0.1)$,

$nm_2(B)=(0, 0.3, 0)$,

$nm_2(A \cup B)=(0.2,0,0)$.

And then you combine $nm_1(., ., .)$ with $nm_2(., ., .)$ using an *N-norm* and/or *N-conorm*.

1.4. Other questions: Do *advanced cultures beyond Earth* have advanced computation system using neutrosophy logic, instead of binary logic? If yes, does it mean that it is possible to write a programming language based on neutrosophy logic?

We say yes, there are programs based on fuzzy logic and on neutrosophic logic.

The binary logic does not work in all our everyday life events. We deal with approximations every time.

We cannot say exactly "Team X will win in the game", hence we cannot use binary logic. In binary logic there is only black or white, but you know that in between there are more colors.

When we predict, we cannot predict 100% (we are not Gods!), we predict a certain percent, say 60% (but this is fuzzy or neutrosophic logic).

1.5. In an Ancient book of Chinese, *The Book of Change*, the TAIJI diagram in fact presents positive with that of negative, and they harmoniously exist.

In neutrosophy not only positive and negative harmoniously exist (as in the Ancient Chinese philosophy and as in dialectics) but also the positive,

negative, and neutralities in between them harmoniously exist.

You might get an idea, according to some application for example, to split Indeterminacy differently, and thus to form a new neutrosophic logic and study it.

Do we mean that Lukasiewicz argument meant that multiple-value logic could be real?

Yes. See in the voting process or in a soccer game.

You have three possibilities: to gain, to loose, or to get a tight game. Hence the binary logic does not work any longer in such cases; we need a trinary logic (neutrosophic logic).

1.6. Observation does not always reflect the reality; there might be distorted observation due to various objective factors (various media of transmission / propagation / refraction of light, optical illusions, disturbed sounds, etc.).

So the experiment is best [not many done to prove quantum or astrophysical theories unfortunately], then observation, then ideas.

But all three have to prove/implicate each other for a perfect/correct/real theory.

1.7. About the deSitter space:

I was neither against it nor for it, but as in neutrosophic logic, as you already remarked, in between [thus, we realize very well how important is multi-valued logic in physics].

So I am not under scientific pressure for this subject.

But I confess I had better/smoother relationships with Dmitri Rabounski, Larissa Borissova, and Stephen Crothers.

I think, there are cases when deSitter is degenerated, and others where it is not [= neutrosophic logic!].

So, this has to be pointed out to all three fighting people, therefore everybody is right and wrong respectively in some degrees, and in a third degree ambiguous/unclear.

1.8. Most physicists are busy with other things, except with revising of 'logic'. Only a few take a look of modifying physics from the scratch (defining logic, see for instance Rauscher or Bearden).

You know I'm more inclined to applications to physics, and for physicists things start to become interesting if we present it as geometry. Therefore I think more physicists appreciate my neutrosophic logic *(NL)* than mathematicians, perhaps we shall define the Neutrosophy as geometry of logic. This is why I think this modal logic seems interesting.

Possible paper may be something like 'Geometric Logic representation of Neutrosophy'... Therefore, physicists can use their knowledge in geometry to study implications of NL, actually this is what I choose to do in a paper, using simple coin tossing problem as example.

We could also analyze something concerning the 'quantization of decision making' in quantitative way. I don't find a similar approach in the physics literature.

1.9. John A. Wheeler concludes, following Niels Bohr, that the universe is *self-organizing*. I subscribe to this self-organization in any macro- or micro-field. This is connected with topology and with Peirce's process philosophy.

I thought at defining and developing a quantum topology – for example.

1.10. About 'our' Lunar Base (by V. Christianto & F. Smarandache): What do you think about the life effect under various gravities?

For example, after living for decades on a lunar base, where gravity is 6 times smaller, how a human being will look like? What physical and psychical changes would occur?

Or, on a big planet, say Jupiter, with a big mass and big gravity, it might be difficult to walk...

Or will it be possible to increase or decrease gravity and atmosphere pressure on a planet in such of way to have the same as on the earth?

1.11. If neither Hilbert space, nor axiomatization (I hate this in quantum theory - which is more chaos), then *multiple valued logic* should do better.

But I thought at "multiple spaces overlapping" [*multi-space* or shortly *mu-space*], so we can explain how a particle can be in two places in the same time, or how a particle can be and cannot be in one place simultaneously (both these phenomena are two parts of neutrosophic indeterminacy, let's denote them by I_1 and I_2 respectively), and maybe other odd phenomena in *QM*.

R. Garden's three-valued logic is referring to: true, false, undecided; while neutrosophic logic is referring to: percentage of truth, percentage of falsehood, and percentage of undecidability/indeterminacy, so *NL* is more refined, more general.

While Refined Neutrosophic Logic is a n-valued-logic, for $4 \leq n \leq \infty$.

More applications in quantum physics would have the neutrosophic probability *(NP)*, than the neutrosophic logic *(NL)*.

A neutrosophic probability space and its axioms are defined starting with my sixth edition book:
http://fs.unm.edu/eBook-Neutrosophics6.pdf
at the end of the book.

For example, the neutrosophic probability that a particle *A* is in a place P_1 and particle *A* is not in P_1 in the same time could be for example: *NP(A in P1) = (0.4, 0.2, 0.4),* i.e. *40% A is in place* P_1*, 40% A is not in* P_1*, and 20%* unknown.

And so on.

1.12. It is possible using graphs in Tifft redshift quantization.

The book of Fuzzy Cognitive Maps and Neutrosophic Cognitive Maps, by W. B. Vasantha Kandasamy and F. Smarandache is the most used/read (online) book about neutrosophic cognitive maps:
http://fs.unm.edu/NCMs.pdf.

1.13. About modern logics: many of them differ from the way the logical operators (*and, or, implication, negation*) are defined. But also they depend on the

introduction of new operators and their study: for example "it is possible that" or "it is sufficient" for modal logic.

In neutrosophic logic I introduced the *neuterization* and *antonymization* operators, in addition of the classical ones adjusted to the neutrosophic way.

We can define ourselves more operators – if needed in practice - and make them work on a logical space, for example on the neutrosophic logical space since it is the most extended.

For example: one physics logical operator might be "it is a potential of/for" (or something similar), another physics logical operator could be another needed idea from physics, maybe "it is a condition of existence of", then another similar operator: "it is a hypothesis for", etc.

There is a book where a friend (Dr. Andrew Schumann) and myself used some non-linear logics (are called non-linear since the logical operators are non-linear functions):
http://fs.unm.edu/Neutrality.pdf.

How to relate the modal operators and other logical operators to neutrosophic logic?

Just extending the operators from the Boolean (or other logical space) to the neutrosophic logic, i.e. instead of using 1 or 2 truthness components for the logical propositions, we have to use 3.

Then we need to adjust the logical operator's function.

I read the article Matrix method to solve multivalued logic differential equations, by Svetlana Yanushkevich.

We can extend the Boolean Differential Calculus (BDC) to Neutrosophic Differential Calculus (NDC).

The problem might be the usefulness of NDC in physics, hence we need first to know how is BDC used in physics?

