Refutation of an epistemic logic for knowledge and probability

Abstract: We evaluate axioms and definitions of an epistemic logic for knowledge and probability. Two equations are *not* tautologous, hence refuting the proposed epistemic logic.

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 LET p,q,r,s: ϕ, x, T, t
~ 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, ∅, Null;
(%z<#z) C as contingency, Δ, ordinal 1;
(%z>#z) N as non-contingency, ∇, ordinal 2;
~(y < x) (x ≤ y), (x ⊆y); (A=B) (A~B).

From: Tomović, S.; Ognjanović, Z.; Doder, D. (2019).
A first-order logic for reasoning about knowledge and probability.
arxiv.org/pdf/1901.06886.pdf sinisatom@turing.mi.sanu.ac.rs

3. The axiomatization Ax_{PCKfo}
In this section we introduce the axiomatic system for the logic PCK^{fo} ... of the following axiom schemata and rules of inference:
I First-order axioms and rules
...

FOR. $$\frac{\phi}{\forall x \phi} \quad (3.1.6.1)$$

p>(#q&p) ; T**F**T**F** TNTN T**F**T**F** TNTN (3.1.6.2)

Definition 3.3. A set T of formulas is saturated iff it is maximal consistent and the following condition holds:

if ¬(∀x)ϕ(x) ∈T , then there is a term t such that ¬ϕ(t) ∈T. (3.3.1)

((~p&#q)<r)>((~p&%s)<r) ; TTCT TTTT TTTT TTTT (3.3.2)

Remark 3.3.2: The result is one falsity value C from tautology.

Eqs. 3.1.6.2 and 3.3.2 as rendered are *not* tautologous. This means the proposed epistemic logic for knowledge and probability is refuted.