

Refutation of Gleason's theorem

© Copyright 2017, 2019 by Colin James III All rights reserved.

Abstract: We evaluate Gleason's theorem in four variables which is *not* tautologous and forms a *non* tautologous fragment of the universal logic VL4.

We assume the method and apparatus of Meth8/VL4 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, T, ordinal 3; (z@z) **F** as contradiction, Ø, Null, ⊥, zero;
 (%z>#z) N as non-contingency, Δ, ordinal 1; (%z<#z) C as contingency, ∇, ordinal 2;
 ~(y < x) (x ≤ y), (x ⊆ y), (x ⊆ y); (A=B) (A~B).

Note for clarity, we usually distribute quantifiers onto each designated variable.

From: en.wikipedia.org/wiki/Gleason%27s_theorem

"Effectively, the theorem says that any legitimate probability measure on the space of measurement outcomes is generated by some quantum state." (1.1)

LET p, q, r, s: probability measure; quantum state; measurement outcomes; space;
 (p=p) Tautology, legitimate.

%q>((#p>(p=p))<(r<s)); TTTT NN**FF** TTTT TTTT (1.2)

Eq. 1.2 as rendered is *not* tautologous. This means Gleason's theorem is *not logically* "a mathematical result which shows that the rule one uses to calculate probabilities in quantum physics follows logically [*sic*] from particular assumptions about how measurements are represented mathematically".