1.14. 'Paraconsistency logic' is used in theoretical physics, which perhaps the reader may find interesting.

There also are good articles by W. Smilga (2005) discussing 'information theory' viewpoint of particle physics, based on binary logic *(1/0).* See below some references from arXiv.org:

**physics/0505040:
Title: Informational Structures in Particle Physics Authors: Walter Smilga
**physics/0502040:
Title: Elementary Informational Structures of Particle
Physics and their Relation to Quantum Mechanics and Space-Time Authors: Walter Smilga
Comments: 16 pages, in German, presented at the spring meeting 2005 of the German Physical Society, Berlin, 4-9 March 2005

I guess this is a good starting point; could it be particles 'interfere' with each other if we use multivalued-logic, perhaps resembles 'bootstrap theory' of Geopffrey Chew from UCLA, Berkeley? Furthermore, information (bit) could be related to Shannon entropy, then to thermodynamics... See this from arXiv.org:

physics/0401002:
Title: Information Flow and Computation in the Maxwell Demon Problem Authors: Roger D. Jones, Sven G. Redsun, Roger E. Frye
Submitted to J. Stat. Phys.

1.15 Another interesting question, if it's real that information → entropy → theormodynamics, then does it offer any clue on reversibility problem? I find only very few articles discussing this issue → Time flows backward are allowed or not?

I think this is right:

Shannon entropy → thermodynamics

since entropy means disorder, the bigger entropy the higher temperature, pressure. See:

physics/0406137:

Title: The (absence of a) relationship between thermodynamic and logical reversibility Authors: O. J. E. Maroney

Based on talk at ESF Conference on Philosophical and Foundational Issues in Statistical Physics, Utrecht, November 2003.

Disorder also mean timearrow (Gibbs theorem). So one can say if we could arrange such that entropy becomes less, it would mean time flows backward... right?

Have you heard of Srinivasan's work on NAFL (non-Aristotelian finitary logic), which discusses among other things a new interpretation of wavefunction. Perhaps you'd like to see it:

PhilSci Archive - Quantum superposition justified in "A new non-Aristotelian finitary logic (NAFL)", proposed by Srinivasan Radhakrishnan.

Platonism in classical logic versus formalism; philsci-archive.pitt.edu/archive/00000635/

[math/0506475] Foundations of real analysis and computability ... From: Radhakrishnan Srinivasan

... theory in the recently proposed non-Aristotelian finitary logic (NAFL)... arxiv.org/abs/math.LO/0506475

1.16. There are many ways of defining neutrosophic operators and the neutrosophic orders, so we might adjust them or define new ones according to each problem/application to solve.

In technical applications *NL* and neutrosophic set *(NS)* components *(T, I, F)* are subsets of the interval *[0,1],* but in philosophy they are subsets of the non-standard unit interval $]0, 1^+[$, since we need to be able to distinguish between absolute truth, which is 1^+, and (relative) truth, which is *1*. Similarly for absolute falsehood and (relative) falsehood, absolute indeterminacy and (relative) indeterminacy.

So, you might catch this in any of your future papers. Then the negation of 1^+ is $^-0$.

$1^+=1+\varepsilon$ (where ε is epsilon), and ε is a very tiny (close to zero) positive number (infinitesimal),

and $^-0=0-\varepsilon$.

I coined the name "neutrosophy" and its "neutrosophic" derivative in English language, since I needed something related to the middle part: i.e. neutral component (neither true nor false, but unknown, or indeterminate).

So, the name "neutrosophic" is much better and natural name, than Atanassov's "intuitionistic".

Even more, "*I*" can be split depending on the application, into *E* = error, *V* = vague, *U* = unknown, etc. and we get a logic on more than four components (actually on *n* components).

The theory of interval neutrosophic logic/set [14] can be extended in an easy way to subset neutrosophic logic/set, by taking *inf(S)* and *sup(S),* where *S* is the subset included in *[0, 1].*

We can define a neutrosophic lattice, i.e. a *pseudo-lattice* on *3* components or more, that do not necessarily verify all axioms of a classical lattice, since nor *NL* verifies all properties of classical logic.

There is an attempt to define the *Neutrosophic Modal Logic* in my first book on neutrosophics (1998) but, of course, it should be developed.

I also think that (as in fuzzy logic/set) the connectives form classes of connectives (*N-norm, N-conorm* for example for neutrosophic conjunction and respectively neutrosophic disjunction), and in each case/application/problem we have to choose the best connectives that work for the respective problem;

neither in fuzzy logic there is used only one conjunction and one disjunction for example. A paper of mine on *N-norm* and *N-conorm* partially solves this question.

Rivieccio also suggested me to define suitable syntactical consequence relations and to prove completeness for each semantic neutrosophic system.

I fully agree; all people who worked in the neutrosophics were focusing either on using it in philosophy (I employed the "law of included middle" by designing the third component *"I"* = indeterminacy; or the "law of included multiple-middle" in refined neutrosophic logic), or in technical applications (so that's why they/we mostly focused on $\wedge$, $\vee$, and $\neg$ *(negation)* neutrosophic connectives.

Rivieccio said: let *T, I, F* be subsets of some partially or linearly ordered lattice *L* instead of the real unit

interval *[0, 1],* or even to consider different lattices L_1, L_2, L_3 such that $T \subseteq L_1$, $I \subseteq L_2$ and $F \subseteq L_3$.

Yes, this can be done, or this HAS to be done especially when *T, I, F* are subsets of *[0,1]* and it would be much harder to define a order relation between subsets like for example *[0.1. 0.3]* and *[0.2,0.4];* but in a lattice we can better define the two binary operations "*meet*" and "*join*" and then a (partial) order relationship.

Neutrosophic modal logic and *neutrosophic temporal logic* could be developed for physics application, especially at the quantum level.

1.17. The use of neutrosophy in *nucleon model* is unexplored yet. I find it at least quite similar to Barut's binucleon.

The basic point is: physicists normally think of +/- like in electromagnetic field. I find Prof. Kaivarainen's work interesting in this regard (bi-vacuum model). But to include another 'neutral' aspect would require significant revision... I guess.

For instance, if we accept Don Borghi experiment supporting Rutherford's initial model, then it seems that *neutron = electron + proton*. The experimental fact that neutron radii ~ electron radii seems to verify this conjecture. But you know, this hypothesis has been almost forgotten in standard literature...

For information theory, I could only mention *Planck radiation*. Can we derive *Bose-Einstein condensate* from information theory (Shannon entropy)?

This would be interesting, if possible.

In the meantime, I could only mention one reference book, albeit rather outdated:

Entropy, Complexity and the Physics of Information, by Santa-Fe Studies, edited by W. Zurek (1990). This is one of the most mind-boggling books I've read.

1.18. While I'm sure that we can describe Schrödinger's paradox in terms of Neutrosophy, I guess most other people will not be quite happy to abandon their simple common-logic system, unless we can prove the advantages of using the multiple-value logic.

