Refutation of Riemannian geometry as generalization of Euclidean geometry

Abstract: From the classical logic section on set theory, we evaluate definitions of the atom and primitive set. None is tautologous. From the quantum logic and topology section on set theory, we evaluate the disjoint union (as equivalent to the XOR operator) and variances in equivalents for the AND and OR operators. None is tautologous. This reiterates that set theory and quantum logic are not bivalent, and hence non-tautologous segments of the universal logic VŁ4. The assertion of Riemannian geometry as generalization of Euclidean geometry is *not* supported.

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). 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 ~ 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, ⊤, ordinal 3; (z@z) **F** as contradiction, ∅, Null, ⊥, zero;
(%z>#z) N as non-contingency, Δ, ordinal 1; (%z<#z) C as contingency, ∇, ordinal 2;
~(y < x) (x ≤ y), (x ⊆ y); (A=B) (A~B).
Note: For clarity we usually distribute quantifiers on each variable as designated.

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LET p, q, r, s: A also Â, B, C, s
Note: Equations are keyed to page numbers.

An atom A≠0 is called a primitive set, that is, A has the property that if B⊆A then B=A. (4.1.1)

(~(p<q)>(q=p))>(p@(s@s)) ; **F**TTT **F**TTT **F**TTT **F**TTT (4.1.2)

We use the symbolic notation Â∈B as an equivalent to the more primitive statement A∩B=A. (4.2.1)

~(q<p)=((p&q)=p) ; T**FF**T T**FF**T T**FF**T T**FF**T (4.2.2)

In set theory, the equivalent [of A xor B] is given by the disjoint union A⊔B=(A∪B)\(A∩B) (23.1.1)

(p@q)=((p+q)\(p&q)) ; **F**TTT **F**TTT **F**TTT **F**TTT (23.1.2)

This is ... resolved by insisting that (−A)∩B= −(A∩B) where A,B are ordinary sets. (24.1.1)

(~p&q)=~(p&q) ; **FF**TT **FF**TT **FF**TT **FF**TT (24.1.2)

Quantum logic and topology: Show that $\vee$, $\wedge$ do not in general obey the rule of de Morgan: $P\wedge(R\vee Q)\neq(P\wedge R)\vee(P\wedge Q)$. (26.1.1)

(p&(r+q))@((p&r)+(p&q)) ; **FFFF FFFF FFFF FFFF** (26.1.2)

Quantum set theory. Sets are given by objects P,Q and we have again $\wedge$, $\vee$ where $P\wedge P = P = P\vee P$ (26.2.1)

(p&p)=(p=(p+p)) ; **F**T**F**T **F**T**F**T **F**T**F**T **F**T**F**T (26.2.2)

None of the equations above is tautologous. Eqs. 4 reiterate that set theory is not bivalent. Eqs. 23-26 reiterate that quantum logic does not follow all of the rules of inference from classical logic, hence quantum logic is not bivalent. The assertion of "Riemannian geometry which is a generalization of flat Euclidean geometry" is *not* supported.