Refutation of Heyting logic

We assume Meth8/VŁ4 with the designated *proof* value of Tautology. The 16-valued truth table is row-major and horizontal.

LET p q r: x y z.

This is taken from:

Sheppeard, M.D. (2018). Idempotents in motivic quantum gravity. vixra.org/pdf/1804.0365v1.pdf

A Heyting algebra [10] is a not necessarily distributive poset lattice with a 0 and 1 and implication $x \to y$. Objects in the lattice are idempotent ... satisfying

$x \wedge (y \vee x) = x = (x \wedge y) \vee x.$ (6.1)

((p&(q+p))=p)=((p&q)+p) ; `FTFT FTFT FTFT FTFT` (6.2)

Remark: Eq. 6.1 is coerced into a theorem as $((x \wedge (y \vee x))=x) = (x=((x \wedge y) \vee x))$.

Implication satisfies

$(x \to y) \wedge x = x \wedge y$ (7.1)

((p>q)&p)=(p&q) ; `TTTT TTTT TTTT TTTT` (7.2)

and the distributivity

$x \to (y \wedge z) = (x \to y) \wedge (x \to z).$ (8.1)

(q>(q&r))=((p>q)&(p>r)) ; `TFFT TFTT TFFT TFTT` (8.2)

While Eq. 7.2 as rendered is tautologous, Eqs. 6.2 and 8.2 are *not* tautologous. This means that objects in the lattice-vectors of Heyting algebra are *not* idempotent. Consequently, Heyting logic is *not* bivalent, and hence refuted.