In this regard, I guess explaining the paradox is the prerequisite, but another problem is what we called *ultraviolet spectral lines*:

NASA scientists observed extreme ultraviolet spectral lines from space for hydrogen and helium.

This is what I don't find clue how to prove it in terms of Quantum Mechanics (*QM)*.

Alternatively, there are few guys claiming to be able to explain the spectral lines using *'classical electromagnetic radiation'*.

The best *QM* approach so far is to use nonlinear field by introducing double- wavefunction into *NSE*. But it can't explain yet the anomalous spectral lines. I also remember herein a paper by Oleinik discussing this idea.

Another question: do you think there is linkage between *Schrödinger's paradox* and *Heisenberg's uncertainty* and also *Einstein-Podolsky-Rosen paradox*?

I'm not sure yet with Heisenberg's uncertainty, but it seems to me that *EPR* could be explained

using superluminal lightspeed (I wrote on this issue in one of my controversial articles about entangled particles — *This was called the Smarandache Hypothesis that there is no speed barrier in the universe and one can construct any speed*.). Other references which may be useful to check.

But of course it will require more work to explore the 'parallelism' between theories. To quote Banach:

"Good mathematician finds analogy between theories, Great mathematician finds analogy between analogies."

1.19. *Non-standard vector space of any dimension to be used in physics*.

I thought that we could work with vectors v not only in the real vector space of dimension four, but to extend them to a complex vector space as follows:

$v = (a_1+b_1i)x + (a_2+b_2i)y + (a_3+b_3i)z + (a_4+b_4i)t$

where $a_1, a_2, a_3, a_4, b_1, b_2, b_3, b_4$ are real numbers,

$i = \sqrt{-1}$, *(x, y, z) = 3D-space, t = time.*

Don't we get Minkovski's *4D*-space when $b_1 = b_2 = b_3 = b_4 = 0$?

A further extension would like to introduce now in physics is the non-standard analysis and therefore the non-standard vector space:

$V = (A_1+B_1i)x + (A_2+B_2i)y + (A_3+B_3i)z + (A_4+B_4i)t$

where $A_1, A_2, A_3, A_4, B_1, B_2, B_3, B_4$ are non-standard numbers, i.e. $A_k = a_k \pm \varepsilon$ and similarly $B_k = b_k \pm \varepsilon$, where ε is a very tiny positive number close to zero; for particular cases we may consider some ε's equal

to zero, therefore the corresponding $A_k = a_k$ or $B_k = b_k$ become just ordinary real numbers.

Having infinitesimals vector spaces may insure the connection between quantum level and macro-level in science, not explored before upon our knowledge.

We can generalize even more, considering a real vector space of dimension n, and then its corresponding complex space, and further their non-standard vector space:

$$V = (A_1+B_1i)x_1 + (A_2+B_2i)x_2 +\ldots+ (A_n+B_ni)x_n + (A_{n+1}+B_{n+1}i)t$$

$A_k = a\pm\varepsilon$ and similarly $B_k = b_k \pm\varepsilon$ where $\varepsilon \geq 0$ (when $\varepsilon = 0$ we can get into the macrolevel for that coordinate x_k, but if $\varepsilon>0$ we could be in a quantum level for that coordinate x_k), and even more coordinates for the time t as well: $t_1, t_2, \ldots$.

Therefore, as particular cases, the quaternion and biquaternion spaces can be well extended to non-standard quaternion space and non-standard biquaternion space respectively.

1.20. Neutrosophy as a MetaPhilosophy.

Student:

Then the question: Which is the real happiness and what contributes to our real happiness. What would we feel if we suddenly died? Happy or miserable? What would we have if all those we possess became the past?

Neutrosophic Philosopher:

It depends on what everybody understands by "happiness"? Myself I am interested in discovering new ideas in science, arts. Someone else would like to become a leader, another to have a nice family, etc.

Student:

Is fate destined by some imaginary power or accumulated by ourselves in the long life cycles?

Neutrosophic Philosopher:

It is created by us, by chance, by friends, by society.

Student:

Then what should we do to create real happiness?

Neutrosophic Philosopher:

Learn to attain happiness defined in your terms. Know how to measure it.

Student:

I am really limited to give any further insight, and you can follow plenty of Buddhist URLs from our previous contact (or other great teachings I am not familiar with). There is only sincerity in this practice.

The slightest bargain can definitely result in the opposite destiny. May you be really genius and understand it.

Neutrosophic Philosopher:

Right, the theory of paradoxism: when I want something, it almost surely happen the contradictory!

*

Feng Liu mentioned in his presentation to the International Congress of Mathematicians (Beijing, P.R. China, 2002), which I attended, that *T, I, F* in

neutrosophy can signify intentions or confidence, not necessarily figures.

He also mentioned in his *Dialogues* and *Sushi's poem*: we fail to see the true face of Lushan mountain just because we are in it. Therefore a preliminary means is to abandon logic. He said in the Chinese Translation of *Neutrosophics* [1] that the evolution and retrogression of human society is more or less a misleading concept, and people have followed a wrong teacher like Darwin, since those who diligently follow the Way would often be sniffed at. The "wise" adhere fast to their accomplishments and would actually understand nothing different from their own referential world, and fail to reach the light.

Meanwhile the Chinese are adapting more and more wastes than treasures from the west – added Feng Liu - the whole globe is merely a neglectable tiny spot in the universe. Man is sin by nature, and also from his sin, he possesses by nature the limitless power of self-enlightenment. When one is deprived of all his treasures - or replaces them with means, he begins his beggar's life. What an exchange of culture! (Clearly such Neutrosophic Dialogues are needed.)

*

Years ago, Master Chin Kung suggested that one should reach *arhat* stage before he can translate Buddhist sutras.

As we know all written words are symbols to illustrate the underlying truth. One needs to actually see the truth instead of imaging the truth.

Arhat stage is the final goal of *Buddhist practice*; the highest rank in early Indian Buddhism, when there is nothing left to learn.

Literally it means "foe destroyer" or "worthy of respect".

Buddhist sutras are referring to Buddha's teaching the *Bodhisattva's path* to the fifty-five stages of the enlightenment, the specific working of individual and collective karma, the existence, the *Instructions to Purity*, how to get a *Bodhimanda* and the *Shurangama Mantra*, and understanding the fifty kinds of deviant *Samadhi-concentrations* that delude us.

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2. Blogs on Applications of Multispace (and Multistructure) in Science

F. Smarandache, V. Christianto, Neil Boyd

2.1. Think about <u>parallel quantum computing</u> [somehow similar to parallel computer programming that we are very familiar with]. Since we work in a multispace $S = S_1 \cup S_2 \cup \ldots \cup S_n$, (a finite or infinite union of spaces that may overlap) which consequently has a

multistructure, we may consider a quantum computing in the same time in each space S_1, S_2, …, S_n – connecting this to the mu-bit.

This is an interesting idea. I could imagine we may propose a novel nanocomputer using this concept...
http://www.foresight.org/updates/Update12/Update12.2.html.

We should call it multi-nanocomputer or *munanocomputer*.

Can we connect the mu-bit and parallel quantum computing to new energy creation (what everybody is looking for today)?

