

Refutation of naive scale invariance and the world as a hologram of 't Hooft

© Copyright 2019 by Colin James III All rights reserved.

Abstract: The equation for naive scale invariance is *not* tautologous, refuting it as basis for the world as a hologram of 't Hooft. These form 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, τ, 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: Susskind, L. (1994). The world as a hologram. arxiv.org/pdf/hep-th/9409089.pdf

The naive scale invariance would imply the following: ...

2) The wave functionals of the eigenvectors transform in a naive way [where] each fluctuation of wave number p simply stretches to wave number λp:

$$\Psi_i[\varphi(p)] \rightarrow \Psi_i[\lambda\varphi(\lambda p)]. \tag{2.10.1}$$

LET p, q, r, s, t: p, λ, i, Ψ, φ.

$$((s\&r)\&(t\&p))\>((s\&r)\&((q\&t)\&(q\&p))) ; \tag{2.10.2}$$

TTTT TTTT TTTT TTTT (1)
TTTT TTTT TTTT T**F**TT (1)

Eq. 2.10.2 as rendered is *not* tautologous, refuting naive scale invariance as basis for the world as a hologram of 't Hooft.