Refutation of quantum arithmetic using repeat-until-success circuits

We assume Meth8/VŁ4 where the designated *proof* value is Tautology. The truth table is repeating fragments of 16-values, row major and horizontal.

LET p q r s: φ_1 φ_2 ;
~ Not; + Or; & And; # necessity, for all; % possibility, for one or some.

Definition	Axiom	Symbol	Name	Meaning	2-tuple	Binary ordinal
1	p=p	T	tautology	proof	11	3
2	p@p	F	contradiction	absurdum	00	0
3	%p>#p	N	non-contingency	truthity	01	1
4	%p<#p	C	contingency	falsity	10	2

From:

Wiebe, N.; Roetteler, M. (2016). "Quantum arithmetic and numerical analysis using repeat-until-success circuits". *Quantum information and computation*. v 16: 1&2. 0134–0178. pdfs.semanticscholar.org/8590/ca37e1266fbd7b58fddf8aee0258f0b93433.pdf

[R]epeat until success circuits can be used to implement a form of multiplication ...

Assume that $\varphi1 \approx \varphi2 \approx 1$ then ... $\varphi1\varphi2 = -1 + \varphi1 + \varphi2 + (1 - \varphi1)(1 - \varphi2)$; (28.1)

((p=q)=(%p>#p))>((p&q)=((~(%p>#p)+(p+q))+(((%p>#p)-p)&((%p>#p)-q)))) ;
TNNT TNNT TNNT TNNT (28.2)

Now let us assume that $\varphi1 \approx 0$ and $\varphi2 \approx 1$. We can then use similar reasoning to show that $\varphi1\varphi2 = \varphi1 - \varphi1(1 - \varphi2)$; (29.1)

((p=((%p>#p)-(%p>#p)))&(q=(%p>#p)))>((p&q)=(p-(p&((%p>#p)-q)))) ;
TTCT TTCT TTCT TTCT (29.2)

Eqs. 28.2 and 29.2 as rendered are *not* tautologous. This means the use of quantum arithmetic using repeat-until-success circuits is flawed and hence is refuted. We abandoned further analysis here.