Not sure, but it is useful to check it. Just find an interesting Stanford thesis discussing quantum computation and quaternion number... Maybe they could be related...
http://www.stanford.edu/~eboyden3/mengthesis/thesis1.htm.

Now perhaps we could combine the mu-bit with Cantor's infinity
http://www.earlham.edu/~peters/writing/infinity.htm.
and get an *infinite-bit*?

2.2. Imagine some multi-entangled states or particles (if possible?) + multispace + multi-parallel quantum computing. One particle (or one particle state) in each space of the multispace.

My best thought so far is to compare this multispace-bit with Young double slit experiment - like the paradox that light could resemble particle (photon) yet it could behave like wave (Fresnel).

We can try a similar experiment with more slits at different distances from each other, or slits of various shapes, and the source light coming from many angles

either separately i.e. each time from the same angle, or in the same time from many various angles.

It seems to me that this paradox could be reconciled once we introduce multispace-bit, that creation of 'bit' will multiplicate itself into multi-space, which triggers wave pattern in Young slit experiment.

But how to put in into a quantum-mechanics language?

In each space S_i the bit may be different, as for the light: particle on S_1, wave on another space S_2. But there might be possible another form of the light (neither particle, nor wave;

— maybe both of them simultaneously, or none of them as in neutrosophics - i.e. a form that we are not aware of in today's science) occurring in space S_3, and so on.

I tried to develop the (geometrical or algebraic or analytical, etc.) multi-space, and then to consider a similar/adopted correspondent for bit, qu-bit (quantum bit), up to mu-bit (= *multi-bit* in a multi-space).

I read a paper about: "Multivalued logic and gates for quantum computation" by Ashok Muthukhrishnnan *et al.*

The authors define the 'qudit' [as a generalization of the qubit] as a d-dimensional quantum system with the basis states $|0\rangle$, $|1\rangle$, ..., $|d-1\rangle$, and also they talk about 'quantum computing in multilevel systems'.

I think the mu-bit and multi-parallel quantum computing are different from 'qubit' (or 'qudit') and

'quantum computing in multilevel systems' respectively.

In our (mine and Vic Christianto's) 'multispace bit' we consider that each space may have a different structure, while I feel that in the 'qubit' the structures are the same for each level.

Hence I think the mu-bit is a generalization of the qudit.

We are able to explain the particle/wave duality of the light, while the qudit is not.

Similarly our multi-parallel quantum computing is a generalization of 'quantum computing in multilevel systems' since we may have different types of quantum computing at each level/space since we accept different structures.

2.3. A question perhaps: does it mean that multispace corresponds to multivalued logic, and if yes could we apply it to make 'multispace-multivalued' interpretation of Schrödinger equation? And how to find differential equation in multispaces?...

We can apply the multi-valued logic in the following way:

a logic L_1 in a field F_1, another logic L_2 in another field F_2, etc. (as many as necessary).

About a common *differential equation* there might be a problem, but I think it would be possible to get a differential equation E_1 in a field F_1, another differential equation E_2 in another field F_2, and so on.

Then try to connect all of them under a general differential equation.

In a multi-space, a point (or an entire region which is common to more spaces) may have in the same time many metrics and pseudo-metrics (metrics that do not verify all metrics' axioms).

So, the multi-space becomes more complex. I wrote this to the physicist D. Rabounski, since this might give him a new impulse of reinterpretation of singular points in various theories.

2.4. I read Dr. Kaivarainen's idea about overunity machine and the possibility of using virtual particles and real particles and antiparticles.

I wonder if another category of particles, called unparticles which are a kind of unmatter (neither particles, nor antiparticles, but something in between: combinations of quarks and antiquarks bounding together even for a very short period of time, such as: pions, pentaquarks, etc.) would be of any usefulness for the interacting with those virtual particles, real particles, and antiparticles? Thus, having four categories of particles interacting each other.

Curiously, in the journal "Telegraph", from 23rd January 2008, there is an article by Roger Highfield, called *Is our cosmos teeming with alien 'unmatter'*, where the name"unmatter" is just in the article's title, but my name is not even cited:

http://www.telegraph.co.uk/science/large-hadron-collider/3322840/Is-our-cosmos- teeming-with-alien-unmatter.html ;

only Prof. Howard Georgi from Harvard University is cited for "unparticle" that is a kind of unmatter

particle, and everybody knows I was the first to coin the name **unmatter** as a combination of matter and antimatter – and a possible third form of matter - since 2004, in CERN website, and I published papers about "unmatter":

1. "A New Form of Matter – Unmatter, Formed by Particles and Anti-Particles" (EXT-2004-182),
— in CERN's web site (2004):
http://cdsweb.cern.ch/record/798551
http://cdsweb.cern.ch/record/798551/files/ext-2004-142.pdf?version=1

   — and in <Progress in Physics>, UNM-G, Vol. 1, 9-11, 2005;
   — and under the title of "Matter, Antimatter, and Unmatter" in <Infinite Energy>, Concord, NH, USA, Vol. 11, Issue 62, 50-51, 2005;
   — and in <Bulletin of Pure and Applied Sciences>, Vol. 23D, No. 2, 173-177, 2004.
2. "Verifying Unmatter by Experiments, More Types of Unmatter, and A Quantum Chromodynamics Formula", in Progress in Physics, Vol. 2, 113-116, 2005; an improved version in "Infinite Energy", Concord, NH, USA, 36-39, Vol. 12, Issue 67, 2006.
3. "Unmatter Entities inside Nuclei, Predicted by the Brightsen Nucleon Cluster Model", Progress in Physics, Vol. 1, 14-18, 2006 (with D. Rabounski).
4. On Emergent Physics, "Unparticles" and Exotic "Unmatter" States, by Ervin Goldfain and Florentin Smarandache, Progress in Physics, Vol. 4, 10-15, 2008;
   — and in <Hadronic Journal>, Vol. 31, No. 6, 591-604, December 2008,
   http://www.hadronicpress.com/hadronic_journal.htm.

Or my abstract on *unmatter* in American Physical Society's meetings:

http://meetings.aps.org/Meeting/GEC09/Event/107355 ;
Bulletin of the American Physical Society, 62nd Annual Gaseous Electronics Conference Volume 54, Number 12 , Tuesday–Friday, October 20–23, 2009; Saratoga Springs, New York, USA.

In the below site there is a blog and a link to my CERN article:

http://novaspivack.typepad.com/nova_spivacks_weblog/2005/03/unmatter_a_poss.html
Unmatter: A Possible Third Form of Matter.

This interesting abstract from CERN proposes a third form of matter that is between matter and antimatter: "unmatter." Interesting idea to track. It could have huge implications if confirmed."

Doing a search on Google for "unmatter" there are 2,680 sites (end of March 2010), and my unmatter articles are among the first, therefore anybody could read them and my definition of "unmatter".

