Refutation of neutrosophy definitions using probability and (in)dependency

Abstract: Definitions of neutrosophy as further embellished with probability and (in)dependency share the same result as denied of tautology. This means neutrosophic logic as a general framework for unification of many existing logics, such as intuitionistic fuzzy logic) and paraconsistent logic, is refuted.

We assume the method and apparatus of Meth8/VŁ4 with Tautology as the designated *proof* value, **F** as contradiction, N as truthity (non-contingency), and C as falsity (contingency). Results are a 16-valued truth table in row-major and horizontal, or repeating fragments of 128-tables for more variables.

LET ~ Not; + Or; & And; > Imply; < Not Imply; = Equivalent;
% possibility, for one or some; # necessity, for every or all; ~(y<x) (x≤ y);
p, q, r, s: Probability of independence 0≤p≤1, ; T Truthity, t, (%p>#p), ordinal 1; F Falsity, f, (%p<#p), ordinal 2; I Indeterminancy, i, Truthity or Falsity, Tautology, Proof, (%p>#p)+(%p<#p), ordinal 3;
(p=p) ordinal 3; (p@p) ordinal 0 (zero); ~(y<x) (x≤ y);

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1. Neutrosophic Logic is a general framework for unification of many existing logics, such as fuzzy logic (especially intuitionistic fuzzy logic), paraconsistent logic, intuitionistic logic, etc. (1.1.0.1)

The main idea of NL is to characterize each logical statement in a 3D Neutrosophic Space, where each dimension of the space represents respectively the truth (T), the falsehood (F), and the indeterminacy (I) of the statement under consideration, where T, I, F are standard or non-standard real subsets of $]^{-}0,1^{+}[$ with not necessarily any connection between them. For software engineering proposals the classical unit interval [0,1] is used.

For single valued Neutrosophic logic, the sum of the components is:

Remark 1: Below is *not* a single valued logic, but a *three*-valued, multi logic.

0≤(t+(i+f))≤3 when all three components are independent; (1.1.1.1)

(((%p>#p)+(%p<#p))\((%p>#p)+(%p<#p))) >
(~((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))<(p@p))&
~((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))>(p=p))) ;
TTTT TTTT TTTT TTTT (1.1.1.2)

Remark 1.1.2.2: The antecedent and consequent are equivalent, hence the result should be expected.

$0\leq(t+(i+f))\leq 2$ when two components are dependent, while the third one is independent from them; (1.1.2.1)

((%p<#p)\((%p>#p)+(%p<#p))) >
(~((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))<(p@p))&
~((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))>(%p<#p))) ;
CCCC CCCC CCCC CCCC (1.1.2.2)

$0\leq(t+(i+f))\leq 1$ when all three components are dependent. (1.1.3.1)

((p@p)\((%p>#p)+(%p<#p)))>
(~((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))<(p@p))&
~((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))>(p@p))) ;
FFFF FFFF FFFF FFFF (1.1.3.2)

When three or two of the components T, I, F are independent, one leaves room for incomplete information (sum<1), paraconsistent and contradictory information (sum>1), or complete information (sum=1). (1.1.4.0)

We write this as: If Eq. 1.1.1.1 and 1.1.2.1, then the sum of (t+(i+f)) is lesser than one or the sum is greater than one or the sum is equal to one. (1.1.4.1)

(((%p>#p)\((%p>#p)+(%p<#p)))+((%p<#p)\((%p>#p)+(%p<#p)))) >
((((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))>(%p>#p))+((((%p>#p)+
(%p<#p))+((%p>#p)+(%p<#p)))<(%p>#p)))+
((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))=(%p>#p))) ;
TTTT TTTT TTTT TTTT (1.1.4.2)

Remark 1.1.4.2: Eq. 1.1.4.2 is trivial because the antecedent as **F**T**F**T implying the consequent as TTTT is an obvious canonical form.

If all three components T, I, F are dependent, then similarly one leaves room for incomplete information (sum<1), or complete information (sum=1). (1.1.5.0)

We write Eq. 1.5.0.0 as: If Eq. 1.1.3.1, then the sum is not greater than one. (1.1.5.1)

((p@p)\((%p>#p)+(%p<#p)))>
~((((%p>#p)+(%p<#p))+((%p>#p)+(%p<#p)))>(%p>#p)) ;
CCCC CCCC CCCC CCCC (1.1.5.2)

Eqs. 1.1.2.1, 1.1.3.1, and 1.1.5.1 are *not* tautologous. This is sufficient to deny the definitions of neutrosophy as using probability and (in)dependency, and further to refute neutrosophic logic as a generalized framework to unify other logics such as those listed in Eq. 1.1.0.1.