Refutation of descriptive unions in descriptively near sets

Abstract: We evaluate an intersection operator named descriptive union for descriptively near sets. From two sources the definition of the operator is *not* tautologous. A proof of seven properties derived from the second definition contains two trivial tautologies with the rest as *no*t tautologous. This refutes the descriptive intersection operator and descriptively near sets on which it is based. This also casts doubt on the bevy of derived math and physics papers so spawned at arxiv, researchgate, and vixra.

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). For results, the 16-valued truth table is row-major and horizontal, or repeating fragments of 128-tables, sometimes with table counts, for more variables. (See ersatz-systems.com.)

LET p, q, r, s, t, u, v, w, x, y, z:
lc_phi φ, uc_Phi Φ, A, B, lc_pi π, K, R^n, 2^K, x, y, (q&(r&s));
~ Not, ¬ ; + Or, ∨, ∪; - Not Or; & And, ∧, ∩; \ Not And;
> Imply, greater than, →, ⊢, ↦; < Not Imply, less than, ∈;
= Equivalent, ≡, ⊨, :=, ⟺, ↔; @ Not Equivalent, ≠;
% possibility, for one or some, ∃, ◊, M; # necessity, for every or all, ∀, □, L;
(z=z) T as tautology; (z@z) **F** as contradiction, ∅;
(%z<#z) C as contingency, Δ, ordinal 1;
(%z>#z) N as non-contingency, ∇, ordinal 2;
~(y < x) (x ≤ y), (x ⊆ y).

From: Peters, J.F. (2013). Near sets: an introduction. Math.Comput.Sci (2013) 7:3-9.

The descriptive intersection $\cap_\Phi$ of *A* and *B* is defined by

$A \cap_\Phi B = \{x \in A \cup B : (x) \in Q(A) \text{ and } (x) \in Q(B)\}$. (0.0.0)

That is, $x \in A \cup B$ is in $A \cap_\Phi B$, provided there is ... $a \in A$, $b \in B$ such that $(x) = (a) = (b)$.
Observe that *A* and *B* can be disjoint and yet $A \cap_\Phi B$ can be nonempty. (0.0.1)

(((y<r)&(z<s))>((q&x)=((q&y)=(q&z))))>(x<(r+s)) ;

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FFFF FFFF FFFF FFFF(16), TTTT **FFFF FFFF FFFF**(16),
TTTT **FFFF FFFF FFFF**(16), TTTT **FFFF FFFF FFFF**(48) (0.0.2)

Remark 0.0.2: The definition of Eq. 0.0.0 as rendered in 0.0.2 is *not* tautologous.

From: Ahmad, M.Z.; Peters, J.F. (2018).
Descriptive unions: a fibre bundle characterization of the union of descriptively near sets.
arxiv.org/pdf/1811.11129.pdf ahmadmz@myumanitoba.ca james.peters3@umanitoba.ca

Definition 3: ... $\cap_\Phi$ is the descriptive intersection. ...

Theorem 1. Let A,B ⊂K be two subsets of a set K,φ : 2K → Rn be the probe function and π : Rn → 2K be a map such that π : x ↦ {y ∈K : φ(y) = x}. Then, A $\cap_\Phi$ B has

[the] following properties: (1.0.1)

((((r<u)&(s<u))>((p=(w>v))&(t=(v>w))))>(t=(x>((y<u)>((p&y)=x)))))
>(z=(q&(r&s))) ;

FFFF **FFFF** **FFFF** **FF**TT(4), **F**T**F**T **F**T**F**T **F**T**F**T **FF**TT(3),
T**F**T**F** T**F**T**F** T**F**T**F** **FF**TT(3), TTTT TTTT TTTT TTTT(4),
FT**F**T **F**T**F**T **F**T**F**T **F**TTT(1), T**F**T**F** T**F**T**F** T**F**T**F** T**F**TT(1) (1.0.2)

Note: Eq. 1.0.2 as rendered serves as antecedent to the 1.n.2 consequents listed below.