From our above paper *On Emergent Physics, "Unparticles" and Exotic "Unmatter" States*, by E. Goldfain and F. Smarandache, unparticles represent exotic quantum states that can occur at energies greater than the Standard Model's energy (bigger than *1 TeV*), with abnormal properties:

- they are mixtures of particles and antiparticles [= unmatter];
- their spin is not integer but fractional (i.e. their spin is different from 1 or 0 for Bosons, and different from1/2, 3/2, 5/2, etc. for Fermions); they are neither particles of matter (leptons and quarks), nor particles that transmit forces {gauge Bosons, as for example photons,

gravitons, particles that transmit the weak interaction (*W, Z*), or gluons that connect the quarks in nuclei and transmit the strong interaction}; therefore, unparticles represent arbitrary mixtures of particles of matter with particles that tie the matter;

- they are mixtures between Left and Right states (i.e. an arbitrary combination of quantum polarizations; they do not satisfy today's theory of the quantum field);
- they are very unstable and decompose almost instantaneously.

I hope the scientific justice will eventually prevail.

2.5. I've studied that Ginzburg-Landau model can be related to 'compact sphere model', therefore this approach may be connected (somehow) to CGLE method of Ervin Goldfain.

Others may find linkage with Schrödinger equation, Brownian motion etc.

2.6. I'd be happy to cooperate with Dr. Ervin Goldfain into connecting Unmatter with Dark Matter {and an idea just coming into my mind is about… Dark Antimatter and Dark Unmatter if these might exist (?)} – but this has to be proved in Geneva's Large Hadron Collider.

Ervin e-mailed me that the properties of "dark matter" seem to be close to unmatter and unparticles, but the experiments in this domain are barely starting.

Matter, antimatter, and unmatter; or particle, antiparticle, and unparticle – as in neutrosophy <*M*>, <*antiM*>, and <*unM*>; or <*P*>, <*antiP*>, and <*unP*>.

It would be interesting in finding out if Dark Matter is composed from aggregates of unmatter and unparticles (without electrical charge, and formed from mixtures of particles with fractional spin).

2.7. Apparently why normal scientists could not accept CF (cold fusion) easily (Taleyarkhan, Putterman etc.) is because there is an obvious problem herein: how to overcome Coulomb barrier? This is why hot-fusioners should create large Tokamak chamber like in ITER project (now to be built in France)...

This is partly why we introduced the 'Hulthen potential' term in Ginzburg-Landau equation, because Hulthen potential permits Coulomb barrier reversal, therefore it could be attractive instead of repulsive at some conditions...

We should envisage all fusions to be done simultaneously in each space $S_1, ..., S_n$ at various (lower, medium, higher) temperatures, pressures, etc..

2.8. Nanotechnology is stressing here in academia as a hot research subject. I bought a handbook from Amazon.com, but it has much organic chemistry.

We can unite nanoscale space with our world scale and with cosmic scale, or inorganic nanoscale with organic nanoscale.

2.9. Multi-space (or multispace) unifies science fields; actually the whole universe is a multi-space.

It is curious that we accepted all quantum theories, not yet proven, many based on imagination (maybe science fiction), while others are reluctant

to multi-space which constitutes so obvious our reality. Sure, I acknowledge (and it is my fault and incompleteness) that there is not much theory behind multi-space (some theory is about Sm. Geometries, that are a particular type of multi-space formed as unions of geometrical spaces only).

Multispace is a qualitative notion, not a metrics notion, since multispace is too large and such including metric and non-metric spaces.

Weyl and Kahler geometries are used in quantization somehow, but my geometries look to be more general and including these geometries; how should we use them?

http://fs.unm.edu/Geometries.htm

Laurent Schadeck has asked if the Smarandache geometries relate to non-associative structures.

Non-associative structures are structures whose laws are not associative.

These geometries are regarded from another point of view, considering a union of hybrid geometrical spaces (that form together a multi-space).

In general, this multi-space embedded with a law is a non-associative structure.

2.10. Parallel universes are also a particular case of multi-space anyway. You can have parallel universes on each dimension. But "combinatorial manifolds" do not include the possibility to use pseudomanifolds as used in the Theory of Relativity.

While combinatorial pseudomanifolds will be part of the multi-space.

2.11. I was still in a trip in Egypt, when an idea came to me that - following the neutrosophic logic where <*A*> and <*antiA*> can be simultaneously true, or using the multispace - maybe more models of the atom might be correct, not only the standard model of the atom.

But the type of model might depend on the substance atom, and on other parameters (temperature, pressure, etc.).

2.12. I read papers on parallel timelines, but those explanations look somehow fantastic to me.

Time is considered a line; shouldn't it be a curve since in the text it is taken for a spiral? Multi-space could work for time in the sense of multi-curve time, I mean curve C_1 (like space C_1) representing time t_1, curve C_2 representing time t_2, etc. Hence, do we need infinitely many curve-times?

2.13. Did you hear that Pluto is not considered a planet any longer, so we now have only eight planets in the solar system (so far… who knows in the future?).

2.14. What about writing **sci-fi** using nano-technology? [say a nanorobot guided inside the body to fight viruses, or nanomachines that auto-reproduce, etc.]. Like Asimov's stories, but adopted for today's science. Microchips as additional human memories implemented in man's brain, etc.

It would be exciting writing such stories! Maybe first we can start with short stories and make a collection.

Another choice I just think is writing a 'satire' version of Star Trek with the purpose of humor, for

instance: "**Star Shrek**". Therefore, we can write another fiction. The character 'Shrek', from Disney, now is going to space-travel... Just Google to see that there is no 'Star Shrek' novel so far...
http://www.magicdragon.com/UltimateSF/SF-Index.html .

2.15. But I'd imagine something in the micro-universe, since in the macrouniverse many people wrote before us, as "the adventure of a particle-man", etc...

— or a man who can move from our normal space to a nucleus space...

— using a lot of fantasist quantum physics...

— with things which are in two places in the same times, and with superluminal speeds inside...

Also, to be innovatory, we can include differential equations in the novel [why not first starting with short SF stories, and then go to a SF novel?];

— for example, the equation may describe the trajectory of the particle-man inside a hydrogen atom...

— or even parts of a scientific article [from ours, in order for not having copyright problems], explaining the *SC potential* of the particle-man inside the nucleus;

— or how the particle-man moves from a space into another space on its multispace, for example from the quantum space to the macrospace and becomes a real man...

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Conclusion

Well, there is a paradox here: if we don't discuss with anybody else, our ideas cannot grow, but if we discuss it others could use them (with people from Seattle I mean is: 'Most Intelligent Customers Realize Our Software Only Fools Teenagers' - you know this joke?

www.ngkhai.net/blog/category/general-interest/jokesquotes

Therefore I think the best way is to secure them first (US/ Europe is the best place, because if we apply to developing countries somehow a patent registered at Europe could supersede it), then begin writing articles for journals, etc...

PHYSICS

Special Theory of Relativity

to Waldyr Rodrigues

I interpreted the Special Theory of Relativity (STR) from a different viewpoint. I do not follow the mainstream dogma; I pass everything through my logos.

I do not talk about clocks, since the clock is an instrument to measure the time, instrument that may not work properly in certain conditions (for example because of an electromagnetic field the functioning of the clock may get distorted).

