

Refutation of negative mass

© Copyright 2019 by Colin James III All rights reserved.

Abstract: We evaluate the two assumptions implying the three attributes associated with negative mass which is *not* tautologous. The conjecture of negative mass is refuted and forms 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 \sim Not, \neg ; + Or, \vee , \cup , \sqcup ; - Not Or; & And, \wedge , \cap , \sqcap , \cdot , \otimes ; \ Not And;
 $>$ Imply, greater than, \rightarrow , \Rightarrow , \mapsto , $>$, \supset , \Rightarrow ; $<$ Not Imply, less than, \in , $<$, \subset , \prec , \neq , \ll , \leq ;
 $=$ Equivalent, \equiv , $:=$, \Leftrightarrow , \leftrightarrow , $\hat{=}$, \approx , \cong ; @ Not Equivalent, \neq , \oplus ;
 $\%$ possibility, for one or some, \exists , \diamond , **M**; # necessity, for every or all, \forall , \square , **L**;
 $(z=z)$ **T** as tautology, \top , ordinal 3; $(z@z)$ **F** as contradiction, \emptyset , Null, \perp , zero;
 $(\%z>\#z)$ **N** as non-contingency, Δ , ordinal 1; $(\%z<\#z)$ **C** as contingency, ∇ , ordinal 2;
 $\sim(y < x)$ ($x \leq y$), ($x \subseteq y$), ($x \sqsubseteq y$); $(A=B)$ ($A\sim B$).
 Note for clarity, we usually distribute quantifiers onto each designated variable.

From: Wang, T. (2019). Negative mass can be positively thought-provoking.
vixra.org/pdf/1910.0259v1.pdf

Abstract Following up ... negative mass by other authors, this article further elaborates on systems of combined mass and negative mass. These configurations can be massless and stationary. ...

3. Assumption and Terminology Based on the aforementioned researches we can make two assumptions regarding the fundamental attributes of negative mass.

Assumption_1: Negative mass can exist. (1.0.1)

Remark 1.1: Eq. 1.1 is not so much an assumption as a conjecture that there exists negative mass; in other words, there is a possibility of negative mass which is testable and falsifiable.

LET $\sim q, q$: mass, negative mass.
 [Note: The free student demo of Meth8/VŁ4 can process one or two variables.]

$\% \sim q = (s=s)$; TTCC TTCC TTCC TTCC (1.0.2)

Assumption_2: Physical laws are the same for negative mass as for mass—i.e. negative mass can be substituted for mass in physical laws (with the same magnitude but opposite sign). (2.0.1)

Remark 2.1: Eq. 2.1 is not so much an assumption of physical laws as a conjecture that the possibility of negative mass implies mass.

$\% \sim q > q$; FFTT FFTT FFTT FFTT (2.0.2)

From Assumption_2, it can be deduced that negative mass generates a gravitational field similar to that of mass, but with opposite sign; negative mass accelerates in the opposite direction as that of the

force which acts on it; there are three kinds of negative masses: inertial, active gravitational, passive gravitational. We can further deduce the following attributes of negative mass. They are important in later arguments and are listed below:

Attribute_1: Negative mass repels negative mass—i.e. negative masses move away from each other. (1.1)

$$\sim q < \sim q ; \quad \mathbf{FFFF \ FFFF \ FFFF \ FFFF} \quad (1.2)$$

Remark 1.2: Eq. 1.2 is contradictory which means it can be explosive in sequents.

Attribute_2: Negative mass repels mass [—i.e. mass moves away from negative]. (2.1)

$$q < \sim q ; \quad \mathbf{FFNN \ FFNN \ FFNN \ FFNN} \quad (2.2)$$

Attribute_3: Mass attracts negative mass—i.e. negative mass moves toward mass. (3.1)

$$\sim q > q ; \quad \mathbf{FFTT \ FFTT \ FFTT \ FFTT} \quad (3.2)$$

Remark 1.0,1.1-3.1: We evaluate the conjecture of “If Assumption_1 and Assumption_2, then Attribute_1, Attribute_2, and Attribute_3” which is Eqs. (1.0.1&2.0.1)>(1.1&2.1&3.1) (4.1)

$$(\sim q \&(\sim q < q)) > ((\sim q < \sim q) \&((q < \sim q) \&(\sim q > q))) ; \quad \mathbf{NNTT \ NNTT \ NNTT \ NNTT} \quad (4.2)$$

Remark 4.2: Eq. 4.2 is *not* tautologous which refutes the negative mass conjecture.