1.10 $A \cap_{\Phi} B = A \cap_{\Phi} B$. (1.1.1)

(((((r<u)&(s<u))>((p=(w>v))&(t=(v>w))))>(t=(x>((y<u)>((p&y)=x)))))
>(z=(q&(r&s))))>(z=z) ;

TTTT TTTT TTTT TTTT(16) (1.1.2)

Remark 1.1.2: Eq. 1.1.1 is trivial with this result to be expected.

1.20 $A = \varnothing \Rightarrow A \cap_{\Phi} B = \{x \in B : \varphi(x) = \varphi(\varnothing)\}$. (1.2.1)

(((((r<u)&(s<u))>((p=(w>v))&(t=(v>w))))>(t=(x>((y<u)>((p&y)=x)))))
>(z=(q&(r&s))))>(((r=(z@z))>z)=((x<s)>((p&x)=(p&(z@z))))) ;

T**F**T**F** T**F**T**F** TTTT TTTT(8), TTTT TTTT TTTT TTTT(8) (1.2.2)

1.30 $A = B \Rightarrow A \cap_{\Phi} B = A$. (1.3.1)

(((((r<u)&(s<u))>((p=(w>v))&(t=(v>w))))>(t=(x>((y<u)>((p&y)=x)))))
>(z=(q&(r&s))))>((r=s)>(z=r)) ;

T**F**T**F** TTTT TTTT TTTT(4), **F**T**F**T TTTT TTTT TTTT(4),
FFFF TTTT TTTT TTTT(4), TTTT TTTT TTTT TTTT(4) (1.3.2)

1.40 $A \cap B \Rightarrow A \cap_{\Phi} B$. (1.4.1)

(((((r<u)&(s<u))>((p=(w>v))&(t=(v>w))))>(t=(x>((y<u)>((p&y)=x)))))
>(z=(q&(r&s))))>((r&s)>z) ; TTTT TTTT TTTT TTTT(16) (1.4.2)

Remark 1.4.2: Eq. 1.4.1 is trivial with this result to be expected.

1.50 $A \cap_{\Phi} B \neq A \cap B$. (1.5.1)

(((((r<u)&(s<u))>((p=(w>v))&(t=(v>w))))>(t=(x>((y<u)>((p&y)=x)))))
>(z=(q&(r&s))))>~(z>(r&s)) ;

TTTT TTTT TTTT TT**FF**(10), TTTT TTTT TTTT **FFFF**(4),
TTTT TTTT TTTT T**FFF**(1), TTTT TTTT TTTT **F**T**FF**(1) (1.5.2)

1.60 $(A \cap_{\Phi} B = A \cap B) \Leftrightarrow \varphi$ is an injective function. (1.6.1)

(((((r<u)&(s<u))>((p=(w>v))&(t=(v>w))))>(t=(x>((y<u)>((p&y)=x)))))
>(z=(q&(r&s))))>((z=(r&s))=p) ;

T**F**T**F** T**F**T**F** T**F**T**F** TT**F**T(4), TTTT TTTT TTTT TT**F**T(8),
T**F**T**F** T**F**T**F** T**F**T**F** **F**T**F**T(4) (1.6.2)

1.70 $A \cap_{\Phi} B \subseteq A \cup B$. (1.7.1)

(((((r<u)&(s<u))>((p=(w>v))&(t=(v>w))))>(t=(x>((y<u)>((p&y)=x)))))
>(z=(q&(r&s))))>~((r+s)<z) ;

TTTT **FFFF** **FFFF** **FF**TT(43), TTTT **FFFF** **FFFF** **FFFF**(16),
TTTT **FFFF** **FFFF** **FF**T**F**(4), TTTT **FFFF** **FFFF** **FFF**T(1),
TTTT TTTT TTTT TTTT(64) (1.7.2)

A set intersection operator was proposed for descriptively near sets and named descriptive union. In the Theorem 1 proof seven properties are listed: two are trivial tautologies; and five as rendered are *no*t tautologous. The refutes descriptive intersection operators and near sets on which it is based.