I considered the STR from the Absolute Time perspective. In this case, the two elapsed times coincide.

$$\Delta t' = \Delta t.$$

Then I solved for the speed and got a superluminal speed. What did I do wrongly herein?

I have the right to consider an Absolute Time {as Galilee (1564-1642) and Newton (1643-1727) did}, why not? What is my misconception? Please tell me your opinion - I learn from you.

There are not two clocks, but the Absolute Time which shows the same time anywhere.

The relativistic velocity of speeds do not work well, because: if you compute *c-c* you get 0/0.

CERN showed that the muon neutrino travels faster than light. About 174 renown scientists from 13 countries have signed the paper showing it. I don't feel that they all are bad…

to Ajay Sharma

There are also other new ideas in my book:

I parameterized the STR and I defined new Relativities, one of them being The Absolute Theory of Relativity (that has a different addition of velocities formula; without any anomalies like time dilation, space contraction, relativity of simultaneity, etc.), and I generated other Relativities too.

to Stephen Crothers

I read your paper called "Correspondence". Thank you for sending it to me.

So Big Bang is related to Black Holes.

Did the point - that the Big Bang Theory sustains it has exploded and created the universe - has infinite density (therefore infinite mass)?

My questions are:

1) What was before that infinite-density point? I feel this question has been asked by many scientists.

2) What is the density of a black hole (as the mainstream says)?

3) I thought the event horizon is a spherical (or almost spherical) surface around the black hole (as

said by the mainstream) where its gravitational field is very high. Is that right?

4) Does there exist infinite gravitational fields?

lui Vlad

Privitor la *Jack Sarfatti*: Noi am mai avut anterior niște contradicții. A striga: *crockpot* fără a demonstra științific pe text (printr-un contraexemplu, prin relevarea unei greșeli în vreo demonstrație) înseamnă *crackpotness* din partea lui. E mai ușor să etichetezi pe cineva *crockpot* prin atac personal, decât să citești articolul sau cartea sa!

Minkowski's spacetime

Florentin Smarandache

I read Thornhill's article about *Reality or Relativity* (regarding the spacetime), but I'd like to get a particular counter-example from our everyday life that does not work in Minkovsky's spacetime. Dr. Charles Kenneth Thornhill has proved that Minkowski spacetime does not reflect the reality. His papers are here: www.etherphysics.net. Why the time axis is denoted *ct* and not simply *t* ? Therefore, *c* = speed of light. Why involving the speed of light to the time axis?

Stephen Crothers

The time axis is *ct* not *t* because this product *ct* gives units of length. In this way it is erroneously claimed

that time is on equal footing with length and so there is a spacetime continuum. The whole notion is nonsense.

Time is not on equal footing with length at all because it has different units. Consequently it cannot be another dimension. So Minkowski's spacetime continuum is meaningless, as Thornhill has shown.

Florentin Smarandache

Why then considering ct and not another speed v times time t : i.e. vt ? So, why light speed? What about if they put the sound speed?

Generalizing to Sm. Geometries

The General Theory of Relativity (GTR) describes the connection between pseudo-Riemannian manifold and the energy-momentum contained in this pseudo-manifold. What about generalizing to my hybrid geometries?

Dmitri Rabounski

Yes, there is a theoretical possibility to extend the GTR to the Sm-Geometries. I mean to introduce a connection between the Sm-Geometry and the energy-momentum tensor. Just two problems. They are the same as those which did not allow to extending the GTR, with success, to the other geometries before.

a) Riemannian geometry has the well-developed mathematical techniques, while many others – do not;

b) Those non-Riemannian geometries, which are now well-developed, have so complicate mathematical techniques that even simplest problem of Special Relativity are very complicate to resolve (as in Finslearian geometry, for instance).

Finally, to extend the GTR to another non-Riemannian geometry, we need to know the differential rules, connection coefficients, and many others - the complete mathematical techniques - which allow to produce calculations in the framework of this geometry.

Florentin Smarandache

Thanks for the comments. I agree with you.

My hybrid geometries are too large (too general) and maybe a particular case of such geometries should be considered where we should be able to define a metric and the differential rules.

In the general multi-space geometries case this cannot be done since the metrics and rules are very different from each other.

Spacetime Coordinates

to Dmitri Rabounski

Here it is my question about using the spacetime:

Suppose a car C is at the position ($x = 2$, $y = 3$, $z = 5$) and time $t = 8{:}00$ a.m. (I don't know how to express 8:00 am in terms of ct ; can you tell me?).

Then the car C moves at the position (x = 6, y = 7, z = 8) and time t = 9:00 am.

How do we compute the metric according to Minkovski between these two spacetime coordinates?

Or give me another concrete example where you can compute the metric between two such events?

Physics Space

to Victor Christianto

AntiGeometry occurs on a geometric space where some axioms are 100% false.

For example:

- Axiom: Through two distinct points there is passing only one line.
- Negation of the Axiom: Through two distinct points there is no passing line, or there are passing two or more distinct lines.

Or, you can get a physics space, where a physics law applies to some elements of the physics space, but not to others; or the physics law may apply to all elements of the physics space, but in different degrees.

Reference:

http://fs.unm.edu/NSS/NeutroGeometryAntiGeometry31.pdf

The Change in Frequency of Light Wave

Florentin Smarandache

When I refer to the medium the light passes through, I also understood the electric/magnetic/gravitational fields that are within it, which can affect the change in frequency of light wave.

For the suggested experiment with different clocks, I want to prove that the the resulted dilation / contraction factors depend on the clock's material and construction type, i.e. it will be found different degrees of redshift / blueshift depending on the clock's material and construction type.

The Liquid Sun

to Dmitri Rabounski

I agreed with the liquid Sun since Pierre-Marie Robitaille told me in Columbus, at the Ohio State University, in February 2013, when I had a lecture. It is more plausible for the stars to be liquid than gaseous.

I feel there is some viscosity on each stars; which one should have a higher density in general, the small stars or giant stars? About the core of a star, we did not discuss much on this subject. Maybe the viscosity of the Sun liquid is variable inside.

You say in your *Inside Stars* book that the gravity approaches infinity near the Sun core surface, but it is not infinity as in a black hole; am I right? If the gravity

approaches infinity near the core surface, what would happen in the center of the Sun?

I read the preface by Pierre Millette. Stellar plasma are modelled by magnetic fluid dynamics.

Indeterminism in our Universe

Florentin Smarandache

We have degrees of determinism and indeterminism.

I do not agree with Einstein's aphorism "God does not play dice" since there is not only determinism in our universe. Especially at the quantum level I'm afraid there is an indeterminism.

If it was only determinism in our universe, then a big equation could be built to predict everything - what I don't think it was possible.

Neutral Energy Solution

I think one should look for 'neutral energy solution' too, since it might be a chance. The indeterminacy depends on the type of event we study.

If there is positive and negative energy it is a high chance to have a neutral energy too (which is a combination of the positive and negative ones).

In a similar way I thought about matter+unmatter which do not annihilate, getting unmatter (for example the mesons, or the pentaquark).

