Refutation of type theory

Abstract: We evaluate the subset equations for the basis of type theory. They are *not* tautologous. Therefore the basis of type theory is a *non* tautologous fragment of the universal logic VŁ4.

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, 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); (A=B) (A~B); (B>A) (A⊢B); (B>A) (A⊨B).
Note for clarity, we usually distribute quantifiers onto each designated variable.

From: Coquand, T. (2018). Type theory.
plato.stanford.edu/entries/type-theory/ coquand@chalmers.se

Consider the following subset of X: A={x∈X|x∉F(x)}. (1.1)

LET p, q, r, s: a, F, X, x.

[A]=(~(s<(q&s))>(s<r)) ; **FFFF FFFF** TTTT TT**FF** (1.2)

This subset cannot be in the range of F.
For if A=F(a), for some a, then a∈F(a) iff a∈A, iff a∉F(a) which is a contradiction. (2.1)

((~(s<(q&s))>(s<r))=(q&%p))>
(((p<(~(s<(q&s))>(s<r)))+~(p<~(q&p)))>(p<(q&p))) ;
FTCT **F**TCT TTNT TTCT (2.2)

Remark 2.2: Eq. 2.2 as rendered is *not* tautologous, but it is also *not* contradictory. This means the basis of type theory is a *non* tautologous fragment of the universal logic VŁ4.