Causality Threshold

to Dmitri Rabounski

How to put the "causality threshold" into Minkowski's diagrams? Use Minkowski's space - a very particular case of a four-dimensional pseudo-Riemannian space (the basic space-time of GR)?

Elastic Space

To define an Elastic Space, not a rigid one. An Elastic Space extends and contracts, gets extra elements or looses old elements. And this happens continously.

Is our Universe elastic?

Entangled Particles

Entangled particles are considered different from "free particles" exchanging signals. This problem for free particles was considered by J. Synge and A. Petrov, well-known experts in General Relativity, authors of Relativity Bibles: J. Synge; *Relativity: the General Theory*. N. Holland, Amsterdam, 1961; A. Petrov, *Einstein Spaces*, Pergamum, London, 1969.

Neutrosophic Energy

The neutrosophic value of the average energy of one system, for a given period of time, is close to the neutrosophic average instantaneous value of this energy over a large number of systems.

Therefore, in principle if one knows the neutrosophic energy levels of the system's components, one obtains the approximate thermodynamic properties of the system.

n-ary Stars

There exists binary stars, that rotate one around the other. What about trinary stars, and in general *n*-ary stars (for $n \geq 3$)? Which will be the maximum *n*-ary stars in the universe?

Doppler effect

Doppler effect and consequently Doppler shift should depend not only on the relative motion of source and observer, but also on the medium (space) composition and density where the wave motion occurs in.

What about the case when the velocities of the source and respectively the observer are not in the line joining the source and observer?

But if the velocities (one or both) are superluminal or instantaneous, how will the Doppler effect look line?

Redshift Periodicity

Redshift periodicity is plausibly the effect of gravitational, electrical, magnetic forces and medium composition and density.

Pressure and momentum contribute to gravitational field.

Operations with Instantaneous Velocities

Operations with instantaneous velocities are like with infinity in mathematical analysis.

Relativity in Quantum Space and in Cosmological Space

Consider the relativity in a quantum space and in a cosmological space. Its behavior is different in each of these spaces.

MISCELLANEA

Theories – Neutrosophic Perspective

A theory may be true on a space, false on another space, and indeterminant (partially trues and partially false, or unknown) on a different space.

*

If a theory (i.e. its space of work, or its axioms, or its theorems, or its concepts) has some indeterminacy,

then one can apply the neutrosophic theories.

It would be interesting if one can prove that each theory has its own indeterminacy.

Then we'd have a neutrosophic part of it.

If the theory has no indeterminacy, one still can use the neutrosophic theories by replacing indeterminacy $I = 0$.

A Method for Solving the Linear Diophantine Equation

to Trung Duyên

Example:

$$9x + 12y - 21z = 6$$

is a Diophantine Linear Equation. Solve for x, y, z as integer solutions only.

Simplify it by dividing by 3:

$$3x + 4y - 7z = 2.$$

Compute $min\{3,4|-7|\} = 3$.

So, solve for x, since 3 is the coefficient of x.

$$3x = -4y+7z+2$$

whence

$$x = (-4y+7z+2)/3 = -y + 2z + (-y+z+2)/3$$

which should be an integer, therefore $(-y+z+2)/3$ should be an integer as well,

so let's denote it by t, or $(-y+z+2)/3 = t$,

then $x = -y + 2z + t$.

From $(-y+z+2)/3 = t$ we get $z = y + 3t - 2$.

Replace $z = y + 3t - 2$ into the equation $x = -y + 2z + t$, and we get:

$$x = -y +2(y+3t-2) + t = y + 7t - 4.$$

Therefore:

$$x = y + 7t - 4$$

$$z = y + 3t - 2$$

So y is a free variable, but let's denote it as $y = u$,

whence the general integer solution is:

$$\begin{cases} x = u + 7t - 4 \\ y = u \\ z = u + 3t - 2 \end{cases}$$

where $u, t \in \mathbb{Z}$ the set of integers.

Therefore, we got a double-infinite integer general solution.

If you replace, in order to verify, this general integer solution into $3x + 4y -7z = 2$ you get an equality.

Neutrosophic Sorites Paradoxes

The classical Sorites paradoxes assert that for certain items <A>, there is no clear frontier between the opposites <A> and <antiA>. The Neutrosophic Sorites Paradoxes are extensions of classical Sorites paradoxes, by neutrosophy: for certain item <A>, there is no clear frontier between <A> and <neutA>, and/or no clear frontier between <neutA> and <antiA>.

Indeterminacy

What about including indeterminacy I in each of the Minkowski spacetime $\{x, y, z, t\}$ coordinates?

How would then indeterminacy propagates in the special & general theories?

These theories can be extended to their neutrosophic form.

Dinamica limbii

Un cuvânt C are sensurile $C_1, C_2, ..., C_n$ știute/existente până la un anumit timp.

Dar alte sensuri i se pot acorda în viitor, așadar avem o parte indeterminată/necunoscută (sau potențială) a sensurilor cuvintelor la un anumit timp: $I_1, I_2, ...$.

Lingvistica computațională neutrosofică

Mirelei Teodorescu

Ai dreptate, neutrosofia merge peste tot unde există nedeterminare (necunoscut, nesiguranță, vag, aproximație, incompletitudine). De acord pentru *lingvistica computațională neutrosofică*.

Neutrosociology

lui Ioan Aurel Pop, președintele Academiei Române

Știu ca sunteți un expert în istorie, și în aceste timpuri avem nevoie de istoria noastra străbună... Am locuit, vizitat și lucrat în țări cu diverse sisteme sociale și religioase, și am fost interesat în a le compara.

Am scris o singura carte de sociologie, dar văzută din punct de vedere al logicii neutrosofice (este o logică pe trei componente: o propoziție are un procent de adevăr, un procent de fals, și un procent de indeterminare/neutru între adevăr și fals) — *Introduction to Neutrosophic Sociology*, http://fs.unm.edu/Neutrosociology.pdf.

Cel mai simplu exemplu ar fi acesta: la un meci de fotbal există trei posibilități: echipa favorită să câștige (deci procent de adevăr), să facă meci nul (procent de neutralitate), ori să piardă (procent de falsitate).

Am constatat că nu există capitalism 100% (deoarece într-o societate există și biznisuri de stat), și nici socialism 100% (deoarece într-un sistem socialist există și biznisuri private, e drept, mici).

Deci, fiecare societate are un procent de capitalism și procent de socialism; dacă procentul de capitalism este mare decât cel de socialism, societatea este considerată capitalistă; iar în sens opus, este considerată socialistă. Țările europene nordice, deși capitaliste, au un procent mare de socialism (multe servicii publice oferite de stat: asistență medicală gratuită (sau aproape gratuită), pensii asigurate, asistență socială pentru șomeri, etc.). În State, este un procent mare de capitalism, și mic de socialism [nu există asistență medicală gratuită sau ieftină, pensii nesigure, asistență pentru șomeri limitată și condiționată...]. La fel și cu democrațiile, nu există democrație 100% și nici dictatură 100%, ci avem în orice țară un procent de democrație și un procent de nedemocrație... depinde care-i mai mare...

Five New Proposed Fields of Research

1. Neutrosophic Statistics vs. Classical Statistics

The Neutrosophic Statistics deals with indeterminate data, i.e. data that has some degree of indeterminacy (unclear, vague, partially unknown, contradictory, incomplete, etc.), and indeterminate inference methods that contain degrees of indeterminacy as well (for example, instead of crisp arguments and values for the probability distributions, charts, diagrams, algorithms,

functions etc. one may have inexact or ambiguous arguments and values).

While the Classical Statistics deals with determinate data and determinate inference methods only.

2. NeutroAlgebra & AntiAlgebra vs. Classical Algebra

In classical algebraic structures, all operations are 100% well-defined, and all axioms are 100% true, but in real life, in many cases these restrictions are too harsh, since in our world we have things that only partially verify some operations or some laws.

We have generalized the classical Algebraic Structures to NeutroAlgebraic Structures (or NeutroAlgebra) {whose operations and axioms are partially true, partially indeterminate, and partially false} as extensions of Partial Algebra, and to AntiAlgebraic Structures (or AntiAlgebra) {whose operations and axioms are totally false} and on 2020 we continued to develop them.

The NeutroAlgebras & AntiAlgebras are a *new field of research*, which is inspired from our real world, that started in 2019.

3. SuperHyperAlgebra and Neutrosophic SuperHyperAlgebra as extensions of the Classical HyperAlgebra

A *m-ary SuperHyperOperation*, or a more accurate denomination *(m, n)-SuperHyperOperation*.

Let U be a universe of discourse and a non-empty set H, $H \subset U$. Then:

$$\circ_{(m,n)}: H^m \to P^n(H)$$

where the integers $m, n \geq 1$,

$H^m = \underbrace{H \times H \times \ldots \times H}_{m\ times}$,

and $P^n(H)$ is the n^{th}-power set of the set H,

i.e. $P^2(H) = P\big(P(H)\big)$,

$P^3(H) = P\big(P^2(H)\big) = P\Big(P\big(P(H)\big)\Big)$, …,

$P^n(H) = P\big(P^{n-1}(H)\big)$,

where $P^\circ(H) \stackrel{\text{def}}{=} H$, and $P^1(H) \stackrel{\text{def}}{=} P(H)$.

This *SuperHyperOperation* is a *m-ary operation* defined from the set H to the n^{th}-power set of the set H.

A *SuperHyperAxiom*, or more accurately a *(m, n)-SuperHyperAxiom*, is an axiom based on *(m, n)-SuperHyperOperations*.

A *SuperHyperAlgebra*, or more accurately *(m-n)-SuperHyperAlgebra*, is an algebra dealing with *SuperHyperOperations* and *SuperHyperAxioms*.

Distinction between SuperHyperAlgebra vs. Neutrosophic SuperHyperAlgebra

i. If all power sets $P^k(H)$, $1 \leq k \leq n$, do not include the empty set ϕ, then one has a classical-type SuperHyperAlgebra;

ii. If at least one power set, $P^i(H)$, $i \in \{1, 2, \dots, n\}$, includes the empty set ϕ, then one has a Neutrosophic SuperHyper-Algebra.

4. The n-SuperHyperGraph as extension of the Classical HyperGraph

Let $V = \{v_1, v_2, \dots, v_m\}$, for $1 \leq m \leq \infty$, be a set of vertices, that contains Single Vertices (the classical ones), Indeterminate Vertices (unclear, vague, partially known), and Null Vertices (totally unknown, empty).

Let $P(V)$ be the power of set V, that includes the empty set ϕ too.

Then $P^n(V)$ be the n-power set of the set V, defined in a recurent way, i.e.:

P(V), $P^2(V) = P\big(P(V)\big)$,

$P^3(V) = P\big(P^2(V)\big) = P\Big(P\big(P(V)\big)\Big)$, …,

$P^n(V) = P\big(P^{n-1}(V)\big)$, for $1 \leq n \leq \infty$,

where by definition $P^0(V) \overset{def}{=} V$.

Then, the *n-SuperHyperGraph (n-SHG)* is an ordered pair:

$$\text{n-SHG} = (G_n, E_n),$$

where $G_n \subseteq P^n(V)$, and $E_n \subseteq P^n(V)$, for $1 \leq n \leq \infty$.

G_n is the set of vertices, and E_n is the set of edges.

The *set of vertices* G_n contains the following types of vertices:

- *Singles Vertices* (the classical ones);
- *Indeterminate Vertices* (unclear, vagues, partially unkwnown);
- *Null Vertices* (totally unknown, empty);

and:

- *SuperVertex* (or SubsetVertex), i.e. two ore more (single, indeterminate, or null) vertices put together as a group (organization).
- *n-SuperVertex* that is a collection of many vertices such that at least one is a $(n-1)$-SuperVertex and all other r-SuperVertices into the collection, if any, have the order $r \leq n-1$.

The *set of edges* E_n contains the following types of edges:

- *Singles Edges* (the classical ones);
- *Indeterminate Edges* (unclear, vague, partially unknown);
- *Null Edges* (totally unknown, empty);

and:

- *HyperEdge* (connecting three or more single vertices);
- *SuperEdge* (connecting two vertices, at least one of them being a SuperVertex);
- *n-SuperEdge* (connecting two vertices, at least one being a *n*-SuperVertex, and the other of order *r*-SuperVertex, with $r \leq n$);
- *SuperHyperEdge* (connecting three or more vertices, at least one being a SuperVertex);
- *n -SuperHyperEdge* (connecting three or more vertices, at least one being a *n* -SuperVertex, and the other *r* -SuperVertices with $r \leq n$;
- *MultiEdges* (two or more edges connecting the same two vertices);
- *Loop* (and edge that connects an element with itself).

and:

- *Directed Graph* (classical one);
- *Undirected Graph* (classical one);
- *Neutrosophic Directed Graph* (partially directed, partially undirected, partially indeterminate direction).

5. NeutroGeometry & AntiGeometry vs. Classical Geometries

The AntiGeometry results from the total negation of any axiom and even of more axioms from any geometric axiomatic system (Euclid's, Hilbert's, etc.), and the NeutroGeometry results from the partial negation of one or more axioms [and no total negation of no axiom] from any geometric axiomatic system.

While the Non-Euclidean Geometries resulted from the total negation of only one specific axiom (Euclid's Fifth Postulate), therefore the Non-Euclidean Geometries are particular cases of the AntiGeometry.

The NeutroGeometry & AntiGeometry are too a *new field of research*, which is inspired from our real world, that we started in 1969 with the Hybrid Geometries as particular cases of the AntiGeometry or Neutro-Geometry, and developed them in 2021.

The author in Egypt, July 2006

A theory is true in a space, false in another space, and indeterminate (unclear, or unknown) in a different space.

*

If a theory (i.e. its space of work, or its axioms, or its theorems, or its concepts) has some indeterminacy,

then one can apply the neutrosophic theory.

It would be interesting if one can prove that each theory has its own indeterminacy.

Then we'd have a neutrosophic part of it.

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